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**INTERTANKO**



**2020 Practical Guide**

**TWENTY 19**

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## Other guidelines

Contractual, commercial, insurance policy, fine and penalty issues are outside the scope of this document. Members are advised to refer to the following Guidelines where relevant:

- INTERTANKO 2020 Bunker Clauses, published in 2018 (Click [here](#))
- INTERTANKO/BIMCO Guidance – contractual issues for scrubber fitted ships (Click [here](#))
- IMO Frequently Asked Questions (FAQs) – the global sulphur limit (Click [here](#))

## 1 Introduction

The decision to implement a sulphur limit of 0.50% m/m globally outside Emission Control Areas (ECAs)<sup>1</sup> on 1 January 2020 was taken by the IMO during its Marine Environment Protection Committee (MEPC) 70th session in October 2016.

To comply with the 2020 requirements, ship owners and ship operators will have to either use compliant fuel oils with a maximum 0.50% sulphur content such as very-low sulphur fuel oil (VLSFO) and marine gas oil (MGO), install an exhaust gas cleaning system (EGCS), also known as a ‘scrubber’, or opt for alternative fuels with very low sulphur content such as methanol and LNG. Decisions on appropriate compliance methods should be made in co-operation with Classification Societies and equipment manufacturers (including boiler and engine manufacturers). Decision-making has to take into consideration the requirements of individual Flag Administrations and Port States, where relevant, as well as each ship’s design configurations, operational characteristics and trading patterns.

Although some ship owners have decided to install scrubbers as a solution, many of their ships may not be able to install them due to various factors including time constraints and capacity constraints at shipyards. Therefore, the large majority of ships must comply with the 1 January 2020 regulations by using compliant fuel oils – consequently, a large part of this document is giving guidance on practical steps for compliance by use of said compliant fuels. Nevertheless, for the sake of completeness, we also address the IMO’s contingency measures for ships when onboard scrubbers experience a malfunction or accidental breakdown.

The priority for INTERTANKO is to provide practical guidance for immediate application by Members in order to keep their fleet compliant at all times, while continually maintaining efficient tanker operations. It will be supported by a number of questions received from Members and the subsequent answers as provided over the course of the past two years. **Most of the FAQs quoted in this document are actual questions received from Members.**

The document also provides information on local and regional requirements, which may be different from the relevant requirements of Annex VI of MARPOL 73/78 Convention.

This document will avoid duplication and repetition of what is already covered by other documents such as INTERTANKO’s 2020 bunker clauses; instead, it will make reference to relevant documents for further viewing. Complex issues will be visualised to maximise understanding of their background, immediate meaning and future implications. Sources of information will be identified following a commonly used citation protocol.

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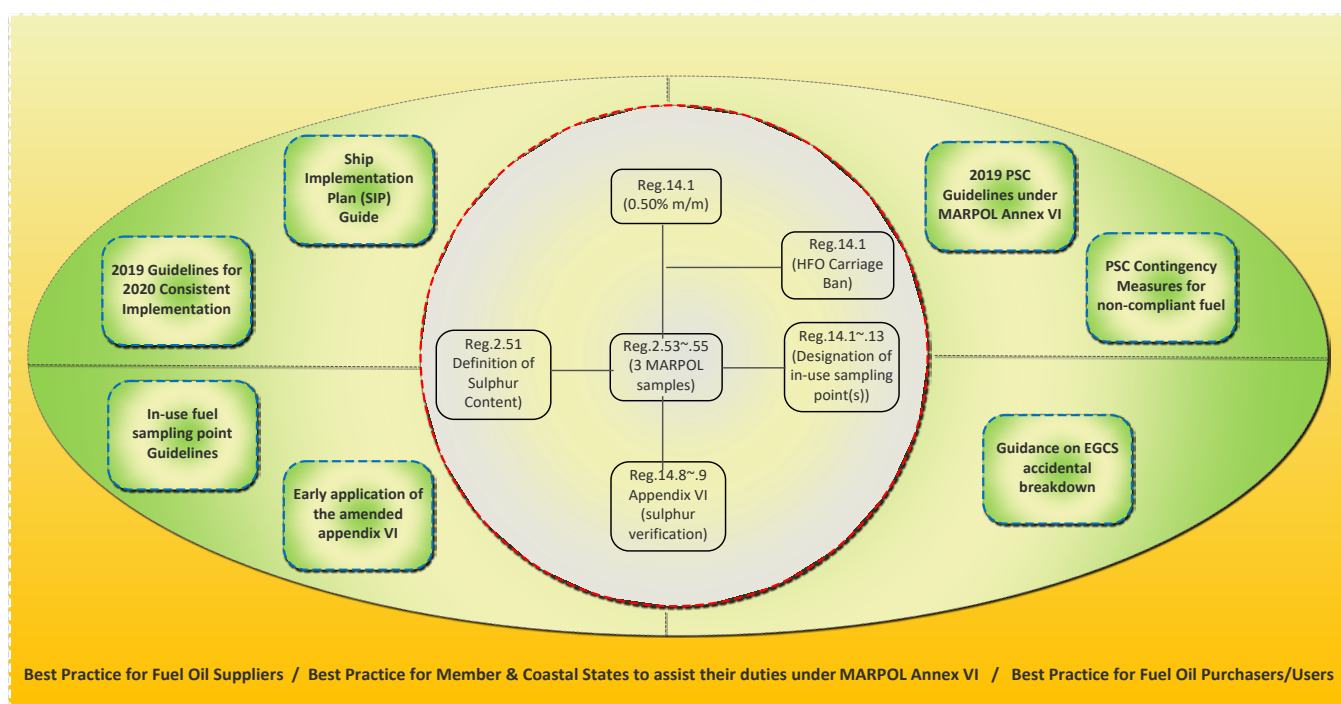
<sup>1</sup> In many publications, “the 0.50% m/m *global sulphur cap*” is used. The phrase of “a global cap” is misleading as “0.50% m/m” is a limit applied globally *outside ECA boundaries*, it is *not* a global limit.

## 2 Mandatory Regulations

IMO Member States, parties to MARPOL Annex VI and industry associations including INTERTANKO have undertaken significant work to deliver high-quality guidelines to assist the shipping and fuel oil industries to successfully meet the 0.50% sulphur cap. This has been undertaken against the backdrop of the evolving regulatory framework and the challenges involved in understanding and communicating these challenges to the IMO across its Member States.

A significant focus will be given to complying with the sulphur content limit of fuel oils being used onboard ships from 1 January 2020. As the industry enters the 2020 regulatory landscape, we encourage Members to monitor the effects of the regulations and share them with INTERTANKO for robust post-implementation reviews over the full length of MARPOL Annex VI and for improvement of this guidance document.

There are 15 IMO instruments relevant to 2020. See a checklist in Appendix 1.



(Figure 1. 2020 Regulatory landscape)

For easy reference, below is a brief overview of all of the relevant regulations and direct links to new amendments to these regulations.

### 2.1 0.50% sulphur content

Regulation 14.1 of MARPOL Annex VI 1: *The sulphur content of any fuel oil used on board ships shall not exceed 0.50% m/m on and after 1 January 2020.*

### 2.2 0.10% sulphur content

Regulation 14.4 of MARPOL Annex VI: *While a ship is operating within an emission control area, the sulphur content of fuel oil used on board that ship shall not exceed 0.10% m/m.*

## 2.3 Prohibition on the carriage of non-compliant fuel oils for combustion purposes for propulsion or operation on board a ship, entry into force date 1 March 2020<sup>2</sup>

Regulation 14.1 of MARPOL Annex VI (Res.MEPC.305(73), adopted on 26 October 2018): *The sulphur content of fuel oil used or carried for use on board a ship shall not exceed 0.50% m/m.* (to see the amended text [click here.](#))

## 2.4 Definition of Sulphur content

Regulation 2.51 of MARPOL Annex VI: *Sulphur content of fuel oil means the concentration of sulphur in a fuel oil, measured in % m/m as tested in accordance with a standard acceptable to the Organization.* (Reference to ISO 8754:2003 Petroleum products – determination of sulphur content –energy-dispersive X-ray fluorescence spectrometry [Click here](#)).

## 2.5 Three (3) statutory samples

Regulations 2.53, 2.54 and 2.55 of MARPOL Annex VI ([click here.](#)):

- 2.53 *“MARPOL delivered sample” means the sample of fuel oil delivered in accordance with regulation 18.8.1 of MARPOL Annex VI.*
- 2.54 *“In-use sample” means the sample of fuel oil in use on a ship.*
- 2.55 *“On board sample” means the sample of fuel oil intended to be used or is in use on board that ship.*

## 2.6 Mandating designation of in-use fuel oil sampling point(s)

Regulations 14.10, 14.11, 14.12 and 14.13 of MARPOL Annex VI ([click here](#))

- 14.10 *. . . sampling point(s) shall be fitted or designated for the purpose of taking representative samples of the fuel oil being used on board the ship taking into account Guidelines developed by the Organization (reference to the 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel oil used on board ships (MEPC.1/Circ.864/Rev.1) [click here](#))*
- 14.11 *For a ship constructed before entry into force of these requirements, the sampling point(s) referred to in paragraph 10 shall be fitted or designated no later than the first renewal survey that occurs 12 months or more after the entry into force of this regulation.*
- 14.12 *...not applicable to a fuel oil service system for a low-flashpoint fuel for combustion purposes.....*
- 14.13 *The competent authority.....shall, as appropriate, utilize the sampling point(s) which is fitted or designated for the purpose of taking representative sample(s) of the fuel oil being used.....without causing the ship to be unduly delayed.*

## 2.7 In-use and on board fuel oil sampling and testing

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<sup>2</sup> In many publications, this regulation is commonly referred to as “HFO (Heavy Fuel Oil) carriage ban” which is misleading. We will see many HFOs that are 0.50% limit compliant on the market. We will use “HSFO (High Sulphur Fuel Oil) carriage ban” instead.

Regulations 14.8 and 14.9 of MARPOL Annex VI

14.8 *If the competent authority of a Party requires the in-use or on board fuel oil sample to be analysed, it shall be done in accordance with the verification procedure set forth in appendix VI to determine whether the fuel oil being used or carried for use on board meets the requirements in paragraph 1 or paragraph 4 of this regulation. The in-use fuel oil sample shall be drawn taking into account the guidelines developed by the Organization (reference to the 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel oil used on board ships (MEPC.1/Circ.864/Rev.1) [click here](#)).*

*The on board fuel oil sample shall be drawn taking into account the guidelines to be developed by the Organization (reference to the Guidelines to be developed prior to entry into force of the provision).*

14.9 *The sample shall be sealed by the representative of the competent authority with a unique means of identification installed in the presence of the ship's representative. The ship shall be given the option of retaining a duplicate.*

For the definition of “in use” and “on board” samples (regulations 2.55 and 2.56) click [here](#).

## **2.8 Fuel verification procedure for MARPOL Annex VI fuel oil samples (Regulation 18.8.2 and appendix VI)**

Regulation 18.8.2 of MARPOL Annex VI

18.8.2 *If a Party requires the representative sample to be analysed, it shall be done in accordance with the verification procedure set forth in appendix VI to determine whether the fuel oil meets the requirements of this Annex.*

Appendix VI of MARPOL Annex VI (for the new appendix VI click [here](#)).

- Part 1 – “MARPOL delivered sample” and “fuel oil suppliers’ samples”<sup>3</sup>
- Part 2 – “In-use sample” and “on board sample”

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<sup>3</sup> The IMO 2019 Guidelines for 2020 Consistent Implementation, section 4.3, control on fuel oil suppliers, states that sampling of fuel oils in bunker barges or shore bunker terminals can be taken and tested in the same manner as MARPOL-delivered fuel oils are tested by the PSC.

### 3 Guidelines

Following the decision to enforce the sulphur limit to 0.50% in 2020 and the adoption of new amendments to MARPOL Annex VI, the IMO has developed a set of guidelines to facilitate a smooth implementation process. This was in response to a strong and unanimous request of the entire industry. In addition, the industry has issued its own guidelines. This Guide provides explanatory notes and guidance on all of these documents.

#### 3.1 IMO Guidelines in support of the regulations

##### 3.1.1 Ship Implementation Plan (SIP)

MEPC.1/Circ.878: *Guidance on the development of the Ship Implementation Plan* was developed by IMO to encourage ships to develop implementation plans to comply with the required sulphur content limit of 0.50% by 1 January 2020. For a copy, click [here](#).

##### 3.1.2 2019 Guidelines for 2020 Consistent Implementation

MEPC.320(74): *2019 Guidelines for Consistent Implementation of the 0.50% m/m sulphur limit under MARPOL Annex VI* – contains a Fuel Non-Availability Report (FONAR) (Click [here](#).)

##### 3.1.3 2019 PSC Guidelines

MEPC.321(74): *2019 Guidelines for PSC under MARPOL Annex VI* (click [here](#)), on application of:

- the HSFO carriage ban from 1 March 2020, and
- provisions concerning electronic record books from 1 October 2020.

##### 3.1.4 In-use fuel oil sampling

Regulation 14.8 and 14.9 of MARPOL Annex VI mandate designation of “in-use” fuel oil sampling point(s) and makes reference to the *2019 Guidelines for Onboard Sampling for the Verification of the Sulphur Content of the Fuel Oil Used On Board Ships* (click [here](#)). It provides a set of conditions for in-use sampling point(s) locations and sample handling.

##### 3.1.5 Early application of the amended appendix VI

MEPC.1/Circ. 882, early application of the amended appendix VI of MARPOL Annex VI – click [here](#).

The amended regulations 18.8.2, 14.8 and appendix VI of MARPOL Annex VI apply from [autumn 2021]. To ensure a globally consistent approach, the IMO’s MEPC issued this Circular inviting Member Governments to apply the amended regulations and appendix VI (sulphur content testing and verification procedure) in advance of their entry into force. This Circular expires once the amended regulations enter into force in [autumn 2021].



### 3.1.6 PSC contingency measures for non-compliant fuel oils

MEPC.1/Circ.881: *Guidance for PSC on contingency measures for addressing non-compliant fuel oil*. Click [here](#). It provides guidance to PSCOs on possible contingency measures in cases where non-compliant fuel oil remains on board a ship.

### 3.1.7 Guidance on EGCS accidental breakdown

MEPC.1/Circ.883: *Guidance on indication of ongoing compliance in the case of the failure of a single monitoring instrument, and recommended actions to take if the Exhaust Gas Cleaning System (EGCS) fails to meet the provisions of the 2015 EGCS Guidelines (MEPC.259(68))*. Click [here](#).

INTERTANKO has summarised and provided some shorter (step-wise) actions ships may consider in accordance with these IMO Guidance (see section 6.2 of this document).

### 3.1.8 Three Best Practices

IMO approved the following three Best Practices (BP) all of which are now referenced in the 2019 IMO Guidelines for 2020 Consistent Implementation.

The two BPs for fuel oil purchasers and users are also referenced in MSC-MEPC.5/Circ.15 “delivery of compliant fuel oil by suppliers”.

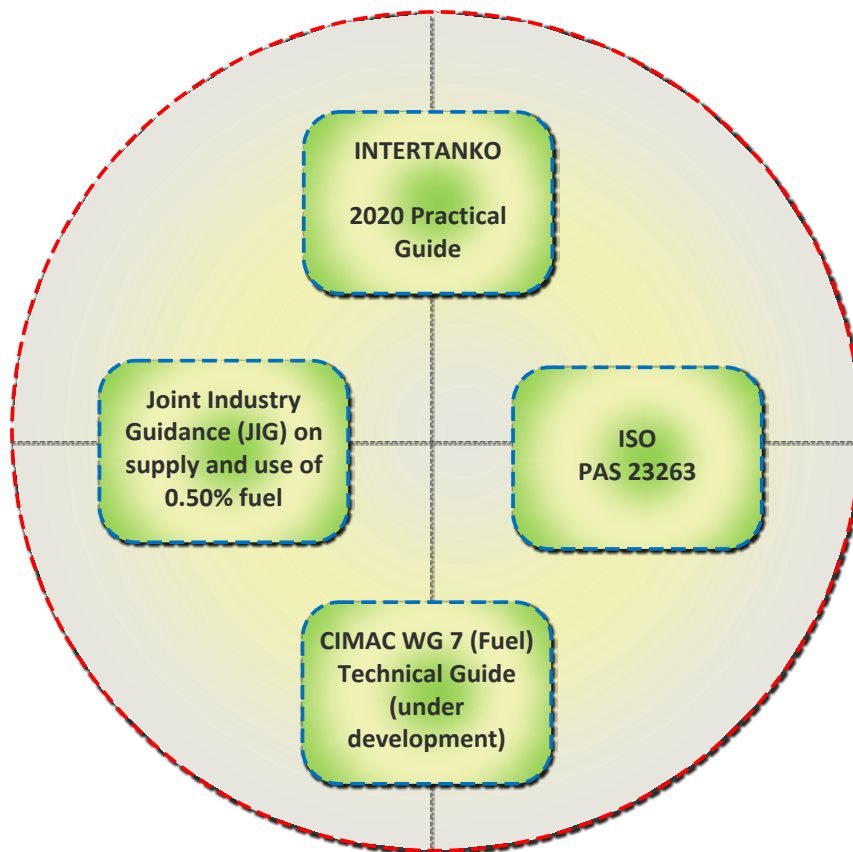
- MEPC.1/Circ.884: *Best Practice for Member/Coastal States to assist their duties under MARPOL Annex VI*. Click [here](#).
- MEPC.1/Circ. 875: *Best Practice for Fuel Oil Purchasers/Users*. Click [here](#).
- MEPC.1/Circ.875/Add.1: *Best Practice for Fuel Oil Suppliers*. Click [here](#).

### 3.1.9 Fuel Oil Suppliers

MSC-MEPC.5/Circ.15: *Delivery of compliant fuel oil by suppliers* (click [here](#)), which states:

- A party to MARPOL Annex VI is required to take all reasonable steps to promote fuel oil availability, and
- Parties undertake to ensure that appropriate authorities designated by them take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the BDN.

### 3.2 Industry Guidelines



(Figure.2, Industry Guidelines)

#### 3.2.1 ISO Publicly Available Specification (PAS) 23263

Following the decision on the 1 January 2020 implementation date at MEPC 70 (Oct 2016), IMO urged the International Organization for Standardization (ISO) to reflect characteristic and requirements of 0.50% m/m fuel oils in the framework of ISO 8217. Due to time constraints and the lack of any typical 0.50% fuels available on the market, ISO, instead of amending ISO 8217, developed ISO Publicly Available Specification (PAS) PAS 23263 (*‘Considerations for fuel suppliers and users regarding marine fuel quality in view of the implementation of maximum 0.50% S in 2020’*).

ISO PAS 23263 was published on 17 September 2019 and can be purchased directly from ISO on the following link: <https://www.iso.org/standard/75113.html>

The PAS addresses key characteristics and properties of 0.50% m/m sulphur content limit compliant fuel oils being placed on the market. However, it should be noted that it does not replace ISO 8217, will not include any new tables, and is to be used as a guidance in support of ISO 8217:2017. The International Council on Combustion Engines (CIMAC) Working Group 7 Fuels has also developed a technical document to address the use of new blended fuel oils. Members are advised to continue to refer to the latest version of ISO 8217 in their bunker procurement. Fuel oil suppliers also need to pay additional attention to the informative annexes and the advice provided in ISO PAS 23263, including the general requirements on fuels to be supplied. Annexes C and D will address stability and commingling of fuel oils respectively.

We will discuss stability and compatibility in more detail in the following section 3.2.2 (JIG).

**Q1. In our bunker procurement contracts in the past, we referred to previous versions of ISO 8217. Why should we use the latest edition of ISO 8217?**

A1. The CIMAC 2017 Guidelines on ISO 8217:2017 detail the benefits of using ISO 8217:2017:

While there are only minor changes to existing characteristics already included in the 2010/2012 edition, additional requirements have been included for distillate fuels to protect against cold operability issues. Hence, adopting the latest revision of the ISO 8217 offers improved quality control and better protection against operational issues while the introduction of Distillate FAME (DF) grades will improve fuel oil availability in some ports. Compared to ISO 8217:2005, this revision carries over the more stringent limits on minimum viscosity for distillate grades, lubricity, cat fines, acid number, H<sub>2</sub>S content and calculated carbon aromaticity index found in the 2010/2012 edition.

In addition, note that the IMO Resolution MSC.465(101) of May 2019 recommends SOLAS Contracting Governments to encourage the widest possible application of the latest edition of relevant industry standards (e.g. ISO 8217) and guidance to enhance the safety of ships related to supply and use of oil fuel.

**Q2. Would ISO 8217 address fuel contamination cases?**

A2. In the 2018 case of contaminated fuels delivered initially in the Houston area and then from other ports, the standard fuel testing according to the ISO 8217:2017 Table 1 and Table 2 requirements run by laboratories had not detected the presence of chemical components unknown to the suppliers and the receivers. The large variety of chemical wastes<sup>4</sup> make it difficult to find a test protocol to detect them.

With respect to this question, the following information is provided:

- PAS 23263 Annex B recommends that in cases where a ship suspects the specific fuel in use on board is the possible cause of operational problems, applicable evidence should be gathered to support further investigation.
- The importance of choosing a quality-oriented supplier cannot be overstated. Both the IMO Best Practice for fuel oil suppliers and the JIG recommend that the supplier should be in possession of quality management systems such as ISO 9001 or equivalent.
- Note that MSC 101 (May 2019) adopted the resolution MSC.465(201) recommending SOLAS Contracting Governments to inform IMO, for transmission to Parties and Member States, of *confirmed* cases where oil fuel suppliers had delivered fuel that jeopardised the safety of ships or personnel; or adversely affected the performance of the machinery<sup>5</sup>.

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<sup>4</sup> Chemical species found were difficult to relate directly to the damage operational issues faced by so many ships, however, the CIMAC WG 7 concluded that some incident had occurred upstream of the supply chain to have caused the operational issues experienced thus failing to have met the ISO 8217 specification Clause 5 requirements.

<sup>5</sup> MSC 101 discussed paper MSC 101/8/2 (INTERTANKO, ICS *et al*) by which INTERTANKO Members' experiences in handling the Houston and Singapore fuel contamination cases were reported.

### 3.2.2 Joint Industry Project (JIP) Guidance (JIG) on 0.50% fuel oils

At MEPC 72 (April 2018), concerns were expressed by IMO Member States and industry organisations about the need to address hitherto unknown new fuel oils. While the IMO urged the ISO to reflect new fuel oils in the framework of ISO 8217, OCIMF and IPIECA (NGOs representing the refining/oil production industry) announced that a Joint Industry Project on Guidance (“Joint Industry Guidance, JIG”) would be initiated as part of a multi-stakeholder exercise to address the impact of new fuel blends or fuel types on fuel and machinery systems, and provide guidance on the handling, storage and use of such fuels. INTERTANKO took part in the Project contributing to the development of a structure and content of the JIG. In particular, the following aspects in the JIG are worthy of note:

- Responsibilities of fuel oil suppliers,
- Information that should be provided by fuel suppliers to allow ship operators to identify and manage potential safety and operational issues associated with certain fuel properties and characteristics,
- Measures that fuel suppliers should take to ensure that the fuel supplied to the ship will not adversely impact on the safe operation of the ship, and
- Expectations on fuel suppliers, including their responsibility to supply fuels that meet the relevant requirements of Regulations 14 and 18.3, as well as any required specifications such as ISO 8217 and PAS 23263 that are safety related (Ref.: MEPC 73/5/17, August 2018).

The JIG would also highlight that the onus is very much on ships’ engineers, who are expected to manage fuel oils according to best practices. This aspect should ensure a balanced approach to address the responsibilities of both fuel oil suppliers and ships and it indicates the substantially increasing demand on fuel suppliers to adopt quality control management, reporting and best practice.

Following over one year’s consultation with all stakeholders, the JIG on “supply and use of max.0.50% sulphur marine fuel” was published in August 2019. Click [here](#).

#### Introductory remarks on JIG

- The JIG does not intend to replace, change, supersede or otherwise depart from international or regional regulations. It is industry guidance, not a standard, and is specifically applicable to 0.50% sulphur content fuel oil.
- Since new fuel oils are blends, the JIG identifies fuel oil suppliers’ responsibilities to:
  - ensure that the final blend, whether produced at a refinery or in a tank terminal, is tested at an accredited (e.g. ISO or equivalent certification) laboratory.
  - provide specified information (as outlined in JIG) allowing ship operators to identify and manage potential safety and operational issues associated with certain fuel properties.
- JIG reads that bunker suppliers should have a Certificate of Quality (COQ) for the fuel oil supplied. Where the COQ is requested or provided, the fuel oil parameters listed in Table 1 or Table 2 of ISO 8217:2017 should be included in the COQ. Therefore, there are three documents that ships can reference to determine fuel oil characteristics:
  - Bunker Delivery Note (BDN),
  - Material Safety Data Sheets (MSDS), and
  - A full and valid Certificate of Quality (COQ).

The COQ should be valid for the batch of fuel that is being provided. It should not be generic or an old one providing historic data. Information about viscosity, density, sulphur content and cold flow properties are necessary as a base minimum to ensure the engineers have a good idea of the fuel oil that the ship is

about to receive. Note that ISO 8217 also provides limits and thus indicative data should be provided on fuel oil chemical components such as H<sub>2</sub>S and heavy metals.

### Important messages from the JIG

- The available space for new bunkers to be loaded should be taken as the capacity of the empty tanks – hence avoiding comingling on loading to the extent possible.
- Be prepared for much greater variability in the characteristics of acceptable quality fuel oils, particularly in terms of on board temperature requirements - have the ability to duly react.
- If a new fuel oil differs significantly from fuel oils used to date, particularly in terms of lower viscosity, try it out for starting, restarting, load pick up and response with a hot engine in a safe location to check that fuel oil injection performance is as required – not deferring to find out while manoeuvring.

### **Stability and compatibility of blended fuel oils** (added on 27 Sept 2019 after publication of ISO PAS 23263)

A major industry concern is the compatibility between different 0.50% sulphur fuels expected to come on the market. The 2019 IMO Guidelines on Consistent Implementation 2020 reads as follows:

#### **3.3 Residual fuels**

##### *3.3.1 Stability and compatibility*

3.3.1.1 It is essential to distinguish between "Fuel stability" within a single batch of fuel and "Fuel compatibility" between different fuel batches.

3.3.1.2 Regarding stability: the fuel shall be stable and homogeneous at delivery and it is the responsibility of the fuel oil blenders and suppliers to ensure this.

3.3.1.3 A wide range of blends of refined products will be used to make the new 0.50% sulphur fuels, and the stability and compatibility of the blends will be an important concern for shipowners/operators. Unstable fuels can separate on their own and incompatible ones can do so when mixed in a single bunker tank, forming sludge that can block filters and ultimately cause engine failures.

3.3.1.4 It is recommended that ships have a comingling procedure. The procedure should primarily aim to ensure new bunkers are loaded into empty tanks to the extent possible. In the event that a ship finds itself possibly having to commingle a new bunker with bunkers already on board, then it is important that the ship determines the compatibility between the two said bunkers before comingling.

3.3.1.5 The reference test method shall be the total potential sediment test in accordance with ISO 10307-2:2009.

Fig.1 and Fig.2 of Section 3 of the JIG provide two example steps that could be followed to minimise compatibility risks during bunker delivery. Note: Any successful strategy to avoid compatibility issues requires close communication with the bunker supplier. It should be a joint strategy. Hence, page 37 of the JIG has the following:

From the supplier's perspective, if the ship is unable to take delivery of the nominated fuel, either in full or in part, this can create scheduling/operational problems for barge operators, potentially incurring costs which can be substantial. Thus, effective and advanced fuel order management and fuel consumption planning to ensure that products are received into segregated tankage to avoid commingling are vital to minimize the risk of such situations arising.

If the ship is unable to receive a bunker stem into an empty tank, and commingling is unavoidable, the risk of incompatibility will be a concern. This could be resolved by the ship sending a sample of the fuel to be commingled, prior to arriving at the port, for compatibility testing to ensure that it is compatible with the fuel that is scheduled to be delivered. If the test indicates incompatibility, the scheduled delivery can be cancelled in advance of the ship's arrival in port.

Note that there is a third option to consider:

Alternatively agree with the supplier/ charterer, barge that the bunkers are delivered as two parcels; one for the empty tanks and the second only to be accepted if the new fuel is compatible with the old bunkers for which it is to be comingled with.

It is worth understanding details on compatibility versus the ratio of comingling of two incompatible or less compatible fuel oils.

<sup>6</sup>In principle, there should be no problem for a 90% to 10% mix. Such a mix, or even an 80:20 mix, may need minor onboard handling adjustments. So, what is the best action the ship crew should undertake?

- ▶ Regarding potential incompatibility of fuels:
  - Compatibility can be defined as a measure of how stable a mixture of two or more different components in a given ratio is. A tendency to form organic sediment when commingling different fuel oils, leading to filter clogging, purification problems etc.
  - Suppliers cannot guarantee compatibility without testing.
    - Apply best practice of complete segregation or controlled commingling
    - Experience suggests that an ASTM D4740 "spot test" is not always reliable.
  - CONCAWE sponsored the ISO/TC 28/SC 4/WG6 study to evaluate testing methodologies to obtain indication about the degree of compatibility between marine fuels without having to mix the fuels. According to the study, parameters related to the solvency power of the fuel oil matrix and the stability of the asphaltenes obtained through these test methods can be used to obtain an indication on the degree of compatibility of fuel oils. It requires the fuel oils to be tested with the same test method. The test methods are typical laboratory tests and equipment is currently however not yet widely available.

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<sup>6</sup> About the information about the CONCAWE/ISO study on 0.50% fuel mixing tests, the author of this Guide sought confirmation from the ISO WG Chairman before printing (25 Sept 2019).

- ▶ Regarding stability,
  - Fuels shall be stable and meet total sediment aged requirement of 0,10 % max. In the ISO PAS, the recommendation is included to meet TSP of 0.10% max.
    - TSA (total sediment accelerated) versus TSP ( total sediment potential)
      - TSA measures the total sediment by filtration after dilution of a sample of residual fuel with a paraffinic solvent under carefully controlled conditions, followed by storage for 1h at 100 °C.
      - TSP measures the sediment by filtration after ageing a sample of residual fuel for 24 h at 100 °C under prescribed conditions.
  - It has been observed in the study that some fuels may have a TSA < 0.10m% but when using the referee method have a TSP of > 0.10m%. Hence the recommendation to test for TSP.
  - Stability is defined as resistance of the fuel to precipitate asphaltenic sludge
    - Asphaltenes: high molecular weight aromatic molecules kept in colloidal suspension
    - Aromatics in the fuel prevent asphaltenes to agglomerate & precipitate
    - Stability can be upset by :
      - Thermal stress
      - Adding paraffinic material/reducing aromatics
      - Mixing with other fuel

The table below is the compatibility matrix based on 1 of the 3 additional test methods evaluated during the ISO/CONCAWE study.

According to the study, it was found that:

- Whatever the mixing ratio, a large percentage of mixed fuels were found to be compatible (approx. 65-69% of a fuels set, including VLSFO, LSFO, HSFO for which individual test parameters were available and TSP ≤ 0.10m%)

Based on this, Members are advised as follows:

- The ship's crew is recommended that the true ratio, instead of a typical 50:50 ratio, in which two fuels will be comingled with, if known, should be used for preparing a more representative sample for the compatibility check; and
- Refer to the compatibility strategy developed by the ISO PAS 23263 WG and the Joint Industry Project (see Appendix 3-1 and 3-2 of this Guide. Page 38 and 39 of the JIG, Fig.1 and Fig.2). Ships should seek information on new fuel oils from the fuel supplier so that they can make an informed decision on a possible rate of mixing two different fuel batches. Note that para.3.1.8 of the IMO's Guidelines on 2020 consistent implementation reads as follows:

### 3. Impact on fuel and machinery systems

3.1.8 Knowing the fuel properties before bunkering will assist in taking the necessary precautions where and when necessary. If the ship is heading towards colder climates and the cold flow properties are inferior, the fuel may be:

- .1 either used before entering cold regions, or
- .2 used with suitable heating arrangement, as mentioned above.

**Q1. Is blending during delivery allowed or not?**

A3. The JIG has a provision similar to the IMO Best Practice for Fuel Oil Suppliers stating that “blending during delivery should be avoided”.

The key message from the IMO Best Practice is to avoid a non-homogeneous product. Unless the fuel makers follow a strictly controlled quality management system, it would be difficult for them to ensure that the end produce is homogeneous. The JIG therefore recommends that fuel oil suppliers should have a quality management system (ISO 9001 or equivalent). The recommendation contained in the JIG makes it prohibitively difficult for the suppliers to justify blending on board a bunker barge during physical bunker delivery<sup>7</sup>.

In addition, in-line blending during fuel delivery to ships makes it impossible for bunker suppliers to issue a compliant BDN since the characteristics of the blend will be unknown and unproven until tested.

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<sup>7</sup> Refer to page 26, section 2 of the Joint Industry Guidance (JIG).



## 4 Essentials of Revised MARPOL Annex VI

### 4.1 HSFO Carriage Ban

In order to make it easier to detect possible violations of using non-complaint fuels on high seas, the IMO introduced a new regulation banning the carriage of non-compliant fuel oil for combustion purposes-unless the ship has a scrubber fitted, effective from 1 March 2020. Consequently, it is prohibitive to supply fuel oils (for use as bunkers) with a sulphur content exceeding 0.50% m/m to ships without a scrubber.

#### FAQs: HSFO carriage ban

**Q1. Because the HSFO carriage ban becomes effective from 1 March 2020, am I allowed to use HSFOs between 1 January 2020 and 29 February 2020?**

A1. No. The enforcement of the 0.50% sulphur limit applies from 1 January 2020. The two-month time gap was an inevitable consequence of IMO's legislative process and it refers to "carriage" only, not to "use". HSFOs left-over may be carried onboard during this period but shall **not be used** for combustion purposes.

**Q2: With the HSFO carriage ban, how do PSCOs enforce this new regulation?**

A2. Two ways.

First, a document review. The ship's BDNs and engine log books.  
In addition, the IAPP Certificate, supplement 2.3.3 which reads:

*2.3.3 For a ship without an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6, the sulphur content of fuel oil carried for use on board the ship shall not exceed 0.50% m/m as documented by bunker delivery notes.....□*

Second, PSCOs may ask for an on-board fuel oil sample to be taken and tested to check whether the fuel oil in storage tanks or associated lines meet the 0.50% limit requirement or not.

**Q3. Shall our ship's International Air Pollution Prevention Certificate (IAPP) Certificate be re-issued before 2020 with the above new paragraph 2.3.3 of the supplement?**

A3. That depends upon the Flag State. At MEPC 74, the International Association of Classification Societies (IACS) informed the Committee that "pursuant to paragraph 3.2 of MSC-MEPC.5/Circ.6, the (IAPP) certificate was not required to be renewed until the renewal survey and Parties to MARPOL Annex VI should notify IACS members if they wanted to have certificates issued earlier (Ref. MEPC 74/18/para.5.28)".

**Q4. Does the HSFO carriage ban apply to emergency equipment such as emergency fire pump, emergency generator, lifeboat engine and rescue boat engine?**

A4. Yes. MEPC 74 approved a Unified Interpretation (UI) on this question as follows:

*Interpretation: Regulation 14.1 of MARPOL Annex VI for the prohibition on carriage of non-compliant fuel oil should be applied to the fuel oil of emergency equipment.*

Note that, because this is a carriage ban regulation, non-compliant fuel oils should not even be stored in the tanks of such emergency equipment. The regulation is clear: it is not to be carried and it is not to be used.

## 4.2 MARPOL samples

### 4.2.1 Bunker Delivery Note (BDN)

MEPC 71 (July 2017) adopted amendments to the format and content of BDN relating to:

- the supply of marine fuel oil to ships which have fitted alternative mechanisms (e.g. EGCS), and
- a declaration to be signed, certified and completed by the supplier.

These amendments (Res.MEPC.286(71), click [here](#)) entered into force on 1 January 2019. Note that appendix V of MARPOL Annex VI contains information to be included in the BDN.

Bunker suppliers may also be required to record additional information in the BDN to comply with local laws/regulations at port of delivery.

The Joint Industry Guide (JIG) indicates that enough information may be provided, so that the ship's crew are able to safely and effectively deal with the fuel in respect of storage, handling, treatment and use of the fuel on board. Note that a sample of the new fuel will be required to be provided to the ship before loading to carry out compatibility checks with old the fuel that is stored on board the ship.

It also recommends that the supplier must state the *actual* sulphur content in accordance with MARPOL Annex VI/Appendix V, rather than advising that the sulphur constitutes < X % m/m. That specific value will enable the crew to manage the fuel grade switching when entering an ECA and to monitor the effectiveness of any abatement technology being used on board. Ship owners are advised to insist on the inclusion of such a clause in their bunker contracts. Ship crews are advised to insist that such a clause and the provisions of MARPOL Annex VI are respected.

For all fuel oils, it is important to study the BDN and Fuel Analysis Report carefully. The original equipment manufacturers should always be contacted if there is any question as to whether the fuels will cause problems for the burners/boilers.

The BDN must be maintained onboard the vessel for three (3) years. PSCOs have the authority to board the vessel to inspect the BDN as part of their initial inspection to verify that the fuel complies with global and local regulations.

### 4.2.2 MARPOL delivered fuel oil sample

Previously commonly known as "MARPOL sample". Refer to a schematic diagram provided in Figure 3.

As the scope of impact and enforcement activities captured by the regulatory framework expands, a significant focus will be on how and where a MARPOL delivered sample is drawn. We expect that the MARPOL delivered sample will begin to play a key role in supporting PSCs to build evidenced based determinations against the suppliers.

It forms the basis of verifying compliance of fuel oils delivered by suppliers as well as confirming which party is responsible for exceedance of the sulphur limit of the ship's on board and/or in-use fuel oils. Therefore, it is important to understand how and where a MARPOL delivered fuel oil sample should be taken.

There are many explanatory notes about the MARPOL delivered fuel oil sample, sometimes conflicting each other<sup>8</sup>; this is partly due to the way in which Regulation 18.8.1 of MARPOL Annex VI is formulated. It reads:

*The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered taking into account guidelines developed by the Organization.*

Many believe this text implies that a representative sample (MARPOL delivered sample) is provided by the supplier together with the BDN. However, the IMO's 2009 sampling Guidelines (Res. MEPC.182(59)), which is foot-noted to the regulation, state that the MARPOL delivered fuel oil sample should be taken at the receiving ship's inlet bunker manifold. The IMO Best Practice for Fuel Oil Suppliers reads that:

*Suppliers should follow MEPC.182(59) which states that the supplier should provide a MARPOL sample drawn by the supplier's representative at the receiving ship's bunker inlet manifold.*

The sampling should be undertaken in the presence of both the supplier and the ship's representative. If the physical supplier refuses to come onboard the receiving ship, this refusal is not a valid reason to move the sampling point. If for safety or practical reasons the supplier's representative cannot move between the barge and the receiving ship to be physically present, the process may be observed visually by alternative means.

ISO 8217:2017, Chapter 3 (application) states that *this Standard specifies the required properties for fuels at the time and place of custody transfer*. The IMO's Best Practice for fuel oil suppliers, section 3.1.1 (goals / objectives) states "*bunkers delivered at the point of custody, which can be the receiving ship's rail or manifold, to meet the buyer's ordered specifications*". SS600 issued by the Singapore Maritime Port Authority has a similar provision (Figure 3 below).

Hence, three key points:

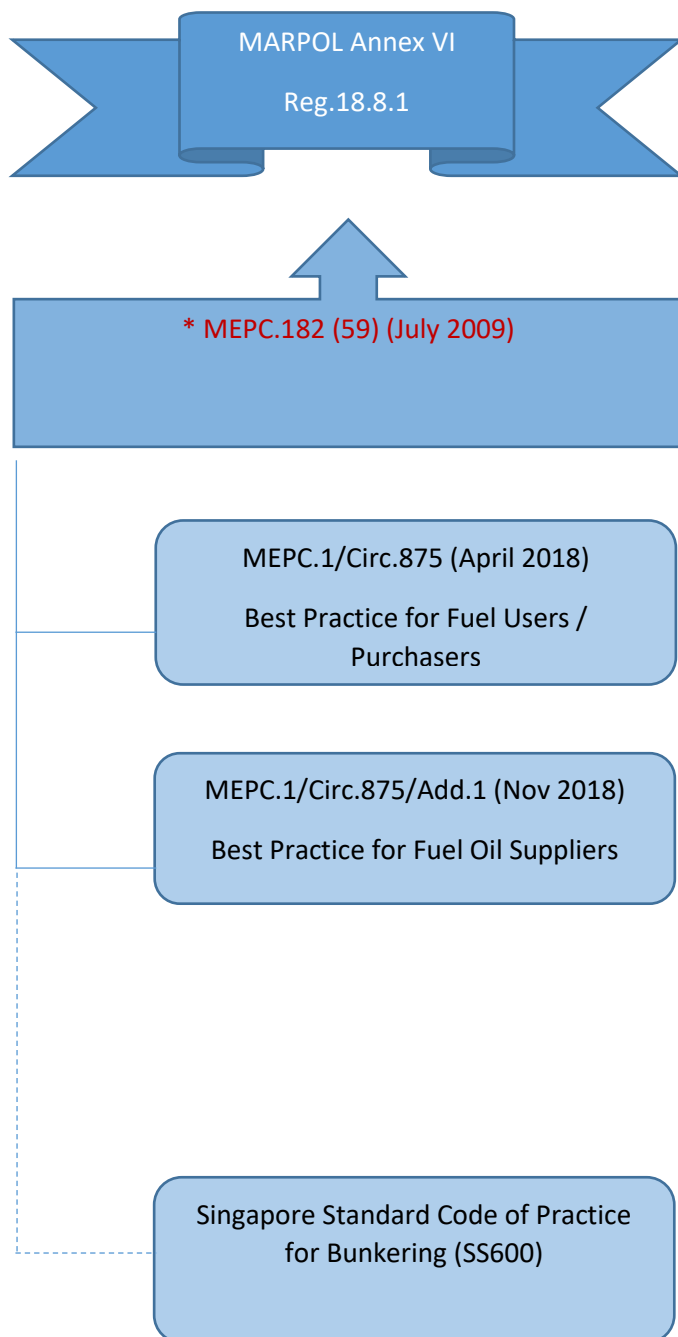
- the sampling is taken at the receiving ship's manifold,
- it is witnessed (supervised), and
- agreed by both parties.

INTERTANKO has highlighted concerns on numerous occasions regarding the rigour with which the MARPOL delivered fuel oil sample should be taken and the lack of wide understanding across the industry. For Members' preparation of 2020, it is important to establish the best practice of taking the MARPOL delivered fuel oil sample in order to ensure consistent verification of compliance.

Figure 3 below provides a schematic diagram with MEPC.182(59) in its pivotal reference point.

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<sup>8</sup> Para.8.5 of 2014 CIMAC Guidelines on interpretation of marine fuel analysis reads that under the Annex VI, the MARPOL sample, *provided by the supplier*, is the physical representation of the delivery.



18.8.1 The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered taking into account guidelines developed by the Organization.\*

6. For the purpose of these Guidelines, a sample of the fuel delivered to the ship **should** be obtained *at the receiving ship's inlet bunker manifold*.

4.7.6 A representative fuel oil sample should be collected during the bunkering process.  
Guidelines for collecting the MARPOL sample are provided in resolution MEPC.182(59).

9.11 Suppliers should follow MEPC.182(59) which states that the supplier should provide a MARPOL sample drawn by the supplier's representative at the receiving ship's bunker inlet manifold.

9.12 If for safety or practical reasons the supplier's representative cannot move between the barge and the receiving ship to be physically present, the process may be observed visually by alternative means.

5.1.5.1 Custody transfer<sup>1</sup> sampling shall apply to all bunker deliveries based on FOB terms in the Port of Singapore. The custody transfer sample shall be taken at the manifold of the vessel. Should disputes arise, the custody transfer sample shall be the official sample for ascertaining the quality of bunkers delivered.

5.1.5.2: if there are physical limitations or constraints at the bunker manifold of the vessel which make custody transfer sampling at that point impossible or impractical, ..may be.....

**1** ISO 8217:2017, Chapter 3 (application) states that this Standard specifies the required properties for fuels at the time and place of custody transfer.

The IMO's Best Practice for fuel oil suppliers, section 3.1.1 (goals / objectives) states "bunkers delivered at the point of custody, which can be the receiving ship's rail or manifold, to meet the buyer's ordered specifications".

(Figure 3. MARPOL delivered sample, SS600 and ISO 8217)



**Q1. What shall we do if the MARPOL sample is taken at the bunker barge?**

A1. If the weather conditions, regional security regulations or terminal policy do not allow the supplier's representative to come to the receiving ship, this should have been notified in advance of bunkering and both parties should agree to a course of action. The sampling process should be witnessed by both parties. If the sampling does not follow Res.MEPC.182(59) ("2009 IMO sampling Guidelines"), the ship is recommended to issue a Note of Protest and report it to the Flag Administration, take a fuel sample at the ship's manifold and keep it for future reference. To ensure regulatory and commercial acceptance of the sample, it is always advisable to have both parties witness<sup>9</sup> the MARPOL delivered fuel oil sample being taken.

**Q2. When will PSCOs inspect the BDN?**

A2. Always. The BDN is a statutory requirement. Having no BDN or an invalid BDN is a breach of the regulations. The 2019 PSC Guidelines under MARPOL Annex VI encourages PSCOs to check the BDNs at their initial inspections. The 2019 IMO Best Practice for Member/Coastal States (MEPC.1/Circ.884) recommends as follows:

Regulation 18.7: Best practices for inspection of bunker delivery notes by competent authorities:

- .1 Member States/port States should verify the availability of bunker delivery notes on board and their compliance with MARPOL Annex VI, appendix V during all port State control inspections.

**4.2.3 MARPOL in use sample**

Regulation 2.55 defines MARPOL in-use sample as the sample of fuel oil the ship uses at the time of sampling. Regulations 14.10, 14.11 and 14.13 require that sampling point(s) shall be fitted or designated for the purpose of taking representative samples of the fuel oil being used on board the ship in accordance with the *IMO 2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel oil used on board ships* (MEPC.1/Circ.864/Rev.1).

The implementation scheme is:

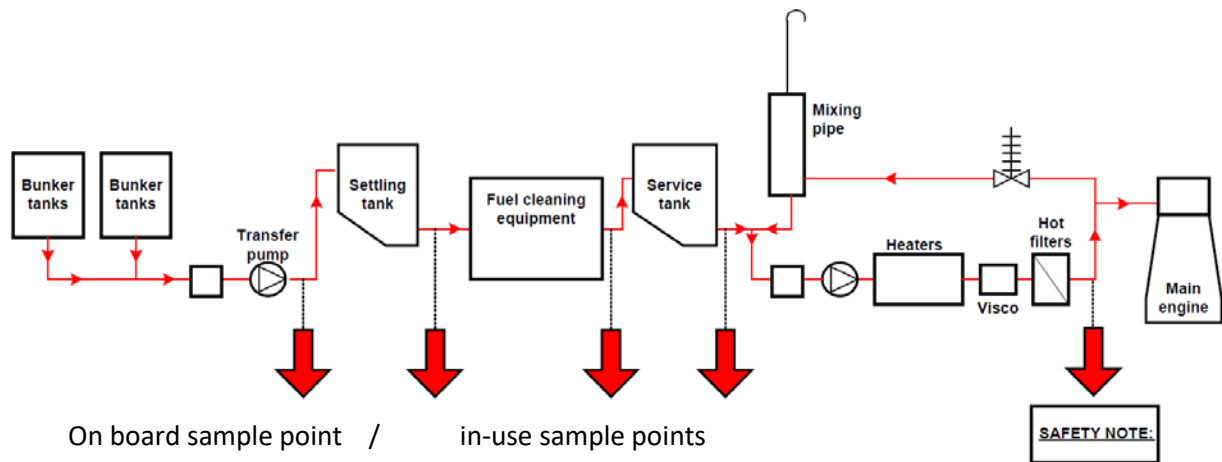
- For new ships: from the entry into force date.
- For existing ships (ships constructed before entry into force of these requirements): the in-use sampling point(s) shall be fitted or designated no later than the first renewal survey that occurs 12 months or more after the entry into force ([autumn 2021]) of this regulation.

The 2019 *Guidelines for on board sampling for the verification of the sulphur content of the fuel used on board ships* were initially developed for in-use sample only. At the time of such developments, it was recognised that many ships had been already fitted with sampling points in their fuel treatment lines according to voluntary guidelines provided by Classification Societies. For this reason, the words "designated" and "confirmed" were

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<sup>9</sup> Without all parties witnessing the sample has no validity and will be invalidated in the event of a dispute. BDN needs the MARPOL sample number on it.

used. The following figure shows typical sampling points installed, e.g. before and after centrifuges and after the service tank.



(Figure 4. Source: CIMAC Recommendation No.25, Fig.8.4<sup>10</sup>)

Location of sampling point(s) in the fuel system should be decided bearing in mind that such point(s) causes no interruption to the normal operation of the ship.

The 2019 Guidelines were built on the widely shared agreement that due to the risk of fire and explosion in a high-temperature environment and the high pressure of fuel oil passing through the fuel conditioning units, the sampling location has to be carefully considered to prevent and contain any leakage.

INTERTANKO has received a number of questions from Members as to whether such fitting or designation would need approval by Classification Societies and how many sampling points shall be fitted or designated. Our general response is:

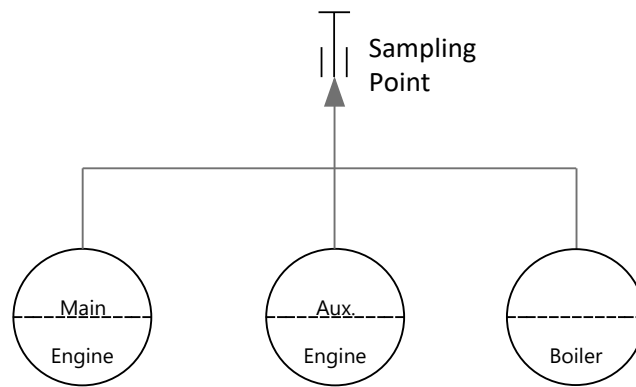
- Members are advised to consult the ship's Classification Society.
- The above referenced regulations do not specify nor require a plan approval<sup>11</sup>.
- Paragraph 2 of the 2019 Guidelines reads as follows:
  - "The number and location of designated fuel oil sampling points should be confirmed by the Administration following consideration of possible fuel oil cross-contamination and service tank arrangements."
- The term "confirmed" refers to the role of the Administration/Recognised Organisation (RO) in relation to ships' designated sampling points.
- Concerning the ship's drawings that need to identify the number and location of such points, paragraph 2.5 of the 2019 Guidelines reads:
  - "be clearly marked for easy identification and described in either the piping diagram or other relevant documents;"

As an indicative example, the 2019 Guidelines provides flexibility in the following case in terms of where and how many sampling points need to be designated. In case a fuel supply line (pipe) is provided from Fuel Oil (FO) service tank to M/E, Aux/Eng and Boiler separately and individually, a single sampling point would not be feasible.

In cases where a common fuel supply line (pipe) from FO service tank is provided to M/E, Aux/Eng and Boiler, which is now an increasing trend, a single sampling point is recommended.

<sup>10</sup> We are informed that this sample drawing may be revised by a CIMAC WG and it will be published by 1Q-2020.

<sup>11</sup> PPR 6/8, Annex 5, page 1: ISWG-AP 1 (Intersessional Working Group on Air Pollution, July 2018) agreed that the Administration is not expected to give approval/agreement.



(Figure 5, a single sampling point)

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### FAQs: in-use sample

**Q1. From which point in time has the ship been obligated to designate or fit sampling point(s) covered by the regulations - from the entry into force date or from the date of issuance of the 2019 sampling Guidelines?**

A1. The regulations do have an implementation scheme applicable to existing ships. However, it should be noted that PSCOs have the right and obligation to enforce the regulations from 1 January 2020 and may require an in-use fuel oil sample to be drawn from the ship's fuel treatment line to check whether the ship is burning the 0.50% limit compliant fuel in accordance with Regulation 14.1 of MARPOL Annex VI. We would recommend that:

- If the ship has already been fitted with such sampling points in accordance with Class recommendations, consult the attending surveyor and discuss whether existing point(s) can be designated for the purpose of complying with the regulation at the next periodical IAPP survey.
- If the ship has no sampling points, make arrangements to fit sampling point(s) at the next occurring dry-dock opportunity in consultation with the ship's Chief Engineer.
- There are no changes to be made to the IAPP Certificate. The attending Surveyor may stamp drawings of pipings or other items, and issue a survey report accordingly. Keep this report as proof of compliance actions and present it when necessary to PSCOs or vetting inspectors for their document review.

#### 4.2.4 Onboard fuel oil sample

Regulation 2.55 of MARPOL Annex VI defines on board sample as *"the sample of fuel oil intended to be used on board that ship"*.

Regulation 14 of MARPOL Annex VI stipulates that if the competent authority of a Party to MARPOL Annex VI requires the *in-use* or *on board* fuel oil samples to be analysed, it shall be done in accordance with the verification procedures set forth in appendix VI. It goes on to state that the on board fuel oil sample shall be drawn taking into account the guidelines to be developed by the Organization (IMO).

While these guidelines are yet to materialise, they are in development and due in time for the [autumn 2021] entry into force date of the amended regulation.

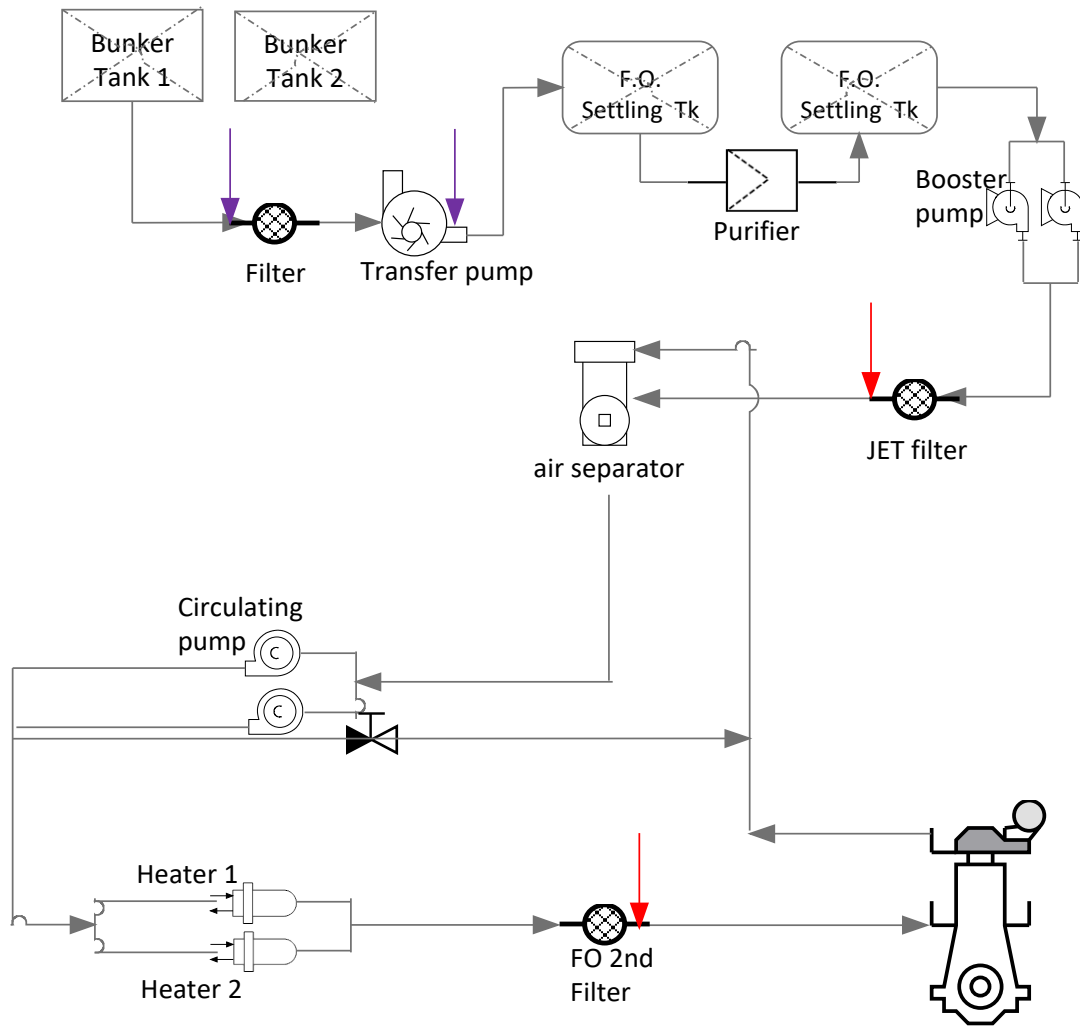
Therefore, to enable enforcement of the prohibition of carriage of non-compliant fuel oil for combustion purposes, associated sampling Guidelines will be developed at the IMO in the near future. When the IMO Guidance is completed, we will add it to this document.

Two methods are foreseen from the proposal from IMarEST(MEPC 74/10/2) and INTERTANKO’s Special Reports on PPR 6 and MEPC 74.

	Methods	Details
1	Sampling from fuel storage tanks	<p>It was discussed that the ship could take a sample safely if appropriate procedures are implemented. INTERTANKO raised concerns on this method during preliminary discussions at IMO. Difficult to ensure homogeneity of fuel oil samples. ISO 3170 will be a reference document. Industry or IMO guidance will be developed accordingly.</p> <p>External service experts with special equipment to be deployed.</p>
2	Sampling from downstream of pump	<p>INTERTANKO recommended this method as an option in our Special Reports, as long as it represents fuel oils not in-use but stored for combustion purposes. It is post-transfer drip samples.</p> <p>A sample could be drawn from a transfer pump (bleed valve) with a suitable sampling connection.</p>

In the absence of specific IMO guidelines at present, INTERTANKO recommends that Members consider installing and designating their own on board sample points that will best provide a sample of fuel from any given tank i.e. post transfer pump (Fig.6 below). This earlier action beforehand would facilitate any potential request for the same.





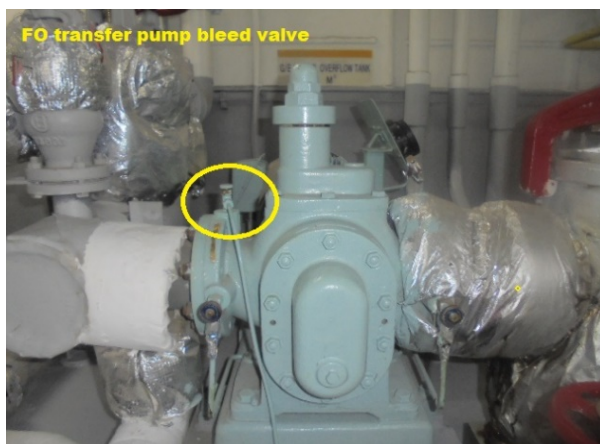
Note (Bleed/sample valve locations)

▼ : on board sampling points

▼ : in-use sampling points

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(sampling point examples<sup>12</sup>)



(Figure 6, Transfer pump bleed valve, by courtesy of MOL Tankship Europe, July 2019)

<sup>12</sup> Note that these figures are for demonstration purpose only.

**Q1. How many on board sampling points are needed? Do they need Class approval?**

A1. The regulation does not specify how many. Each case is different on a ship-by-ship basis. Unlike in-use fuel oil sampling point(s), there is no mandatory designation requirement applicable to on board sampling points hence no Class approval nor confirmation is needed at this stage. Class approval will be needed however, if the ship is installing/modifying a new device into the fuel system. We would recommend that without having to wait for the IMO's on board sampling Guidelines, Members consult the ship's Chief Engineers and check the most suitable sampling location, taking into account the above suggestions. We wouldn't recommend a direct sample being taken from fuel storage tanks.

**4.3 Testing and verification procedure of the sulphur content**

Appendix VI of MARPOL Annex VI, in support of Regulation 14.1 of MARPOL Annex VI, provides a set of sample testing and verification procedures for use by Administrations. In this appendix, it is stated in a footnote that the sulphur content of fuel oil should be determined according to ISO 8754.

At the time of bunkering, the ship relies on the sulphur content value stated by the fuel supplier on the BDN. PSCOs would require testing and verification of a MARPOL-delivered sample, on board sample and/or in-use sample, if their initial inspection raises reasonable cause for concern relating to possible non-compliance with Regulation 14.1 (sulphur limit and HSFO carriage ban).

Many ship owners have made a common practice to draw the ship's own samples of the fuel oil delivered to their ships. This sampling is done in compliance with the IMO Guidance for MARPOL delivered fuel oil sampling. These samples are tested by an accredited test laboratory in order to verify the regulatory sulphur limit and quality of the delivered fuel oil against the specifications to which the fuel oil was procured.

The verification procedure stipulated in appendix VI of MARPOL Annex VI, a statutory requirement, has not been widely used in practice – this is partly because the procedure involves more than one test laboratory. Consequently, the industry, with co-sponsorship from IMO Member States, addressed verification issues and mechanisms necessary to ensure a level playing field in the commercial landscape including efforts to ensure that compliant fuel is delivered to the ship.

In 2017, INTERTANKO Members provided multiple reports on PSC enforcement actions as a result of verifications on the 0.10% ECA limit fuels which were due to incorrect understanding and practice of the regulations. INTERTANKO proposed amendments to appendix VI which were approved<sup>13</sup> at MEPC 74. The amended appendix VI was built on the following logic:

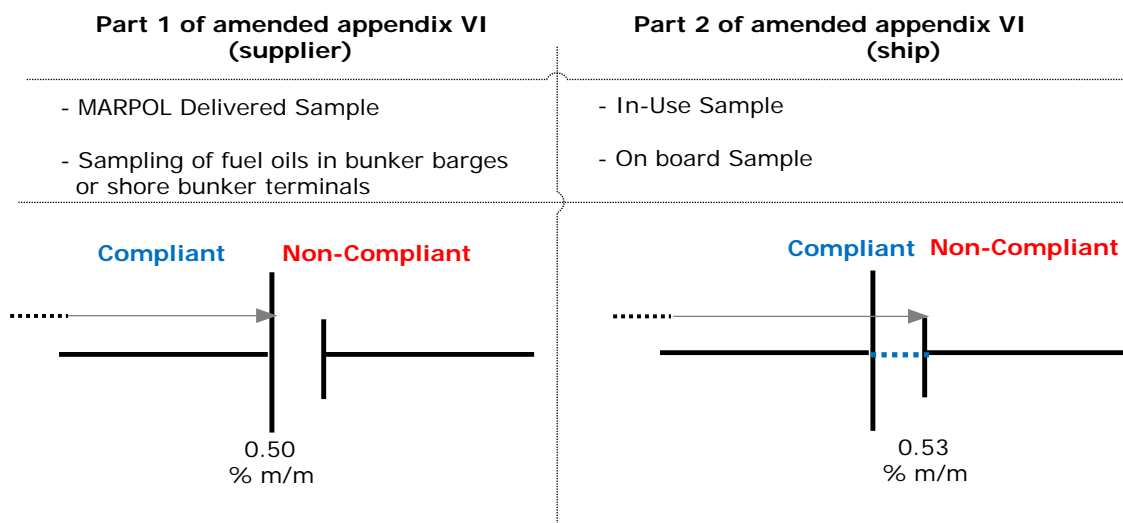
- The new definition of “sulphur content” in Regulation 2.51 refers to ISO 8754.
- ISO 8217 specifies that the reference test method for sulphur content shall be ISO 8754.
- Testing fuel oil with ISO 8754 entails the application of repeatability (r) and reproducibility (R).
- ISO 8754 refers to ISO 4259 (determination and application of precision of data in relation to methods of test).
- ISO 4259 provides a statistical 95% confidence formula (in other words, Confidence Interval (CI)), including 0.59R method.

ISO 4259 provides general information to allow the supplier or the recipient to judge the quality of a product with regard to the specification when a single result is available. It specifies testing margins at both the supplier and

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<sup>13</sup> MEPC 75 (March/April 2020) is expected to adopt the amended appendix VI for entry into force in [autumn 2021].

recipient ends, respectively. When following the testing methods of ISO 4259, in order to prevent the test result of the sample from exceeding 0.50% m/m, the sulphur content in the fuel oil to be delivered, as determined by the supplier according to ISO 8754, must not exceed 0.47% m/m.



Para.2.6:

Old: The results obtained from this verification procedure shall be final (PPR 6).

Now: The final results obtained from this verification procedure shall be evaluated by the competent authority (MEPC 74).

Para.4.6:

Old: The results obtained from this verification procedure shall be final (PPR 6).

Now: The final results obtained from this verification procedure shall be evaluated by the competent authority (MEPC 74).

INTERTANKO©  
post-MEPC 74, 2019

(Figure 7, verification methods<sup>14</sup>)

This is an outcome of extensive discussions of the verification procedure and different schools of thought on how to handle the range of testing variances, absolute limit vs confidence level and testing repeatability (r) and reproducibility (R).

As shown in the sketches above, it is important to note that application of the 95% confidence level would not reduce the stringency of the regulation because the fuel oil suppliers or fuel producers should target a sulphur limit lower than the lower limit of the 95% confidence level (0.47%) to ensure that the fuel oil meets the specified limit when it is delivered.

MEPC.1/Circ.881 ensures a consistent approach to verifying the sulphur limit of the fuel oil delivered to, in-use or carried for use on board a ship *until* the entry into force of the amended appendix VI.

The occurrence of marginal exceedance, which is non-compliant, is discussed in more detail in Section 4.6.

## FAQs: testing and verification procedure

### Q1. Why are there two different verification criteria in the amended appendix VI?

<sup>14</sup> The amended appendix VI uses the phrase “considered to have, or have not, met the requirement”. Hence, the importance of paragraphs 2.6 and 4.6 of the amended appendix VI.

A1. The fuel producers and suppliers have the means to control the sulphur content, whereas the ship does not. The amended appendix VI follows principles recommended by ISO 8754 and ISO 4259. Even para.10.3 of the IMO Best Practice for Fuel Oil Suppliers reads:

For the bunker producer/supplier, the recommendation is that the blend target should not be the actual specification limit, but rather the limit minus an appropriate safety margin. For the bunker producer/supplier to ensure that the product meets the specification limit with 95% confidence, the blend target should be the limit minus 0.59R for a maximum limit.

**Q2. If the PSCO determines that our ship's in-use fuel oil has been analysed to, say, 0.55% m/m, is it final?**

A2. The amended appendix VI is built on a single test result (Note: in this context, "a single test" does not mean that the test laboratory will run only one testing; to ensure test repeatability, they will run at least more than one testing).

PSCOs will determine enforcement actions or a next course of action based on a report of the test laboratory at their discretion.

#### **4.4 Ship Implementation Plan (SIP)**

Various PSC Memorandum of Understanding (MoUs) have announced they will initiate a Concentrated Inspection Campaign (CIC) for implementation of 2020 regulations.

MEPC.1/Circ.878 provides guidance on the development of SIP, encouraging ships to develop implementation plans outlining how the ship has prepared to be compliant by 1 January 2020.

The SIP is not mandatory and it is not subject to endorsement by the Flag State or a Recognised Organisation (RO). However, it will be useful for ships to present it to PSCOs when they review preparatory actions ships undertook to ensure compliance. The SIP addresses issues related to the use of compliant fuel oil and how to identify and mitigate any safety risks associated with such fuels. The SIP covers, as appropriate, but not limited to:

- time schedule
- calculations estimating the consumption of the remaining HSFOs prior to the effective date
- assessment of potential impact on machinery systems
- calculation of the time needed in order to "be fully flushed of all fuel oils exceeding the applicable sulphur content" prior to entry into force of the regulation
- tank cleaning
- a description of how to deal with and limit the impact of possible non-availability of LS-HSFO
- crew awareness and training.

#### Bunker tank cleaning

Fuel storage tanks that have carried HSFOs will have HSFO residues in their internal structure. The fuel treatment lines have also been exposed to HSFO residues.

Appendix 3 of the MEPC.1/Circ.878 (SIP) provides guidance for bunker tanks cleaning with clarifications on the following three methods:

- dry dock tank cleaning,

- tank cleaning during navigation (“tank cleaning in service can be performed by the ship’s crew and/ or by employing a riding crew for this purpose”), and
- by adding chemical additives.

A number of ships have been carrying out 0.50% trials and in so doing they have been drawing in use samples to confirm the fuel sulphur content has not been unduly contaminated from HSFO. Based on the above methods, we recommend the following:

- flushing tanks with distillate marine (DM) fuels – early use of ultra-low sulphur DM fuels to naturally flush the tanks, piping and fuel system components of HSFO and sediment.
- using one or more bunkerings of 0.50% fuels well before the enforcement date, again having a flushing effect.
- Using a specialist additive dosed over several bunker loads before the first 0.50 is loaded to clean the tanks using biological methods.
- manual / physical cleaning.
- samples may be drawn during consumption of the fuel to determine the in-use sulphur content for comparison and for checking effectiveness of the cleaning.

### Flushing

Concerning “flushing”, we are receiving many questions about the regulatory and technical background. Note that the tank cleaning guidance has the following alternative:

4 Alternatively, ships have been using ship specific changeover procedures to effectively and safely load on top of existing fuel oil and gradually flushing through the fuel system until the sulphur content in the fuel oil is at a compliant level.

Fuel change-over in ECAs has enabled many ships to be well drilled. However it is estimated that some 50% of the world fleet has not experienced an ECA change-over. Such experience can also be applied to switching from one HSFO storage tank to another, not just into settling and service tanks.

When the ship switches over from HSFO to a low-sulphur fuel oil, the ship would consume the HSFOs to the extent possible before entry into the ECA. It would then add a low-sulphur fuel to the storage tank with great care, and burn the fuel oil. By doing this, the ship’s fuel oil’s sulphur content would gradually decrease and reach the required content before entry into the ECA. This is a proven practice but requires great care, e.g. compatibility check, viscosity monitoring, temperature controlling, ignition and combustion monitoring, etc.

Note that the following paragraph was added to the PSC’s contingency measures for non-compliant fuel, as suggested by INTERTANKO. This is to address a case where the ship, after being forced to use a FONAR due to non-availability of compliant fuel, still has small amounts of HSFO left-overs or has HSFO residues left in the bunker tanks and pipeline<sup>15</sup>.

4 After the non-compliant fuel oil is completely used or discharged, such actions should include the possibility of cleaning and/or flushing through or dilution of remaining residues by using compliant fuel oil with the lowest sulphur content available.

This flushing process may need to be repeated, depending on the amount of residue present. In some instances, tank bottoms may have to be manually cleaned.

### Plans for managing the potential of loading incompatible fuels

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<sup>15</sup> PPR 6/8/9 (INTERTANKO, Dec 2018), some practical aspects ships will encounter as a result of fuel non-availability.

The ISO PAS 23263 and the JIG will provide incompatibility testing procedures for the ship and the supplier but Members should provide sufficient material on the compatibility of fuel oil in their SIP. Para.7.2 and 7.3 of the SIP reads:

- 7 The ship implementation plan could be used as the appropriate tool to identify any specific safety risks related to sulphur compliant fuel oil, as may be relevant to the ship, and to develop an appropriate action plan for the Company to address and mitigate the concerns identified. Examples should include:
- .1 procedures to segregate different types of fuel and fuels from different sources;
  - .2 detailed procedures for compatibility testing and segregating fuels from different sources until compatibility can be confirmed;
  - .3 procedures to changeover from one type of fuel to another or a fuel oil that is known to be incompatible with another fuel oil;
  - .4 plans to address any mechanical constraints with respect to handling specific fuels, including ensuring that minimum/maximum characteristics of fuel oil as identified in ISO 8217 can be safely handled on board the ship; and
  - .5 procedures to verify machinery performance on fuel oil with characteristics with which the ship does not have prior experience.

This is one of the key points that SIP should address. There is no simple way to address this issue knowing that suppliers are not able to predict compatibility. The ship and the management should make a carefully written forward planning document so that the risk of incompatibility can be well mitigated.

## FAQs: SIP

### Q1. Is the SIP mandatory?

A1: No. Paragraph 4 of the SIP Guidance indicates that a SIP is not mandatory. Paragraph 3 further clarifies that Administrations and Port State Control authorities may take into account the implementation plan when verifying compliance with the 0.50% sulphur limit requirement.

### Q2. Even so, would it not be better to have approval of the Administration/RO?

A2: Because the SIP is not mandatory, it is entirely up to the ship owner and the Administration/RO. We are informed that some ship owners are seeking approval of the SIPs from their Flag Administrations.

### Q3. Is tank cleaning a requirement?

A3: The phrase “if tank cleaning is required...” is used multiple times in IMO’s 2020-related instruments. However, it is not a requirement. It is the ship’s responsibility, obligation or due diligence to determine whether tank cleaning is necessary to bring the ship to full compliance with the 0.50% sulphur limit from 2020. Not carrying out the tank cleaning is also an option if it is determined that the ship does not need cleaning.

## 4.5 Fuel Oil Non-Availability Report (FONAR)

A template of FONAR is recommended in Appendix 1 of MEPC.320(74) *The 2019 Guidelines on Consistent Implementation of the 0.50% sulphur limit under MARPOL Annex VI*. This is a standard format for reporting fuel

oil non-availability and it may be used when a ship is unable to obtain compliant fuel. This will also facilitate consistent reporting and assist Member States and Port Authorities when they review information received and decide on actions to take including an overall review of the global and regional spread of compliant fuel availability. Regulation 18.2.1.2 of MARPOL Annex VI requires that evidence be provided to support a claim that all efforts were made to obtain compliant fuel oil.

During the course of developing a FONAR template, many IMO Member States emphasised that submission of a FONAR will not be considered an exemption from the existing regulations. Instead, the FONAR should be used to document that every effort was made to obtain compliant fuel prior to bunkering non-compliant fuel and provide details of actions intended to be taken to regain compliance.

FONARs will be thoroughly investigated by PSC and submitted to IMO<sup>16</sup> via the Annex VI module of GISIS with the port Authority associated with the non-availability investigating the case and reporting the results to IMO. This would allow them to address the ongoing supply of compliant fuel oil to ships calling at the port in question.

#### Operation constraints (if applicable), paragraph 5 of FONAR template

Ships can issue a FONAR in case they experience “operational constraints” with the complaint fuels available. There are no examples of "operation constraints" provided in IMO Guidelines. It is for the ship to identify and describe those constraints. These may be situations when the ship identifies that the compliant fuel may have significant quality problems which would cause operational and/or safety risks. It may be a situation when the ship determines a lack of compatibility between the existing fuel on board the ship and the compliant fuel oil the ship has procured, and when the ship has no room to avoid comingling them.

However, a very strong case would have to be given if the ship could demonstrate that such a claim includes a high degree of forward planning:

- Ships should always try to retain a few days of compliant fuel in the event that HSFO is loaded.
- Then, the ships should plan that all the HSFO may be used at sea and switch back to compliant fuel on arrival at the next bunker port. This would eliminate the need or risk of having to de-bunker remaining HSFO from a FONAR loading.

The FONAR template should be read in conjunction with MEPC.1/Circ.881 “*Guidance for PSC on contingency measures for addressing non-compliant fuel oil*”. This is because the ship with FONAR will have a certain amount of unused HSFO left on board after she has arrived at a next port. See the following paragraph concerning disposal of remaining HSFO on board.

#### Guidance for Master/Owner – a record of actions

The 2019 PSC Guidelines has an appendix entitled “Non-availability of compliant fuel claimed” which contains useful guidance to PSCOs in the case that non-availability of compliant fuel is claimed while a ship is in an ECA. This appendix could also apply to ships that are unable to obtain compliant fuel oil outside of an ECA. This appendix provides a *list* of the type of documentary *evidence* which the Master/Owner could provide to support their FONAR claims.

#### **4.5.1 Disposal of remaining HSFOs on board (MEPC.1/Circ.881, PSC Contingency Measures)**

Ships will experience a range of complex challenges when they have no alternative but to use non-compliant fuel oils. Disposal of remaining HSFO on board after the voyage terminates is a complex issue requiring comprehensive

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<sup>16</sup> MEPC 73 (Oct 2018) approved MEPC.1/Circ.880 encouraging Member States to report availability of 0.50% fuels to IMO GISIS. MEPC 74 (May 2019) further approved MEPC.1/Circ.887 urging them to submit Regulation 18 related data to IMO GISIS for a full understanding of effectiveness and impact on ship operation due to the global 0.50% limit.

guidance framework as ship owners seek clarity on actions to be taken and Port States want to have a degree of discretion over the action they can take.

According to the HSFO carriage ban effective 1 March 2020, a ship shall not carry HSFO for combustion purposes unless she is equipped with emission abatement technology. A ship could be required to attempt de-bunkering of the non-compliant fuel oil at the next available port(s), before considering using this fuel oil on the high seas. However, de-bunkering or dry-docking would create significant logistical and practical issues.

Considering the questions raised by INTERTANKO et al, IMO issued MEPC.1/Circ.881 "*Guidance for PSC on contingency measures for addressing non-compliant fuel oil*" which provides the following as possible contingency measures:

- actions predetermined in the SIP<sup>17</sup> if available
- discharging non-compliant fuel to another ship as cargo or to an appropriate shipboard or land-based facility if practicable and available
- managing the non-compliant fuel oil in accordance with a method acceptable to the Port State, and
- operational actions, such as modifying sailing or bunkering schedules and/or retention of non-compliant fuel on board the ship.

The following new paragraph, as suggested by INTERTANKO<sup>18</sup>, which is similar to the flushing recommendations contained in the tank cleaning guidance of the SIP, has been added to the PSC Contingency Measures.

4 After the non-compliant fuel oil is completely used or discharged, such actions should include the possibility of cleaning and/or flushing through or dilution of remaining residues by using compliant fuel oil with the lowest sulphur content available.

Note that MEPC.1/Circ.881 was originally developed to apply to the post-FONAR HSFO left-overs only, however, MEPC 74 decided to make it address all possible instances of non-compliant fuel oil (MEPC 74/WP.8/para.19).

Members should pay particular attention to the spirit of the Guidance that any action being undertaken by the ship would need approval of the Flag Administration. This would allow Port State discretion and the ability to determine the most appropriate action based on the merits of each case.

#### The China Ministry of Transport Maritime Safety Administration – 2020 Global Sulphur Limit Implementation Plan

Paragraph (3)9 of the Draft Implementation Plan (August 2019) reads as follows:

##### (3) Requirements for vessels carrying non-compliant fuel and its handling.

From March 1, 2020, if an internationally trading vessel violates the regulations and loads non-compliant fuel in the waters under China's jurisdiction, IMO MEPC.1/Circ. 881 "Guidance for Port State Control on Contingency Measures for Addressing Non-Compliant Fuel Oil" shall be followed, where measures to unload the non-compliant fuel may be taken, or with the consent of the maritime administration of the port where the vessel is, **the non-compliant fuel may be retained** on board and **guarantee** is provided to the maritime administration on the measures to be taken **not to use the non-compliant fuel in the waters under China's jurisdiction**.

INTERTANKO advice:

- INTERTANKO, pointing out that the PSC contingency measures (MEPC.1/Circ.881) are not intended to be used for a case of violation of the HSFO carriage ban, has sought clarifications about this paragraph. Clarification is also being sought on the requirement of "guaranteeing".

<sup>17</sup> In this context, it refers to appendix 3 of the SIP, the tank cleaning guidance including cleaning/flushing.

<sup>18</sup> PPR 6/8/10/para.8, cleaning of fuel systems of ships forced to use residual fuels, INTERTANKO, Dec 2018.



- Upon receipt of a final version of the regulation, supplementary information will be provided.

## FAQs: disposal of HSFO left-over

### **Q1. Does it mean that I can burn HSFO left-over in high seas if I cannot find a suitable reception facility at the next port?**

A1. The idea of allowing the ship to use left-over HSFO as soon as feasible at high seas more than 200nm from shore was discussed. However, a reference to such a specific action was deleted from the Guidance. Following the Guidance, the ship should develop a course of action and present it to the Flag State and the next Port Authority. It is then up to the authorities to determine the best appropriate action taking into account this Guidance.

### **4.6 Fuel oil samples test results – Marginal Exceedance of the 0.50% limit**

This section is in continuation of Section 4.3 presenting the amended appendix VI of MARPOL Annex VI, sulphur content testing and verification procedure.

In 2017, INTERTANKO Members reported the following cases relating to the 0.10% m/m ECA limit:

- Marginal exceedances of the sulphur content limit leading to non-compliance verifications.
- The lack of uniformity in number of decimals used and rounding of the results leading to non-compliance verifications.

A test result can never be any more than 95% accurate and to this extent one result to another may vary within the standard deviation curve of test results depending on how many are carried out, hence the logic of the ISO 4259. From their perspective, the fuel suppliers shall ensure that the limit is not exceeded in accordance with the precision limit given in the test method, i.e. the target is limit minus the 0.59R, so for 0.50% m/m limit it will be 0.47%. This allows for any exceedance to fall below the given limit as supplied.

Those who wish to understand deeper how this Appendix VI was amended and how the text precision was defined are advised to refer to the CIMAC Guidelines 09/2014 titled “the interpretation of marine fuel oil analysis test results with particular reference to sulphur content”.

INTERTANKO has raised concerns on many occasions that 0.50% max sulphur fuel oils may be produced very close to the limit<sup>19</sup>, notwithstanding the requests from the industry to target a value lower than the limit with a safety margin. If the fuel oil was originally produced close to the limit without any margin, or even marginally above the limit, it would degrade any previously compliant fuel oil remaining in a tank to the point that the overall mix would turn out to be over the limit. If PSC takes an in-use or on board sample of such fuel oils, it is highly likely to be verified as exceeding the limit and hence, non-compliant.

Indeed, there remains an underlying concern that there will be multiple cases of marginal exceedance of the 0.50% limit. It is important to have a good understanding of the scientific background of the ISO 4259-based verification procedures and of protective provisions that are helpful to draw a line between the supplier’s responsibility and the ship’s liability. While the ship owners and charterers may be able to successfully establish a claim in respect

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<sup>19</sup> ISWG AP 1/2/12 (INTERTANKO et al, July 2018): A wise fuel blender includes a safety margin and sets the sulphur target below 0.50% m/m in order to limit the risk of exceeding the limit; however, the blender will go as close to target as possible to avoid giving too much valuable product away. Sometimes the supplier oversteps the target, and the closer he blends to 0.50% m/m, the higher the risk is that an analysis result comes out above the limit.

of over-the-limit fuel oil delivered, it will be a different matter to obtain recompense for non-compliance resulting from the over-the-limit fuel oil.

#### 4.6.1 Decimals used for test results and rounding

We noted<sup>20</sup> that there were multiple cases where different numbers of decimals were used for test results giving rise to disputable situations. Subsequent verification and enforcement actions were based on the request by PSCO on the number of decimals to be used. To avoid inconsistent reporting and disputes, the amended appendix VI of MARPOL Annex VI and ISO 8754 provide a test reporting and interpretation protocol, i.e. the use of two decimals.

In addition, in cases where the test result yields, for example, 0.10245% m/m, the digits after the two decimals have to be rounded. In the rounding operation, accuracy of the test results should not be compromised by truncating numbers or cutting off some decimals. According to ISO 80000-1, Quantities and units, "rounding" means replacing the magnitude of a given number by a "rounded number". In the example given above, the official test result should record the sulphur content as 0.10% m/m.

#### 4.6.2 Exceedance of MARPOL delivered sample

Up until now, there is little information as to how many MARPOL delivered samples have been tested, under the current appendix VI of MARPOL Annex VI. It is reported that the verification procedure has not been widely used<sup>21</sup>.

According to the 2019 PSC Guidelines under MARPOL Annex VI (Res. MEPC. 321(74)), PSCOs' initial inspections in respect of the sulphur regulations will include checking the IAPP Certificate, BDN and engine log books. A more detailed inspection can be conducted if there are "clear grounds" which are detailed in paragraph 2.5.3 of resolution MEPC.321(74). If a PSCO determines that there is a clear ground to conduct a detailed inspection, the PSCO could require the ship's MARPOL delivered sample to be analysed in accordance with the verification procedure Part 1 of the amended appendix VI of MARPOL Annex VI. This action may apply to cases where, for example, there is reason to believe that the suppliers delivered non-compliant fuel or the BDN is not representative of the fuel oil that was delivered to the ship.

If an analysis of the ship's MARPOL delivered sample reveals that the sample exceeds the 0.50% limit, and if the sampling was conducted in accordance with the IMO 2009 Guidelines (Res. MEPC.182(59)), the in-use sample will also exceed the limit likely resulting in ship's non-compliance. The amended appendix VI of MARPOL Annex VI is built on the recognition that it is important to establish a fair distribution of responsibilities between the supplier and the receiver. Therefore, Members should be equipped with a well-prepared plan describing how to deal with such a situation when it arises.

Members may consider using the following steps as guidance:

Step	Action
1	At the time of bunker procurement, specify that: <ul style="list-style-type: none"> <li>the MARPOL delivered fuel oil sample should be taken in accordance with the IMO 2009 Sampling Guidelines (Res. MEPC.182(52)).</li> <li>The supplier is to notify the ship prior to the ship's arrival if is unable to follow the IMO 2009 Guidelines.</li> </ul>
2	At the time of bunkering, make every effort to adhere to the IMO 2009 Guidelines. In cases where it is not possible due to safety, weather, security or local regulatory reasons, follow para.9.12 of the Best Practice for Fuel Oil Suppliers (MEPC.1/Circ.875/Add.1 – See "MARPOL delivered sample" above).

<sup>20</sup> INTERTANKO suggested a standard reporting protocol and rounding in PPR 5/13/11 and PPR 5/13/12 (Feb 2018).

<sup>21</sup> PPR 5/13/5, EU et al, Nov 2017

	Note: The MARPOL delivered fuel oil sample is the starting point of complying with all regulations of MARPOL Annex VI. The first question the ship and management should ask is if PSC determines as a result of their verification that the MARPOL delivered sample exceeds the limit, was the sample taken at the receiving ship's inlet bunker manifold and witnessed by the ship's crew?
3	<p>The ship should be able to present the following, but not limited to:</p> <ul style="list-style-type: none"> <li>• The bunker procurement document,</li> <li>• The BDN corresponding to the fuel oil analysed by PSC, and</li> <li>• The MARPOL delivered fuel oil sample, sealing number</li> </ul> <p>to demonstrate that the ship and the management ordered fuel oils in compliance with MARPOL Annex VI sulphur requirements.</p>
4	<p>The PSCO may send the MARPOL delivered fuel oil sample to a test laboratory accredited to ISO 17025 or equivalent for performance of sulphur content test of ISO 8754. Verification procedure Part 1 of the amended appendix VI will apply (see Appendix 2):</p> <p>Note that para.2.6 of the amended appendix VI reads:</p> <p style="padding-left: 40px;">“The final results obtained from this verification procedure shall be evaluated by the competent authority”.</p> <p>One could read this paragraph to suggest that it gives the competent authority the flexibility to evaluate the final result obtained from the laboratory by requiring a second testing by a different laboratory.</p> <p>Given the background of the above referenced paragraph 2.6, Members are advised to check that it is not misinterpreted by suppliers.</p> <p>The final decision is entirely up to the PSCOs based on a test report received from the laboratory (para.2.7 of the amended appendix VI).</p>

#### 4.6.3 Exceedance of on board and in-use sample as a result of PSC verification

If there is clear ground to suggest that the fuel oil that the ship is carrying, about to use or is using may not be compliant with the sulphur limit, the PSCO would, as part of a detailed inspection, require an on board or in-use sample to be taken and would either use a portable sulphur analysing device or, if this test indicates possible non-compliance, will then send it to an accredited laboratory for testing and verification<sup>22</sup>.

In this case, the verification procedure, Part 2 of the amended appendix VI of MARPOL Annex, will apply (see Appendix 2).

Step	Action
1	<p>PSCO requires a sample to be drawn:</p> <ul style="list-style-type: none"> <li>• Agree with PSCOs a point(s) from which a sample will be drawn.</li> <li>• See the above explanatory notes about the three MARPOL delivered fuel oil samples</li> </ul>
2	<p>Draw a sample from the sampling point(s):</p> <ul style="list-style-type: none"> <li>• On board sample: see Section 4.2.4 of this Guide. IMO Guidelines to be developed in 2020.</li> <li>• In-use sample: see Section 4.2.3 of this Guide and the IMO Guidelines (MEPC.1/Circ.864/Rev.1)</li> </ul>
3	If PSCO's test result shows exceedance:

<sup>22</sup> In many ports it may not be the PSCO that actually inspects the sulphur compliance - a number of Administrations are implementing their environmental departments to ensure “a sulfur inspector form a competent authority”.

	<ul style="list-style-type: none"> <li>• Before PSCO's compliance determination, recommend PSCOs to test the MARPOL delivered sample corresponding to the on board or in-use fuel in question.</li> <li>• Present the BDN and the ship's retained MARPOL delivered sample to PSCO.</li> </ul>
4	<p>Note the following recommended provisions within the regulatory framework:</p> <ul style="list-style-type: none"> <li>• The 2019 IMO Best Practice for Member/Coastal State: <ul style="list-style-type: none"> <li>Regulation 18.8.2: Best practice/guidance on when an Administration would require the MARPOL delivered sample to be analysed, and if a written statement should be delivered to the ship if the MARPOL sample is required for analyses: <ol style="list-style-type: none"> <li>.1 Analysis of the MARPOL delivered sample may be relevant if there are indications that the bunker delivery note is not representative of the fuel oil delivered. An indication could be information from another port State that the bunker delivery note or the MARPOL delivered sample as required by regulation 18 of MARPOL Annex VI presented to a port State control officer were not in compliance with the relevant requirements;</li> </ol> </li> </ul> </li> <li>• The amended appendix VI of MARPOL Annex VI. <p style="text-align: center;"><i>4.6 The final results obtained from this verification procedure shall be evaluated by the competent authority.</i></p> <p style="text-align: center;">(This paragraph 4.6 was added to provide consistency with the corresponding paragraph 2.6 of Part 1 for MARPOL delivered fuel oil sample).</p> </li> <li>• The PSCO is expected to determine compliance taking into account the BDN, the on board or in-use sample testing results and the MARPOL delivered fuel oil sample test report where relevant.</li> </ul>

#### 4.6.4 Exceedance of on-board and in-use sample as a result of the ship's independent testing

This section focuses on the ship's own voluntary compliance measure in the context of a sulphur limit.

INTERTANKO Members reported multiple occurrences of cases where ships had purchased fuel oils assumed to be compliant according to information on the BDN but were later found to be non-compliant by test results on fuel oil samples taken during bunkering. PPR 6 noted that this case would not be addressed by means of a FONAR but a solution was needed<sup>23</sup>.

After a number of discussions about INTERTANKO's reported cases and suggestions<sup>24</sup>, MEPC 74 agreed to include a new paragraph 2.1.6 to the *2019 PSC Guidelines under MARPOL Annex VI* addressing how to follow-up a possible discrepancy between the sulphur content on the BDN and independent test results of commercial samples taken by the ship during bunkering.

*Chapter 2, Inspections of Ship required to carry the IAPP Certificate*  
*2. Initial Inspections*

<sup>23</sup> Ref. PPR 6/20/para.8.75/page 31

<sup>24</sup> PPR 6/8/9 (INTERTANKO, Dec 2018) and MEPC 74/10/13 (INTERTANKO et al, April 2019), Need for clarifications in case of a discrepancy on fuel oil compliance

2.1.6 In addition, if the BDN shows compliant fuel, but the master has independent test results of the fuel oil sample taken by the ship during the bunkering which indicates non-compliance, the master may have documented that through a Notification to the ship's flag Administration with copies to the competent authority of the relevant port of destination, the Administration under whose jurisdiction the bunker deliverer is located and to the bunker deliverer.

Paragraph 2.1.6 is intended to protect the ship from possible PSC enforcement actions against the fuel oil that is beyond the ship's control.

The basis of this approach is that BDN is a statutory declaration that fuel oil was compliant. If a ship had fuel tested independently and test results indicated "non-compliance", there is a regulatory gap which needs to be closed in a transparent manner. Note that voluntary compliance measures can be effective, however, they do not provide protection as much as a regulation or at least the PSC Guidelines can.

Suppose that the BDN declares that the fuel oil delivered is 0.50% limit compliant:

Step	Action
1	The ship takes a sample and sends it to the company's recognised ISO 17025 accredited test laboratory for testing. The ship will not use the fuel until a test report arrives.
2	If the test results indicate potential non-compliance: <ul style="list-style-type: none"> <li>• Note that this is only an <i>indication of potential</i> non-compliance of the fuel oil delivered and stored (not in use).</li> <li>• Issue a Note of Protest and send it to the ship's flag Administration and copy it to the Port Authority under whose jurisdiction the fuel oil in question was delivered.</li> <li>• In pursuance of para.1 of the PSC contingency measure (MEPC.1/Circ.881), notify the-Port State of the next port of call, informing the indication of potential non-compliant fuel oil.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Develop a course of action to be taken, including retention on board of the fuel oil in question, with reference to para.1 and 2 of MEPC.1/Circ.881. Note that FONAR does not apply in this instance.</li> <li>• Seek agreement on the actions to be taken from the Flag State and the Port State of the next port of call.</li> </ul> <div data-bbox="491 1346 1473 1644" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Regulation 18.8.2: Best practice/guidance on when an Administration would require the MARPOL delivered sample to be analysed, and if a written statement should be delivered to the ship if the MARPOL sample is required for analyses:</p> <p>.1 Analysis of the MARPOL delivered sample may be relevant if there are indications that the bunker delivery note is not representative of the fuel oil delivered. An indication could be information from another port State that the bunker delivery note or the MARPOL delivered sample as required by regulation 18 of MARPOL Annex VI presented to a port State control officer were not in compliance with the relevant requirements;</p> </div>
4	MARPOL delivered fuel oil sample testing:  To determine compliance of the fuel oil in question, a testing of its MARPOL delivered sample is needed. However, the sealed MARPOL delivered sample is a property of the authorities and the decision is entirely up to the authorities.  Test results of any voluntary or commercial sample are not within the scope of the amended appendix VI of MARPOL Annex VI, as far as the verification of compliance (i.e. 0.50% max and 0.53% max) is concerned.

Whether the outcome of the MARPOL delivered fuel oil sample testing provides grounds for any enforcement action against the supplier may depend very much on the particular conditions and specific facts in each case.

On a separate note, MSC 101 (May 2019) also identified the need to address situations where independent test results indicate that non-compliant fuel oil in breach of the flashpoint requirement under SOLAS was delivered. Information gathering will commence with a view to further discussion at MSC 102 (May 2020). See Section 5.2 concerning flashpoint.

#### **FAQs: sulphur content analysis**

##### **Q1. What kind of portable devices for on board sulphur analysis do PSCOs use? How reliable are they?**

A1. The portable devices only provide an indication of compliant or non-compliant fuel and we have seen reports of PSCO's portable sulphur analysis device campaigns taking place in North America, Europe, China and elsewhere. Members are advised to recommend to PSCOs that their portable devices, if in use, are calibrated or aligned to ISO 8754 and a proof of such calibration should be presented to the ship.

## 5. Reporting on fuel oil availability, safety and quality issues

### 5.1 General reporting requirements

Members are advised to report to the ships' Flag States and keep records of:

- Fuel non-availability issues
- Fuel oil quality related issues
- Delivery of fuel oils that do not meet the requirements of Regulation 3 (fuel oil quality) of MARPOL Annex VI and of SOLAS II-2 (60°C flashpoint).

Reports to the Flag State and Port State where relevant of all cases must be made immediately by the quickest practicable means and be kept on board.

These reports tell the Flag States and enforcing authorities about fuel oil quality/safety related incidents and cases of 0.50% limit compliant fuel oil availability. This will enable them to identify where and how risks arise and whether there is a need for further investigation. It also allows the IMO to establish a global database, provide advice on how to avoid the same incidents in a publicly available platform and identify any regulatory review.

This reporting scheme relies on the regulatory obligations imposed by MARPOL Annex VI:

Regulation 14.2.4	<i>A ship shall notify its Administration and the competent authority of the relevant port of destination when it cannot purchase compliant fuel oil</i>
Regulation 14. 2.5	<i>A Party shall notify the Organization when a ship has presented evidence of the non-availability of compliant fuel oil</i>
Regulation 18.9.5	<i>Parties undertake to ensure that appropriate authorities designated by them inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulation 14 or 18 of this Annex</i>
Regulation 18.9.6:	<i>Inform IMO for transmission to Parties and the IMO Member States of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations 14 or 18 of this Annex</i>

Following serious concerns raised by the shipping industry and many Member States, IMO approved MSC-MEPC.5/Circ.15 urging parties to MARPOL Annex VI:

- to take all reasonable steps to promote the availability of fuels complying with MARPOL Annex VI;
- to ensure that appropriate authorities take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the BDN.

In addition, MEPC.1/Circ.887 (MEPC 74) on *Reporting of data related to fuel oil availability and quality in GISIS (Global Integrated Shipping Information System)* was issued to promote greater understanding of the consistent implementation of the 0.50% m/m Sulphur limit under MARPOL Annex VI.

The *2019 Guidelines for 2020 Consistent Implementation* provides more detailed guidance on reporting.

- 4.1.3 (sampling and verification according to appendix VI) According to regulation 11.4 of MARPOL Annex VI, the Administration shall investigate any report of an alleged violation and thereafter promptly inform the Party which made the report, as well as the Organization, of the action taken. When informing the Organization, the MARPOL Annex VI GISIS module should be used.
- 4.4.1 When a Party finds a non-compliance of a ship or a fuel oil supplier, the information of the non-compliance should be reported to the MARPOL Annex VI GISIS module (regulation 11.4).
- 4.4.2 Publication of information on non-compliant ships/fuel oil suppliers or a reporting scheme to IMO to be registered on centralized information platforms are proposed as elements of an effective

enforcement strategy. Various PSC regimes have successfully used the publishing of information related to substandard ships/fuel suppliers as a deterrent to non-compliance. Port States also need to report detentions of ships to IMO which may affect the future PSC targeting of the ship. The IMO GISIS database already makes available certain information related to non-compliances with the MARPOL Annex VI regulations.

- 5.1.8 Regulation 18.2.5 of MARPOL Annex VI provides that a Party to MARPOL Annex VI notify the Organization when a ship has presented evidence of the non-availability of compliant fuel oil in a port or at their terminal. For this purpose, MARPOL Annex VI GISIS module provides the platform for Parties to upload such notifications.

IMO will review and improve functionality in the current MARPOL Annex VI module in GISIS, including on Regulation 18.1: fuel oil availability; Regulation 18.2.5: evidence of non-availability of compliant fuel oil; and Regulation 18.9.6: failure of fuel oil suppliers to meet the requirements specified in regulation 14 or 18 of Annex VI.

The screenshot shows the IMO GISIS MARPOL Annex VI reporting interface. The page title is "GISIS: MARPOL Annex VI" and the specific regulation is "Regulation 18.2.5 Evidence of non-availability of compliant fuel oil". The interface includes a navigation menu with various regulations and a search bar. Below the header, there is a table displaying notifications. The table has columns for Notifying Party, Name of ship, Flag Administration, Date of non-availability, Port/Terminal, and Fuel type. The table shows 135 notifications in total, with the first 25 displayed. The data includes entries from various countries like Bahamas, Canada, Greece, and Malta, with ship names such as CS CALVINA, IRIS HALO, and EIBE OLDENDORFF.

Notifying Party	Name of ship	Flag Administration	Date of non-availability	Port/Terminal	Fuel type
Bahamas	CS CALVINA	Bahamas	2019-01-03	Mobile, United States (USMOB)	MGO
Canada	IRIS HALO	Panama	2018-12-28	Vancouver, Canada (CAVAN), English Bay Anchorage	MGO
Canada	EIBE OLDENDORFF	Malta	2018-12-27	Prince Rupert, Canada (CAPRR)	MGO
Canada	SEA PLUTO	Marshall Islands	2018-12-24	Prince Rupert, Canada (CAPRR)	MGO
Canada	Tzoumaz	Switzerland	2018-12-17	Port-Cartier, Canada (CAPCA)	MGO
Canada	LIA H	Cyprus	2018-12-15	Prince Rupert, Canada (CAPRR)	MGO
Cyprus	SALT LAKE CITY	Cyprus	2018-12-15	IJmuiden, Netherlands (NLIJM), IJmuiden anchorage	MGO
Canada	BENJAMIN CONFIDENCE	Philippines	2018-12-07	Port-Alfred, Canada (CAPAF)	MGO
Canada	VEGA DREAM	Panama	2018-12-05	Port-Cartier, Canada (CAPCA)	MGO
Canada	Angellic Peace	Greece	2018-12-03	Vancouver, Canada (CAVAN), Trincomali Anchorage	MGO
Canada	CATALONIA	Malta	2018-11-26	Matane, Canada (CAMNE)	MGO
Canada	STARDUST	Marshall Islands	2018-11-18	Prince Rupert, Canada (CAPRR)	MGO

(Figure 8, the IMO GISIS reporting format)

## 5.2 Flashpoint

SOLAS regulation II-2/4.2.1 stipulates that no fuel oil with a flashpoint of less than 60°C shall be used<sup>25</sup>.

This is a safety-oriented requirement to prevent the ignition of flammable liquids in the engine room. SOLAS regulation VI/5.1 requires that ships be provided with a Material Safety Data Sheet (MSDS) prior to the bunkering of fuel oil, where the flashpoint temperature should be reported. However, documentation of flashpoint temperature under MSDS is not mandatory. The existing required data to be included in the BDN does not include the flashpoint temperature. However, please note that commercial bunker procurement contracts refer to ISO 8217 which includes the 60°C flashpoint limit in line with SOLAS regulation II-2/4.2.1. MSC 101 (May 2019) adopted Resolution MSC.465(101) – *Recommended interim measures to enhance the safety of ships relating to the use of oil fuel*<sup>26</sup>. It recommends SOLAS Contracting Governments to:

- Inform IMO, for transmission to parties and Member States, of all **confirmed** cases where oil fuel suppliers delivered fuel failing to meet the requirements specified in SOLAS regulation II-2/4.2.1, taking into account regulation 18.9.6 of MARPOL Annex VI.

<sup>25</sup> SOLAS II-2/4.2.1 also states that for emergency generators, oil fuel with a flashpoint of not less than 43°C may be used.

<sup>26</sup> MSC 101/WP.10, Page 3~4



- Take action as appropriate against oil fuel suppliers in **confirmed** cases of deliveries of oil fuel that does not comply with the requirements specified in SOLAS regulation II-2/4.2.1, taking into account regulation 18.9.4 of MARPOL Annex VI.

Further, MSC 102 (May 2020) will discuss possible development of guidelines for ships to address situations where independent test results indicate that (flashpoint requirement) non-compliant oil fuel was delivered. Target completion date by 2021.

Note that IMO uses the term “**confirmed cases**<sup>27</sup>”. This means that when a ship owner reports such a non-compliance case to the ship’s Flag State, the case should have been confirmed by the supplier in question, by an independent test report or by any other means. Members are advised to report cases of non-compliant fuel oils to the ship’s Flag State – **click [here](#)**.

## FAQs: Reporting

### Q1. Does the IMO compile FONARs issued so far?

A1. There are no FONAR reports compiled anywhere at present – after 2020, FONARs will be more rigorously monitored. The IMO has asked Member States to report 0.50% fuel non-availability so we may see more reports in 2020. Note should be also taken that question number 7 in the FONAR standard format requests the ship to mention previously issued FONARs and their related details.

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<sup>27</sup> The definition of *confirmed cases* will be further discussed at IMO.

## 6 Exhaust Gas Cleaning Systems (EGCS)

### 6.1 Regulation

The ship may meet the sulphur content limit requirements in Regulation 14 of MARPOL Annex VI by using approved equivalent methods, such as exhaust gas cleaning systems (EGCS) or scrubbers, which clean the emissions before they are released into the atmosphere. This approval is undertaken in accordance with Regulation 4 "equivalency" of MARPOL Annex VI. This equivalency is granted on a ship-by-ship basis and should be approved by the ship's Administration who will then communicate its approval to IMO.

(Table 1, fuel oil sulphur content and corresponding emission ratio, IMO 2015 Guidelines)

Fuel oil sulphur content (% m/m)	Ratio emission SO <sub>2</sub> (ppm)/CO <sub>2</sub> (% v/v)
0.50	21.7
0.10	4.3

There is no reference to "EGCS" or "scrubbers" in MARPOL Annex VI. Instead, the IMO 2015 Guidelines for EGCS (Res.MEPC.259(68)) provides guidance for monitoring of the SO<sub>2</sub>/CO<sub>2</sub> content of the exhaust gas for sulphur contents of the fuel oil to ensure their equivalent compliance with the fuel oil sulphur content limits set out in Regulation 14 of MARPOL Annex VI.

The IMO 2015 Guidelines provide EGCS approval schemes, certification and approval processes, required documentation and emission and discharge washwater criteria.

A comprehensive technical revision of the 2015 Guidelines is expected in 2020. In the meantime, recognising an urgent need to address contingency measures in case of EGCS malfunction, MEPC 74 (May 2019) approved MEPC.1/Circ.884, which provides guidance to ships that operate an EGCS on how to handle unexpected issues during its operation, such as:

- System malfunction that leads to emission exceedance,
- Short-terms exceedances of the applicable emissions ratio, and
- Interim indication of on-going compliance in the case of sensor failure.

Any EGCS malfunction that lasts more than one hour or repetitive malfunctions should be reported to the Flag and Port State's Administration along with an explanation of the steps the ship operator is taking to address the failure. At their discretion, the Flag and Port State's Administration could take such information and other relevant circumstances into account to determine the appropriate action to take in the case of an EGCS malfunction, including not taking action. Paragraphs 6 and 12 of the Guidance are the key provisions.

#### System approval

There are two EGCS approval methods:

- 'Scheme A' – initial unit certification of exhaust gas cleaning performance, with continuous monitoring of operating parameters and daily emission checks; and
- 'Scheme B' – performance certification by continuous monitoring of exhaust emissions using an approved system, with daily checks of operating parameters.

Both approvals are subject to periodical survey under the IAPP Certificate.

Information on the market may indicate that most scrubbers installed on the merchant fleet are Scheme B approved. Scheme A approval is sought when the owner places a new building order for a series of the same design ships.

One of the significant differences between the two schemes is the continuous monitoring of exhaust emissions or operating parameters.

The EU Sulphur Directive (EU 2016/802) Article 8(2) reads: *“Ships using the emission abatement methods referred to in paragraph 1 shall continuously achieve reductions of sulphur dioxide emissions that are at least equivalent to the reductions that would be achieved by using marine fuels that meet the requirements of Articles 6 and 7”*

The EMSA (European Maritime Safety Agency) 2018 Sulphur Inspection Guidance (click [here](#)) further explains actions to be taken in case of the ship not continuously reducing SOx emissions. This means that the ship has to continuously reduce SOx emissions achieving the equivalent emission ratio and shall be able to demonstrate the ship’s compliance in this regard. This is why the ability to continuously monitor the exhaust emissions is important at the time of system procurement, approval and installation. It is worth noting that in most cases, despite the categorisation, Scheme A approved scrubbers also offer the ability to continuously monitor exhaust emissions.

#### Open, closed and hybrid systems

There are two main categorisations – Dry and Wet. The Wet system has three more sub-categories.

Dry	Wet		
	Open loop	Closed loop	Hybrid

There are local ports where operation of open-loop scrubbers is not allowed, including ports in China, Singapore, UAE, Belgium, Germany, Lithuania, Latvia, Ireland, Norway and the US.

Members are advised to consult their local agents when entering foreign ports and check any local restrictions about open-loop scrubber washwater discharges. A publicly available list of these ports can be found at [here](#).

#### Documents required for Scheme B approved scrubber

	Documents required	Purpose	Administration/RO approval is required?
1	SOx Emissions Compliance Plan (SECP)	To detail the ship’s method of compliance for all fuel combustion units.	Yes
2	EGCS Technical Manual, Scheme B (ETM-B)	EGCS operating and maintenance parameters and survey procedures are recorded.	Yes
3	Onboard Monitoring Manual (OMM)	Sensor data, positions where emission exhaust and discharge washwater measures are taken, it analyses data, monitoring system maintenance and survey procedures.	Yes
4	EGC Record Book or Electronic Logging System	Maintenance, repairs and service history is recorded. To be inspected by PSCOs. It may be part of the ship’s planned maintenance record system.	Yes

Note. SOx Emission Compliance Certificate (SECC) is required for Scheme A approved scrubbers only.

#### Bunker Delivery Note (BDN)

Amendments to the BDN (Res.MEPC.286(71)) restricts supply of HSFOs only to those ships which have an alternative means of compliance (e.g. EGCS). It entered into force on 1 January 2019.

When asked to provide fuel oil exceeding the sulphur limit in Regulation 14.1 to a ship, the suppliers, prior to delivery, should receive notification from the buyer that the fuel is intended to be used in compliance with the regulation, e.g. the ship has an approved EGCS.

US EPA requirements

The US 2013 VGP EGCS washwater requirements are the same as the IMO’s 2015 EGCS Guidelines except (Ref: US EPA Vessel General Permit – EGCS, 2013, click [here](#)) :

- pH (limit at “end of pipe” to demonstrate compliance but allow for slightly lower 6pH vs 6.5)
- Monitoring: generally similar although includes selenium (and requires monitoring for the entire duration of the permit)
- Reporting: Requires reporting of monitoring data to EPA.

Refer to the following advice from the ABS Advisory on EGCS July 2018.

The U.S. EPA Vessel General Permit (VGP) is a separate regulation required for operation 3 nautical miles from US shores. The requirements are broadly aligned with IMO. The notable differences are on pH discharge and the recording, monitoring and reporting obligations. The pH of the washwater discharged from the scrubbing process is to be no less than 6.0 measured at the ship’s overboard discharge and no other methodology of pH determination would be acceptable. For more detailed and specific requirements, including reporting procedures, reference may be made to the specific sections of the VGP 2013, such as 2.2.26 Exhaust Gas Scrubber Washwater Discharge and other associated sections.

**6.2 What to do in case a single monitoring instrument of EGCS fails?**

Guidance on the steps and actions to be taken by ships are provided in MEPC.1/Circ.883: *Guidance on Indication of Ongoing Compliance in the Case of the Failure of a Single Monitoring Instrument, and Recommended Actions to take if the EGCS fails to meet the Provisions of the 2015 EGCS Guidelines (MEPC.259(68))* (the IMO guidance can be seen [here](#)). Para.6 and 12 of MEPC.1/Circ.883 contain the key points, i.e, an accidental breakdown, the one-hour time threshold and reporting requirements.

Step	Action
1	<p>Ship takes action to identify and remedy the malfunction.</p> <p>Consult the troubleshooting chapter of the ship’s EGCS Technical Manual which includes:</p> <ul style="list-style-type: none"> <li>• a checklist for the operator to use to identify a malfunction; and</li> <li>• a list of remedial actions that can be taken to resolve the malfunction after it is identified.</li> </ul>
2	<p>If the system’s malfunction is not rectified in ONE HOUR, this is regarded as an accidental breakdown. Change over to compliant fuel oil immediately. Record-keeping is vital.</p> <p>If the ship does not have compliant fuel oil, or a sufficient amount of compliant fuel oil on board, the ship should communicate this to the relevant authorities, including the ship’s Flag Administration, for their agreement, a proposed course of action to either bunker compliant fuel oil or to carry out repair works.</p>

3	<p>Check data of all monitoring sensors (pH, PAH, turbidity). The effect on the other parameters may indicate whether the change in signal is caused by sensor failure or whether the performance of the EGCS itself has changed. If the other parameters are continuing at normal levels, it is an indication that there is only an instrumentation malfunction rather than non-compliance with regard to the levels allowed in the exhaust gas and the discharge water.</p>
4	<p>Ship keeps the following records of interim indications for demonstrating compliance (but not limited to):</p> <ul style="list-style-type: none"> <li>• record of the data at the time of malfunction;</li> <li>• record of the sulphur content of the various grades of fuel oil used from the time when the malfunction started;</li> <li>• log the malfunctioning of the monitoring equipment and (for Scheme A) record all parameters that might be considered suitable to indicate compliant operation; and</li> <li>• the monitoring equipment that has suffered a malfunction should be repaired or replaced as soon as practicable.</li> </ul>
5	<p>Record any EGCS malfunction event in the EGCS Record Book including the date and time the malfunction began and, if relevant, how it was resolved, the actions taken to resolve it and any necessary follow-up actions.</p>
6	<p>Any EGCS malfunction that lasts more than ONE HOUR, or REPETITIVE malfunctions, should be reported to the Flag and Port State's Administration along with an explanation of the steps the ship operator is taking to address the failure.</p>

MEPC.1/Circ. 883 concludes that: *At their discretion, the Flag and Port State's Administration could take such information and other relevant circumstances into account to determine the appropriate action to take in the case of an EGCS malfunction, including not taking action.*

## FAQs: EGCS

### Q1: Which approval schemes are most commonly chosen by ships?

A1: Scheme B approved open-loop or hybrid scrubbers.

### Q2: For Scheme B approved scrubbers, which document would certify or confirm that the ship is fitted with a scrubber?

A2: See item 2.3 of the Supplement to the ship's IAPP (International Air Pollution Prevention) Certificate:

- 2.3.1 When the ship operates outside of an emission control area specified in regulation 14.3, the ship uses:
- .1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.5% m/m; and/or
  - .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SOX emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.50% m/m
- 2.3.2 When the ship operates inside an emission control area specified in Regulation 14.3, the ship uses:

(Reference: IMO Resolution MEPC.305(73) adopted on 26 October 2018)

Regardless of the compliance method(s), Members are advised to check accuracy of this section of the ship's IAPP Certificate.

**Q3: If a ship's scrubber is malfunctioning for more than one hour in high seas, how would PSCOs of the next port check whether the ship was in compliance or not?**

A3: PSCOs could check the high frequency auto-logged operating parameters and compare the records with the EGCS Technical Manual and the ship's log books to confirm whether the scrubber operated continuously in compliance in high seas.

**Q4: Is there a compilation of scrubber malfunctioning reports?**

A4: No. IMO GISIS does not have such reporting module at present. This matter is under consideration.

## 7 Closing Remarks

INTERTANKO has undertaken a number of studies that resulted in evidence-based proposals and new ways forward in relation to the implementation of the sulphur limit – this Guidance is informed by elements of this wide scrutiny. We will continue to explore practical ways in which the information and insight gathered through our consultation functions can be analysed and reported to the IMO to help drive further improvements in the quality of analysis underpinning the regulations and associated guidelines. The expansion of the better regulation framework will effectively promote collaboration, efficiency, regulatory consistency and scrutiny amongst all stakeholders.

The 0.50% sulphur limit will present an array of challenges. Gathering post-2020 feedback and comments from Members, however anecdotal, will provide a valuable insight into their experiences in 2020. As Members operating in different regions are exposed to a variety of situations, there will always be new information shared and new perspective gained. It is hoped that many comments will be collected from within the INTERTANKO Membership.

This interaction within INTERTANKO will help its Members maintain constant regulatory awareness and keep them on their path as the leading players in the shipping industry.

## REFERENCES

## APPENDIXES

- Appendix 1: Checklist of IMO instruments on 2020
- Appendix 2: Testing and verification procedure
- Appendix 3: Compatibility strategy (section 3.2.2 of this Guide)
  - Appendix 3-1: Unexpected comingling
  - Appendix 3-2: Planned comingling
- Appendix 4: Local and regional regulations

## Checklist of IMO instruments on 2020

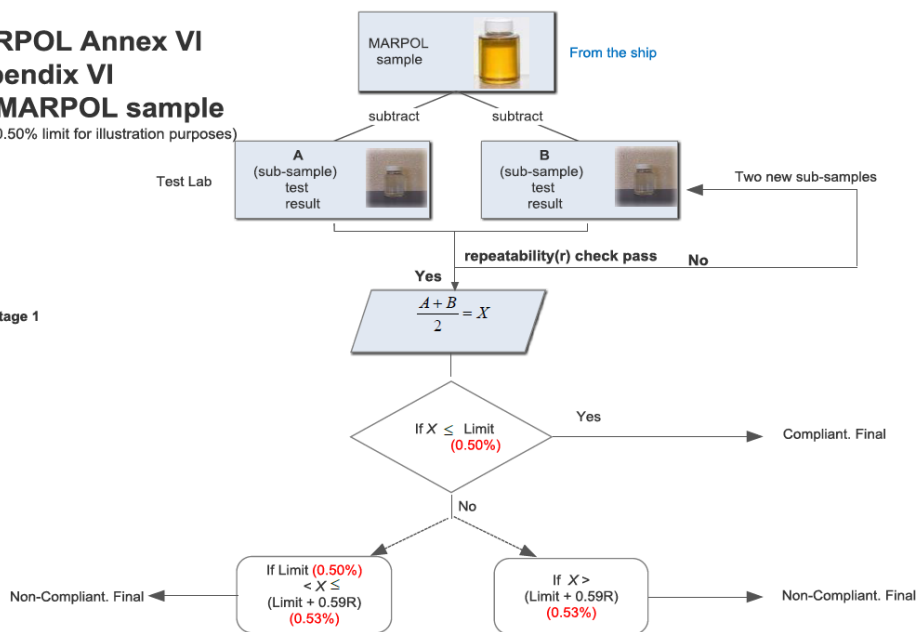
(M: Mandatory, N-M: Non-Mandatory)

	IMO Instruments	Entry into force or effective date
.1	Reg. 14.1 of MARPOL Annex VI ( 0.50% limit, <b>M</b> )	1 January 2020
.2	Amendments to MARPOL Annex VI, Reg.14.1 and 14.4, HSFO carriage ban ( <b>M</b> )	1 March 2020
.3	MEPC.1/Circ.878: Guidance on the development of the Ship Implementation Plan (SIP) (N-M)	Nov 2018
.4	Amendments to MARPOL Annex VI, new definitions of sulphur content (Reg. 2.51), MARPOL samples (Reg. 2.53~55, 14.8~9) and mandating designated in-use fuel oil sampling points (Reg. 14.10~13) ( <b>M</b> )	[autumn 2021]
.5	MEPC.1/Circ.864/Rev.1: 2019 Guidelines for In-use fuel oil sampling for verification of the sulphur content (N-M)	June 2018
.6	Reg.18.8.2 and amendments to Appendix VI of MARPOL Annex VI, sulphur content verification procedures ( <b>M</b> )	[autumn 2021] See .7 below.
.7	MEPC.1/Circ. 882 encouraging early application of the amended appendix VI of MARPOL Annex VI (N-M)	See .6 above.
.8	MEPC.320(74): The 2019 Guidelines on Consistent Implementation of the 0.50% sulphur limit under MARPOL Annex VI (N-M)	June 2018
.9	MSC-MEPC.5/Circ.15: Urging delivery of compliant fuel oil by suppliers (N-M)	June 2018
.10	MEPC.1/Circ.881: Guidance for PSC on contingency measures for addressing Non-Compliant fuel oil (N-M)	June 2018
.11	MEPC.321(74): 2019 Guidelines for PSC under MARPOL Annex VI (N-M)	June 2018
.12	MEPC.1/Circ.883: An MEPC Circular providing EGCS (Scrubber) Accidental Breakdown Guidance (N-M)	June 2019
.13	MEPC.1/Circ.884: Best Practice for Member/Coastal States to assist their duties under MARPOL Annex VI (N-M)	June 2019
.14	MEPC.1/Circ. 875: Best Practice for Fuel Oil Purchasers/Users (N-M)	April 2018
.15	MEPC.1/Circ.875/Add.1: Best Practice for Fuel Oil Suppliers(N-M)	Nov. 2018
Ad d.	MSC.465(101): Recommended interim measures to enhance the safety of ships relating to the use of oil fuel(N-M)	May 2019



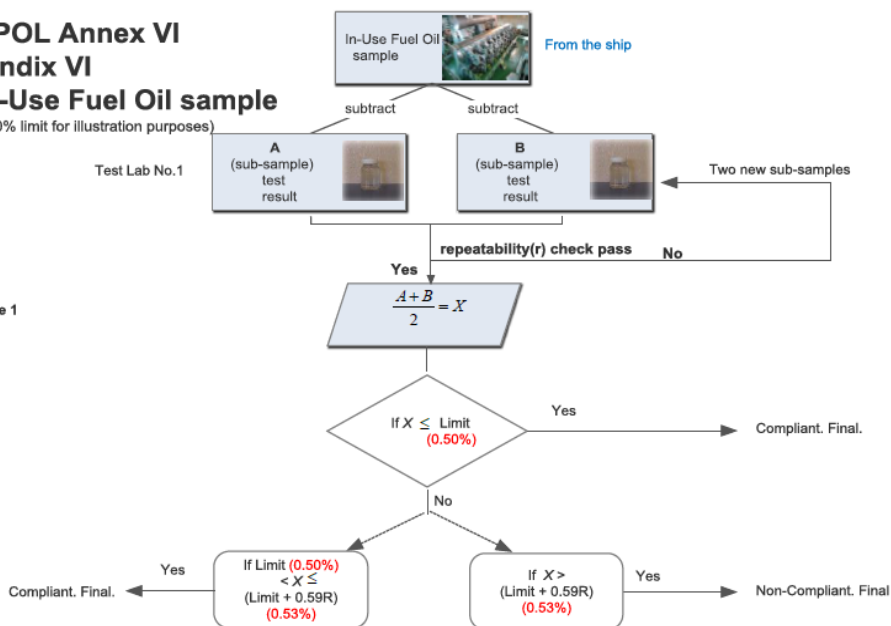
Testing and verification procedure

**MARPOL Annex VI  
Appendix VI  
for MARPOL sample**  
(using 0.50% limit for illustration purposes)



(Figure 9. Part 1 of the amended appendix VI of MARPOL Annex VI, MARPOL delivered sample)

**MARPOL Annex VI  
Appendix VI  
for In-Use Fuel Oil sample**  
(using 0.50% limit for illustration purposes)



(Figure 10. Part 2 of the amended appendix VI of MARPOL Annex VI, on board and in-use sample)

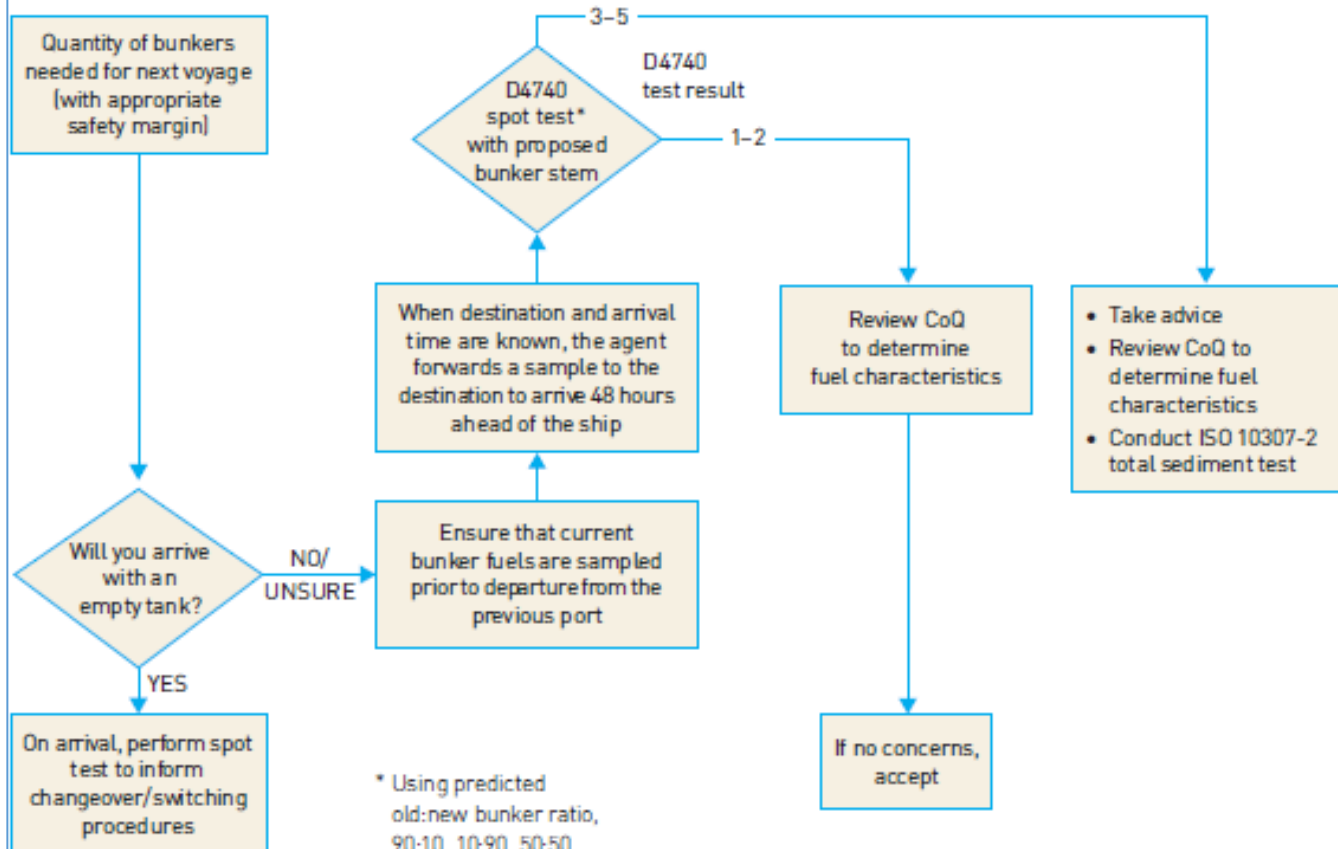
Appendix 3

<sup>28</sup> Source: ISWG-AP 1/3/3, INTERTANKO et al, 25 May 2018

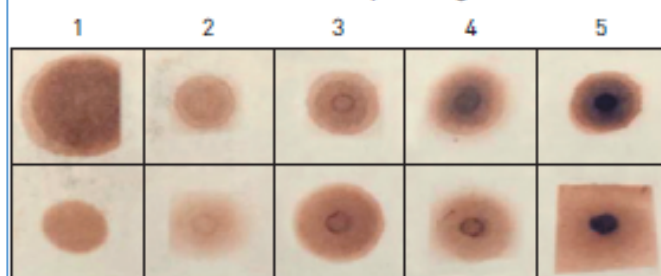
### Compatibility strategy (section 3.2.2 of this Guide)

#### Appendix 3-1, Unexpected comingling

Figure 1 Example of the steps that could be followed during a bunker delivery  
*(a high-level scheme more suited to those situations where segregated bunkering is the norm and the ship may unexpectedly have to commingle)*



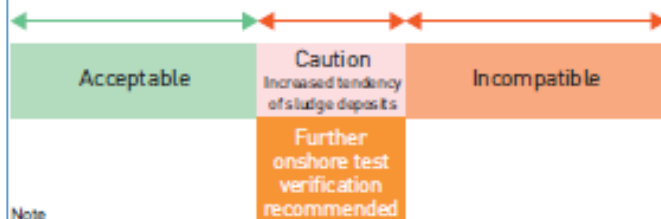
#### \* ASTM D4740 spot rating<sup>1</sup>



Reference spot description [source: ASTM D4740: 2019]

Characterizing features according to spot number:

1. Homogenous spot [no inner ring].
2. Faint or poorly defined inner ring.
3. Well-defined thin inner ring, only slightly darker than the background.
4. Well-defined inner ring, thicker than the ring in reference spot no. 3 and somewhat darker than the background.
5. Very dark solid or nearly solid area in the centre; the central area is much darker than the background.



Note

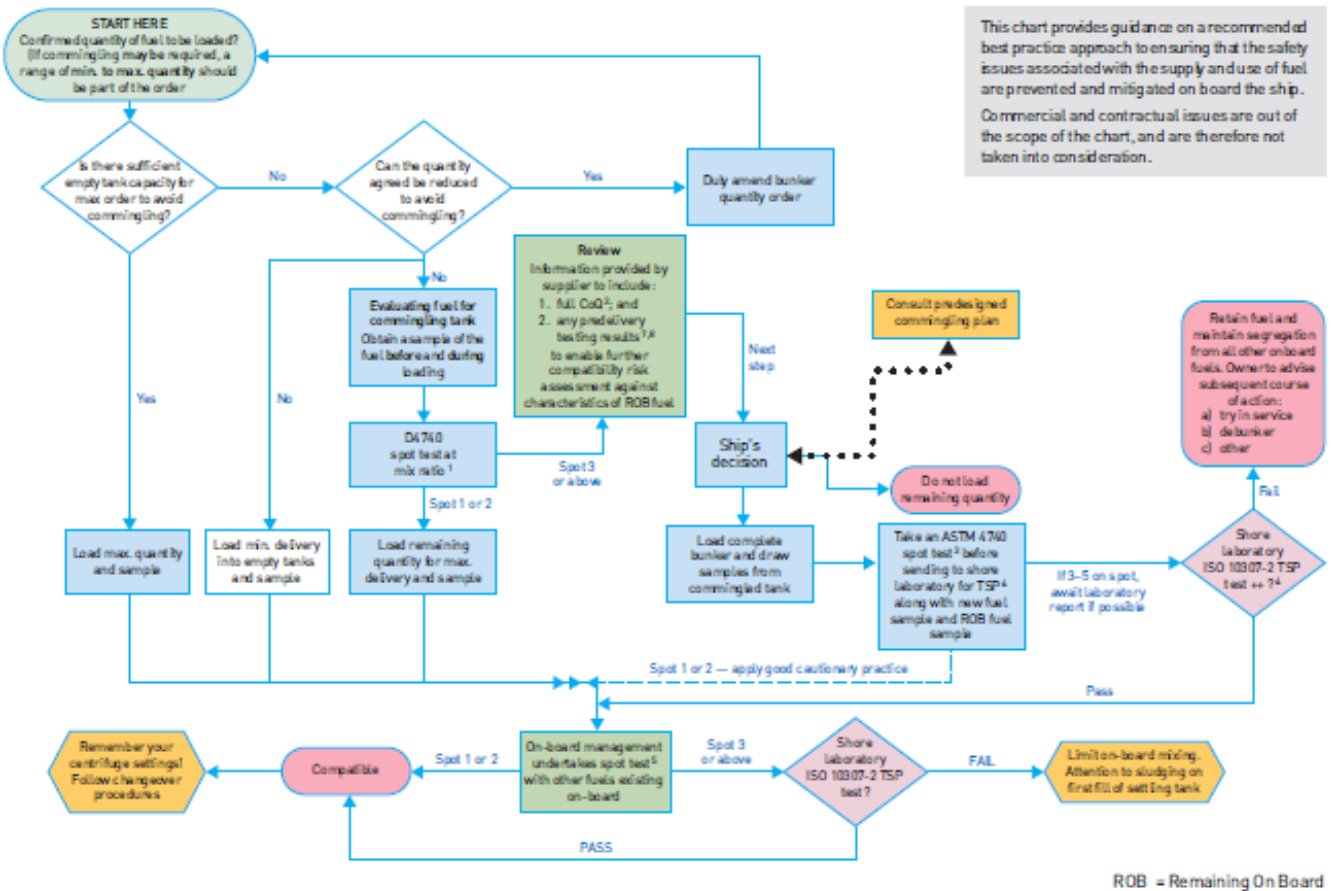
1. Where a spot rating is difficult to determine, i.e. whether the rating is '2' or '3', the higher rating numbers should be reported.

(Source: JIG, Section 3, Avoiding fuel compatibility issues, Page 38)

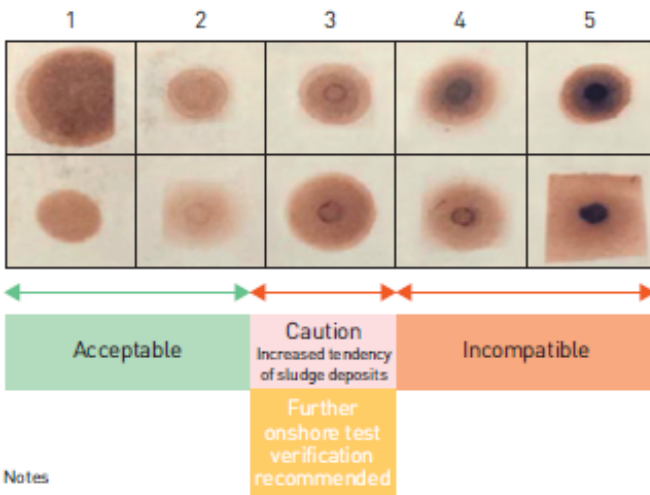
Appendix 3-2, Planned comingling

Figure 2 Example of the steps that could be followed during a bunker delivery

(a more detailed example which caters for additional eventualities)



\* ASTM D4740 spot rating<sup>6</sup>



Reference spot description (source: ASTM D4740: 2019)

Characterizing features according to spot number:

1. Homogenous spot (no inner ring).
2. Faint or poorly defined inner ring.
3. Well-defined thin inner ring, only slightly darker than the background.
4. Well-defined inner ring, thicker than the ring in reference spot no. 3 and somewhat darker than the background.
5. Very dark solid or nearly solid area in the centre; the central area is much darker than the background.

Notes

1. Mix ratio should be approximately that of the intended comingling ratio (new, old and test: 10:90 / 90:10 / 50:50) to have a wider picture of mix behaviour.
2. CoQ completed: to include minimum requirements of viscosity, density (CCAI may be calculated), micro carbon residue (MCR), pour point, sulphur; further analysis and other operational parameters may be included. Requires support from suppliers.
3. This will be a single fuel spot test of a sample from a comingling tank (if possible; if not possible, move straight to outcome assumption of spot 3-5).
4. TSP—signifies a full laboratory-based compatibility/stability assessment programme which may require the full 24-hour test programme to achieve a definitive result.
5. New bunker compatibility check with bunkers remaining on board, using 50:50, 10:90 and 90:10 spot checks to facilitate on-board transfer and use.
6. Where a spot rating is difficult to determine, i.e. whether the rating is '2' or '3', the higher rating number should be reported.
7. Some ships may be in a position to forward samples for pre-bunker analysis compatibility checks, requiring close cooperation with the suppliers.
8. ASTM D4740 spot test to be requested from the supplier if multiple batches of the same fuel grade are delivered from multiple tanks.

(Source: JIG, Section 3, Avoiding fuel compatibility issues, Page 39)

### Local and regional regulations

Currently, EU, the US, China, Hong Kong Special Administrative Region of the PRC, Australia and Taiwan are implementing their own regulations relating to the 0.50% sulphur cap. For details, refer to the ABS Advisory EGCS July 2019 (page 3-7) click [here](#).

It is expected that more States will develop their own regulations in the coming months. This Guide will be updated with such new local and regional regulations worldwide.

- For China's 2020 new regulations regarding FONAR and the PSC's contingency measures for non-compliant fuel oils: see Section 4.5.1.

△ △ △