



SPECIAL CIRCULAR

No. 14-009
4 November 2014

To the Members

Dear Sirs,

Regulation of air pollution by ships under MARPOL Annex VI

Members' attention is drawn to the progressive reduction of air pollution limits by ships as well as the introduction of Emission Control Areas under the existing legislative framework.

This Club Circular draws Members' attention to the regulatory constraints and outlines how Members may ensure compliance.

1. MARPOL 73/78 – the regulatory instrument

- 1.1 The International Convention for the Prevention of Pollution from Ships 1973/1978 (hereafter referred to as “MARPOL”) was adopted in response to a spate of tanker accidents in the 1970s and has been expanded subsequently to provide a regulatory regime akin to a maritime environmental law code.
- 1.2 Different annexes of MARPOL apply to different types of marine pollution. Annex I applies to oil, Annex II applies to noxious liquid substances, Annex III applies to harmful substances, Annex IV applies to sewage, Annex V applies to garbage and Annex VI applies to air pollution by sulphur oxide and nitrous oxide emissions.
- 1.3 We have dealt with Annex V in our circular of 3 September 2013. It may be downloaded from: https://www.piclub.or.jp/index.php?action=pages_view_main&active_action=journal_view_main_detail&post_id=1587&comment_flag=1&block_id=384#_384
- 1.4 This circular is in relation to Annex VI and the prevention of air pollution by ships.
- 1.5 Annex VI has been revised several times and may be downloaded from: [http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Air%20pollution/Resolution%20MEPC.176\(58\)%20Revised%20MARPOL%20Annex%20VI.pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Air%20pollution/Resolution%20MEPC.176(58)%20Revised%20MARPOL%20Annex%20VI.pdf) ; and taking into consideration amongst other things the following subsequent amendments: [http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Technical%20and%20Operational%20Measures/Resolution%20MEPC.203\(62\).pdf](http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Technical%20and%20Operational%20Measures/Resolution%20MEPC.203(62).pdf) .
- 1.6 This circular contains sufficient information for Members to obtain an overview of Annex VI but Members are recommended to review for further details the relevant documents, which can be downloaded from the links referred to in this circular.

2. General outline of MARPOL 73/78 Annex VI

- 2.1. Regulation 1 of Annex VI provides that it applies to all ships (which includes fixed and floating drilling rigs and other platforms) of 400+ GT. Despite the fact that many countries have enacted supplementary laws (see paragraph 3 below) Annex VI has a widespread coverage itself as it applies (i) to ships flying the flag of a state which has ratified the MARPOL convention; and (ii) to ships which are engaged in voyages involving jurisdictions that have ratified MARPOL Annex VI.

- 2.2. In general, MARPOL Annex VI establishes limits on (i) sulphur oxides (hereafter referred to as “SOx”); (ii) particulate matter (hereafter referred to as “PM”); and (iii) nitrogen oxides (hereafter referred to as “NOx”) which may be contained within the ship’s emissions. The limits vary depending on the geographical area in which the ship is sailing at any given moment. In more sensitive ecosystems than others or in close proximity to a coastline in an Emission Control Area (hereafter referred to as “ECA”) more stringent requirements may apply. The allowed SOx, PM and NOx emissions may therefore vary depending on the geographical location of the ship.

Under MARPOL Annex VI, the established ECAs are:

ECA	Restrictions in relation to	Geographical definition of the area
The Baltic Sea	SOx	As defined in MARPOL Annex I
The North Sea	SOx	As defined in MARPOL Annex V
North America	SOx, NOx and PM	As defined in MARPOL Appendix VII of Annex VI
US Caribbean Sea	SOx, NOx and PM	As defined in MARPOL Appendix VII of Annex VI

Figure 1: Geographical Illustration of ECAs



Source: Hapag Lloyd

In ECAs ships will need to burn oils which will enable compliance with ECA requirements. The ship will need to change over from its usual fuel to a fuel which satisfies the more stringent ECA requirements. As to timing of the change-over, according to paragraph 6 of Regulation 14 of MARPOL Annex VI, the ship is required to have fully changed over to the ECA-compliant fuel oil before entering the ECA. Similarly when leaving an ECA, the change-over is not to commence until after leaving the ECA.

In order to prove compliance (where necessary) Members are advised to instruct their crews to use either the engine log book or indeed a separate oil record book in order to keep records of the following details: (i) quantities of the ECA compliant fuel oils on board at each change-over; and (ii) the time and position when completing or commencing a change-over.

2.2.1. Regulation 14: Limits of SOx and PM

- 2.2.1.1. Regulation 14 sets a global cap on the sulphur content of any maritime fuel oil. Paragraph 9 of Regulation 2 defines fuel oil as “any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including distillate and residual fuels.” The same SOx limit therefore applies to IFO and MDO or MGO. However, the remainder of the circular adopts the language used by the draftsmen of MARPOL Annex VI and refers to *fuel oil*.

2.2.1.2. As mentioned above, Annex VI introduces two sets of emission and fuel quality requirements which are (i) global and (ii) more stringent in ECAs. Further, in order to allow the shipping and bunkering industry enough time to adapt to the new Regulations (and to establish sufficient refinery capacities) Annex VI provides for a progressive reduction SO_x and NO_x emissions.

2.2.1.3. In relation to the *global limit* of permitted sulphur in marine fuel oil *outside ECA*, paragraph 1 of Regulation 14 of Annex VI provides that the sulphur fuel oil used on board ships shall not exceed:

- (i) 4.50% m/m prior to 1 January 2012;
- (ii) 3.50% m/m on and after 1 January 2012; and
- (iii) 0.50% m/m on and after 1 January 2020

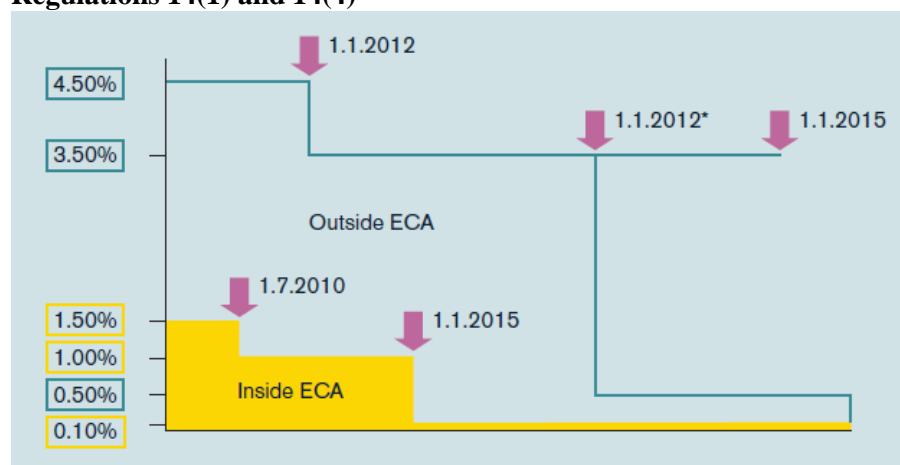
According to paragraph 2 of Regulation 14 referring to MEPC.82(43), the limits stipulated in Annex VI are subject to further revision and *may* be adjusted depending on the availability of low sulphur fuel oil and the average use. It is within the IMO's discretion to make adjustments to (iii) above and either to bring it forward to 2018, or to postpone it until 2025.

MEPC.82(43) can be downloaded from:
[http://www.imo.org/blast/blastDataHelper.asp?data_id=15684&filename=82\(43\).pdf](http://www.imo.org/blast/blastDataHelper.asp?data_id=15684&filename=82(43).pdf)

2.2.1.4. In relation to the limits in ECAs, paragraph 4 of Regulation 14 of Annex VI provides that ships operating within the ECA need to burn fuel oil which shall not exceed the following limits:

- (i) 1.50% m/m prior to 1 July 2010;
- (ii) 1.00% m/m on and after 1 July 2010; and
- (iii) 0.10% m/m on and after 1 January 2015.

Figure 2: Illustration of progressive decrease of sulphur content under Regulations 14(1) and 14(4)



Source: Lloyds Register

2.2.1.5. In order to prove compliance, the bunker suppliers shall document the sulphur content of fuel oil on the bunker delivery note (see Paragraph 5 of Regulation 14 and Paragraphs 5-8 of Regulation 18). Members are advised to pay particular attention to this fact and to include this into the ship crews' instructions for receiving bunkers.

2.2.1.6. Bunker delivery notes should contain the following information:

- (i) Name and IMO number of the receiving vessel;
- (ii) Port or anchorage where delivery took place;
- (iii) Date of commencement of delivery;
- (iv) Name, address and contact details of the bunker supplier;
- (v) Product names and specification;
- (vi) Received quantity in metric tons;
- (vii) Density at 15° C, kg/m³ (fuel oil shall be tested in accordance with ISO 3675:1998 or ISO 12185:1996);
- (viii) Sulphur content (& m/m) (fuel oil shall be tested in accordance with ISO 8754:2003); and
- (ix) a signed and stamped declaration by the supplier (as identified in (iv) above) to the effect that the fuel oil supplied is in conformity with the applicable paragraph of MARPOL Annex VI or any other relevant local law (e.g. gas and/or diesel oil envisaged for consumption within Californian waters as set out in paragraph 3.3.2.).

2.2.2 Regulation 13: Limits of NOx

2.2.2.1. Sub-paragraphs 1.1. and 1.2 of Regulation 13 clarify that marine engines which are contemplated to be used for emergencies only fall outside the ambit of Regulation 13. Only engines which are designed for everyday use are within the ambit of Regulation 13.

2.2.2.2. Paragraphs 3-5 of Regulation 13 introduce a regime of standards which become progressively tighter, i.e. the later the ship's date of construction the tighter the standards which need to be satisfied.

2.2.2.3. For ease of reference the following table illustrates the three tiers into which an engine which is constructed for everyday use may fall.

Tier	Ship construction date on or after	Total weighted cycle emission limit (g/kWh) n = engine's rated speed (rpm)		
		n < 130	n = 130 - 1999	n ≥ 2000
I	1 January 2000	17.0	$45.n^{-0.2}$ e.g., 720 rpm - 12.1	9.8
II	1 January 2011	14.4	$44.n^{-0.23}$ e.g., 720 rpm - 9.7	7.7
III	1 January 2016*	3.4	$9.n^{-0.2}$ e.g., 720 rpm - 2.4	2.0

Source: IMO

Tier III is further restricted in its application. It only applies to ships while operating in an ECA which seeks to limit NOx emissions and not just SOx emissions (please see paragraph 2.2 for which ECAs limit SOx emissions only and which ECAs limit both SOx and NOx emissions).

- 2.2.2.4. For ships which were constructed prior to 1 January 2000 (i.e. which fall within the scope of the first tier) paragraph 7 of Regulation 13 provides a means for retrospective NOx certification.

If a particular ship falls within the ambit of paragraph 7 of Regulation 13 (e.g. the engine generates more than 5,000 kW and was constructed in the 1990ies) it will need to comply with NOx limits set out in sub-paragraph 7.4 of Regulation 13. For ease of reference the table below summarizes the NOx limits.

Engine construction date	n < 130	n = 130 - 1999	n > or = 2000
On or after 1 January 1990 but prior to 1 January 2000	17.0 g/kWh	45*n ^(-0.2) g/kWh	9.8 g/kWh

- 2.2.2.5. In determining the NOx emission limit for a particular engine a two-stage test must be applied.

First, the date of construction determines into which tier a particular engine falls. The tier-system represents the progressive tightening of NOx limits over time and allows the industry to adapt to the Annex VI over time, i.e. to build future ships according to the new standards and continue to trade old ships if permissible.

Secondly, depending on the engine's speed (measured in rounds per minute) the NOx emission limit is set in g/kWh which means the weight of the NOx emission which the engine produces whilst running at a certain speed.

- 2.2.2.6. IMO Resolution MEPC.177(58) is also referred to as the NOx Technical Code 2008 which is incorporated into Regulation 13 and provides amongst other things mandatory testing and certification procedures which must be followed when ascertaining whether or not the exhaust values fall within the above stated limits.

Further, the NOx Technical Code 2008 paragraph 2.3.4 requires a ship to carry an approved technical file, which must set out details (e.g. NOx emissions including any NOx reducing device; and records of the engine's performance) as set out in greater detail in paragraph 2.4 of the NOx Technical Code.

The NOx Technical Code 2008 can be downloaded from:
[http://www.imo.org/blast/blastDataHelper.asp?data_id=23761&filename=177\(58\).pdf](http://www.imo.org/blast/blastDataHelper.asp?data_id=23761&filename=177(58).pdf)

2.2.3. Summary: Regulations 13 and 14

- 2.2.3.1. In summary, Regulation 14 limits the range of permissible fuel oils and the limit varies depending on the geographical area in which the ship is operating at any given moment in time. In contrast Regulation 13 prescribes the engines' design which will also depend on the geographical area in which the ship is operating when Tier III comes into effect. At the moment Regulation 13 only imposes limits on the exhaust value which depend upon the engines' speed.

Regulation 13 targets integral features of the ship itself, whereas Regulation 14 targets the fuel supplies. Despite the fact that low sulphur fuel oil supplies come with a price tag attached,¹ it appears that compliance with Regulation 14 is somewhat easier to achieve than compliance with Regulation 13.

However, the common feature throughout Regulations 13 and 14 is a progressive tightening of the permissible air pollution limits.

- 2.2.3.2. As stated in paragraph 2.1. above, every ship of 400GT+ falls within the scope of MARPOL Annex VI. In order to prove compliance Regulation 6 of MARPOL Annex VI requires the issue of an International Air Pollution Certificate (hereafter referred to as “IAPP”). Members are advised to ensure that the technical department keeps the relevant documentation up to date.

2.2.4. Alternative means for compliance

- 2.2.4.1. Regulation 4 provides the legal base for ratifying states to approve alternative means of compliance which must be at least as effective as Regulations 13 and 14 in terms of reduction of exhaust values.

- 2.2.4.2. An example for such system are Exhaust Gas Cleaning Systems (hereafter referred to as “EGCS”) which reduce SOx emissions by water washing the exhaust gas before release into the atmosphere. IMO Resolution MEPC.184(59) sets out details in relation to the certification and can be downloaded here:

[http://www.imo.org/blast/blastDataHelper.asp?data_id=26469&filename=184\(59\).pdf](http://www.imo.org/blast/blastDataHelper.asp?data_id=26469&filename=184(59).pdf)

- 2.2.4.3. In relation to NOx reduction measures further alternative means (e.g. selective catalytic reduction equipment), are available although they are infancy in the marine context.

3. Air Pollution Limits other than under MARPOL 73/78 Annex VI

- 3.1. Various national states and/or inter-governmental organisations have enacted their own or supplementary legislation in addition to MARPOL Annex VI. A non-exhaustive selection of legislation enacted in various jurisdictions in addition to MARPOL is considered in the following paragraphs. In case of doubt, Members are advised to consult with the competent authorities in the relevant jurisdictions.

3.2. European Union: EU Directive 2012/33/EU

- 3.2.1. The relevant EU legislation is EU Directive 2012/33/EU (hereafter referred to as the “EU Directive”) which became effective as of 18 June 2014. EU Directive 2012/33/EU can be downloaded here:

<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:327:0001:0013:EN:PDF>

However, a number of other EU Directives² have preceded this legislation which may still be occasionally referred to.

- 3.2.2. The general theme of the EU Directive is that it provides for stronger enforcement and monitoring in order to achieve compliance.

- 3.2.3. The EU Directive is expressly linked to MARPOL 73/78 Annex VI (as discussed in paragraph 2 above) and adopts it, but it also imposes in articles 9

¹ <http://www.dfsseaways.co.uk/about-us/press/press-releases/new-sulphur-rules-cause-closure/> In Europe a North Sea ferry service between the UK and Denmark ceased to operate because the low sulphur price surcharge made the service economically unviable

² EU Directive 99/32/EU and EU Directive 2005/33/EU

and 14 stricter SOx limits than the limits which are already imposed by MARPOL 73/78.

The table below illustrates the stricter SOx limits under EU law.

Summary of Global MARPOL 73/78 Annex VI Regulations

Geographical area	SOx limits
Outside ECAs	3.50% m/m on and after 1 January 2012
	0.50% m/m on and after 1 January 2020
Within ECAs	1.00% m/m on and after 1 July 2010
	0.10% m/m on and after 1 January 2015

In contrast, other regional SOx limits apply under the EU Directive

Geographical area	SOx limit for all ships	SOx limit for passenger ships*	SOx limit for ships at berth in EU ports
Outside ECAs	3,50% as from 18 June 2014	1.50% until 1 January 2020	0.1%, unless shore electricity is used or the berthing duration is less than 2hrs
	0,50% as from 1 January 2020	0.50% as from 1 January 2020	0.1% as stated above
Within ECAs	1.00% until 31 December 2014	1.00% until 31 December 2014	0.1% as stated above
	0.10 as from 1 January 2015	0.10% as from 1 January 2015	0.1% as stated above

* Passenger ships are defined in EU Directive 2005/33/EC Section 3f as ships which carry more than 12 people other than crew (including superintendents who travel on board on the business of that ship). Some German container lines take private individuals on board their cargo ships³ as passengers. Members who consider offering such services may want to consider restricting the number of passengers in light of the more stringent SOx limits in relation to ships which sail with passengers on board within EU waters.

3.3. United States and California

- 3.3.1. The United States have two layers of legislation. As a matter of US federal law the Act to Prevent Pollution from Ships implements MARPOL 73/78 Annex VI as discussed in paragraph 2 above. The Act to Prevent Pollution from Ships can be downloaded here:
<http://www.epw.senate.gov/atppfs.pdf>
- 3.3.2. As a matter of state law California enacted the Ocean-Going Vessels Fuel Regulation which sets special SOx limits for gas- and diesel oil but not for fuel oil which in the absence of state law remains subject to MARPOL Annex VI. The Ocean- Going Vessels Fuel Regulation can be downloaded here:
<http://www.arb.ca.gov/regact/marine2005/revfro13.pdf>
- 3.3.3. The Ocean-Going Vessels Fuel Regulation imposes a SOx limit for marine diesel or gas oil of 0.1% as of 1 January 2014, which is stricter than what is

³<http://www.opdr.com/en/opdr-business-sectors/freighter-voyages.html>

permitted under EU legislation. By way of comparison, under EU legislation and MARPOL Annex VI the 0.10% SO_x becomes only applicable as of 1 January 2015.

- 3.4. In summary, Members are advised to consider the SO_x limit under MARPOL Annex VI as a starting point. However, when Members contemplate to sail into waters (e.g. the Californian coast line) which they are not familiar with from their regular trade then Members are advised to consult with local agents and/or local lawyers whether local law imposes stricter limits of air pollution than what is permissible under MARPOL Annex VI.
- 3.5. As a matter of practicality Members are advised to consider SO_x limits at an early stage. Prudent voyage planning requires (i) calculating the estimated amount of low sulphur fuels; (ii) considering the max. Permissible sulphur content; and (iii) inquiring the availability of the low sulphur fuel oils upon receipt of the employment orders in order to leave enough time for sourcing at alternative places enroute.

4. Penalties and club cover for fines

4.1. Regulation 11 of MARPOL 73/78 Annex VI sets out the method of enforcement. Further, local law may provide further rights than what is available under MARPOL Annex VI.

4.2. Paragraph 2 of Regulation 11 provides that:

“A ship to which this Annex applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has emitted any of the substances covered by 3 <http://www.opdr.com/en/opdr-business-sectors/freighter-voyages.html> this Annex...If an inspection indicates a violation of this Annex, a report shall be forwarded to the Administration for any appropriate action.”

Accordingly, enforcement is conducted by the authorities of individual ratifying member states.

4.3. The Association has learned of fines imposed by the Californian Air Resources Board in the region of USD300,000, which is however not conclusive guidance in relation to the likely quantum of fines for violation of MARPOL Annex VI or national laws as may be applicable.

4.4. The general rules in relation to Club Cover for fines are set out in Rule 31. As a general rule, Club cover may be prejudiced if the Member did not take all reasonable steps necessary for compliance.

5. Provision of bunkers in relation to time-chartered vessels

5.1. If Members charter owned tonnage out to time charterers or operate themselves with chartered tonnage, the following considerations in relation to the charterparty will become relevant. Since the rise of regulation in the bunkering sector is a relatively new phenomenon most standard charterparty forms do not provide express terms in relation to the provision of bunkers which comply with MARPOL Annex VI or the local law equivalents as may be applicable.

5.1.1. The common scheme in most charterparty forms (such as the NYPE 1946 and 1993 or the BALTIME 1939) is that charterers are obliged to provide and pay for bunkers. With regard to the required quantity and quality for safe performance of the voyage, owners are obliged to co-operate with charterers and to provide charterers with information about the characteristics and needs of their ship to safely reach the destination. The mutual obligation on

charterers and owners to co-operate derives from the co-operative nature of the commercial adventure.

5.1.2. The case law and charterparty forms predate the implementation of the various regulatory instruments referred to in the preceding paragraphs. This creates a level of uncertainty as to whether charterers or owners are ultimately responsible for failure to comply with MARPOL Annex VI or the local law equivalents. Since the obligation to supply the vessel with appropriate fuels is mutual much will depend on the circumstances of the particular case and charterers' and owners' respective conduct. As a matter of precaution Members are therefore advised to take a proactive approach irrespective of their position in a charterparty.

5.2 In order to address the uncertainty Members may wish to address the responsibility for compliance with the various regulatory instruments in a rider clause. Indeed, industry organizations such as BIMCO have produced precedents which Members may wish to consider incorporating as rider clauses into their charter parties.

5.2.1. BIMCO's Bunker Fuel Sulphur Content Clause (revised) reads as follows:

“(a) Without prejudice to anything else contained in this Charter Party, the Charterers shall supply fuels of such specifications and grades to permit the Vessel, at all times, to comply with the maximum sulphur content requirements of any emission control zone when the Vessel is ordered to trade within that zone.

The Charterers also warrant that any bunker suppliers, bunker craft operators and bunker surveyors used by the Charterers to supply such fuels shall comply with Regulations 14 and 18 of MARPOL Annex VI, including the Guidelines in respect of sampling and the provision of bunker delivery notes.

The Charterers shall indemnify, defend and hold harmless the Owners in respect of any loss, liability, delay, fines, costs or expenses arising or resulting from the Charterers' failure to comply with this Sub-clause (a).

(b) Provided always that the Charterers have fulfilled their obligations in respect of the supply of fuels in accordance with Sub-clause (a), the Owners warrant that:

*(i) the Vessel shall comply with Regulations 14 and 18 of MARPOL Annex VI and with the requirements of any emission control zone;
and*

(ii) the Vessel shall be able to consume fuels of the required sulphur content

when ordered by the Charterers to trade within any such zone.

Subject to having supplied the Vessel with fuels in accordance with Sub-clause (a), the Charterers shall not otherwise be liable for any loss, delay, fines, costs or expenses arising or resulting from the Vessel's failure to comply with Regulations 14 and 18 of MARPOL Annex VI.

(c) For the purposes of this Clause, “emission control zone” shall mean zones as stipulated in MARPOL Annex VI and/or zones regulated by regional and/or national authorities such as, but not limited to, the EU and the US Environmental Protection Agency.”

- 5.2.2. Different versions of this clause appear to be in circulation. Members are advised to adopt the above cited clause and pay particular attention to whether or not sub-clause (c) is included. Despite the fact that ‘emission control zone’ is a term which is peculiar to MARPOL Annex VI, sub-clause (c) widens the application of the clause to areas other than those defined by MARPOL Annex VI. As set out in paragraph 3.3. of this circular, California provides for its own local laws which go beyond what MARPOL requires. It is therefore important that owners and charterers are not just obliged to comply with MARPOL Annex VI but also with local laws which may be applicable depending on the vessel’s position.
- 5.2.3. The clause defines charterers’ and owners’ mutual obligations (referred to in paragraph 5.1.1. of this circular) in greater detail. However, it does not strictly adopt the approach of mutual obligation referred to above, since the owners’ obligations are dependent on charterers having discharged their obligation to provide and pay for fuel in accordance with the clause in the first place. It is therefore more favourable to owners than charterers. An alternative method of drafting would be to use mutual hold harmless clauses, i.e. allocating the:
- Responsibility to supply compliant fuels on charterers; and
 - Responsibility to use such fuels according to the relevant laws as may be applicable on owners.
- 5.2.4. Further, the clause only obliges charterers to supply regulation-compliant fuels within emission control zones. There are, however, also global sulphur limits which apply outside emission control zones. In the absence of a specific contract term addressing usage of fuels outside emission control zones it appears that owners and charterers are again dependent on the somewhat unclear concept of mutual responsibility (see paragraph 5.1.1. of this circular). Members are therefore advised to check whether or not the charterparty includes a detailed vessel’s description clause which either (i) sets out the sulphur content of permissible fuel oils, or (ii) incorporates fuel oil specifications (such as ISO 8217:2010) which provide that the fuel oil shall be in accordance with the regulations referred to in this circular.

6. Conclusion

- 6.1. In summary, Members are advised to take all necessary steps in order to ensure compliance with MARPOL Annex VI or local laws as may be applicable. Further, as a matter of good practice, Members are advised to take a proactive approach in relation to ships which are time chartered out. Employment orders sent by time charterers to the ship should also be reviewed (in particular in relation to cargo carrying capacity and the respective bunkering itinerary) with regard to compliance with the regulatory requirements set out in the preceding paragraphs.

Yours faithfully,

The Japan Ship Owners’ Mutual Protection & Indemnity Association