INTERNATIONAL MARITIME ORGANIZATION

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MARINE ENVIRONMENT PROTECTION COMMITTEE
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REPORT OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE ON ITS SEVENTY-EIGHTH SESSION

Attached are the annexes to the report of the Marine Environment Protection Committee on its seventy-eighth session (MEPC 78/17).

LIST OF ANNEXES

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ANNEX 1

RESOLUTION MEPC.343(78)
(adopted on 10 June 2022)

AMENDMENTS TO THE ANNEX OF THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO

Amendments to MARPOL Annex I

(Watertight doors)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO article 16 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL), which specifies the amendment procedure and confers upon the appropriate body of the Organization the function of considering amendments thereto for adoption by the Parties,

HAVING CONSIDERED, at its seventy-eighth session, proposed amendments to MARPOL Annex I concerning watertight doors,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to MARPOL Annex I, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article 16(2)(f)(iii) of MARPOL, that the amendments shall be deemed to have been accepted on 1 July 2023 unless prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet have communicated to the Organization their objection to the amendments;

3 INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of MARPOL, the said amendments shall enter into force on 1 January 2024 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article 16(2)(e) of MARPOL, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to MARPOL;

5 ALSO REQUESTS the Secretary-General to transmit copies of the present resolution and its annex to Members of the Organization which are not Parties to MARPOL.

ANNEX

AMENDMENTS TO MARPOL ANNEX I

(Watertight doors)

CHAPTER 4 – REQUIREMENTS FOR THE CARGO AREA OF OIL TANKERS

PART A – CONSTRUCTION

Regulation 28 – Subdivision and damage stability

1 Paragraph 3.1 is replaced by the following:

".1 The final waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding may take place. Such openings shall include air pipes and those which are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and flush scuttles, small watertight cargo tank hatch covers which maintain the high integrity of the deck, remotely operated sliding watertight doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type."

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ANNEX 2

RESOLUTION MEPC.344(78)
(adopted on 10 June 2022)

AMENDMENTS TO THE ANNEX OF THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973, AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO

Amendments to MARPOL Annex II

(Abbreviated legend to the revised GESAMP Hazard Evaluation Procedure)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO article 16 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL), which specifies the amendment procedure and confers upon the appropriate body of the Organization the function of considering amendments thereto for adoption by the Parties,

HAVING CONSIDERED, at its seventy-eighth session, proposed amendments to appendix I of MARPOL Annex II concerning the abbreviated legend to the revised GESAMP Hazard Evaluation Procedure,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to appendix I of MARPOL Annex II, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article 16(2)(f)(iii) of MARPOL, that the amendments shall be deemed to have been accepted on 1 May 2023 unless prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet have communicated to the Organization their objection to the amendments;

3 INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of MARPOL, the said amendments shall enter into force on 1 November 2023 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article 16(2)(e) of MARPOL, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Parties to MARPOL;

5 ALSO REQUESTS the Secretary-General to transmit copies of the present resolution and its annex to Members of the Organization which are not Parties to MARPOL.

ANNEX

AMENDMENTS TO MARPOL ANNEX II

(Abbreviated legend to the revised GESAMP Hazard Evaluation Procedure)

Appendix I

Guidelines for the categorization of noxious liquid substances

The three tables under the title "Abbreviated legend to the revised GESAMP Hazard Evaluation Procedure" are replaced by the following four tables:

"

	A **Bioaccumulation and Biodegradation**			**B** **Aquatic Toxicity**	
Numerical rating	A1 Bioaccumulation		A2 Biodegradation	B1 Acute toxicity $LC/EC/IC_{50}$ (mg/L)	B2 Chronic toxicity EC_{10} or NOEC (mg/L)
	A1a: log P_{ow}	A1b: BCF			
0	log <1, log > ca.7 MW > 1000	no measurable BCF	R: readily biodegradable	AT >1000	CT >1
1	1≤ log <2	1≤ BCF <10	NR: not readily biodegradable	100< AT ≤1000	0.1< CT ≤1
2	2≤ log <3	10≤ BCF <100		10< AT ≤100	0.01< CT ≤0.1
3	3≤ log <4	100≤ BCF <500		1< AT ≤10	0.001 < CT ≤0.01
4	4≤ log <5	500≤ BCF <4000		0.1< AT ≤1	CT ≤0.001
5	5≤ log < ca.7	BCF ≥4000		0.01< AT ≤0.1	
6				AT ≤0.01	

	C **Acute Mammalian Toxicity**				
Numerical rating	C1 Oral toxicity	C2 Dermal toxicity	C3 Inhalation toxicity		
			C3a		C3b
	LD_{50}/ATE (mg/kg)	LD_{50}/ATE (mg/kg)	vapour/mist LC_{50}/ATE (mg/L)	mist only LC_{50}/ATE (mg/L)	vapour only LC_{50}/ATE (mg/L)
0	ATE >2000	ATE >2000	ATE >20	ATE >5	ATE >20
1	300< ATE ≤2000	1000< ATE ≤2000	10< ATE ≤20	1< ATE ≤5	10< ATE ≤20
2	50< ATE ≤300	200< ATE ≤1000	2< ATE ≤10	0.5< ATE ≤1	2< ATE ≤10
3	5< ATE ≤50	50< ATE ≤200	0.5< ATE ≤2	0.05< ATE ≤0.5	0.5< ATE ≤2
4	ATE ≤5	ATE ≤50	ATE ≤0.5	ATE ≤0.05	ATE ≤0.5

	D **Irritation, Corrosion and Long-term Health Effects**		
Numerical rating	D1 Skin irritation and corrosion	D2 Eye irritation and corrosion	D3 Long-term health effects
0	not irritating	not irritating	**C** – Carcinogenic
1	mildly irritating	mildly irritating	**M** – Mutagenic
2	irritating	irritating	**R** – Reprotoxic
3	severely irritating or corrosive 3A Corr. (≤4 h) 3B Corr. (≤1 h) 3C Corr. (≤3 min)	severely irritating	**Ss** – Sensitizing to skin **Sr** – Sensitizing to respiratory system **A** – Aspiration hazard **T** – Target Organ Toxicity **N** – Neurotoxic **I** – Immunotoxic

	E **Interference with Other Uses of the Sea**		
Numerical Rating	E1 Flammability flashpoint (^{o}C)	E2 Physical effects on wildlife and benthic habitats	E3 Interference with coastal amenities
0	- (not flammable, does not burn)	**Fp** - Persistent floater **F** - Floater **S** - Sinker **G** - Gas **E** - Evaporator **D** - Dissolver and combinations thereof	no interference ***no warning***
1	Fp >93		slightly objectionable ***warning, no closure of amenity***
2	60< Fp ≤93		moderately objectionable ***possible closure of amenity***
3	23≤ Fp ≤60		highly objectionable ***closure of amenity***
4	Fp <23		

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ANNEX 3

RESOLUTION MEPC.345(78)
(adopted on 10 June 2022)

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

(Watertight doors)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

RECALLING ALSO resolution MEPC.19(22), by which it adopted the *International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (the IBC Code)*, and resolution MEPC.16(22), by which the IBC Code has become mandatory under Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL),

RECALLING FURTHER article 16 of MARPOL and regulation 1.4 of MARPOL Annex II concerning the procedure for considering amendments to the IBC Code for adoption by the Parties,

HAVING CONSIDERED, at its seventy-eighth session, proposed amendments to the IBC Code concerning watertight doors,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to the IBC Code, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article 16(2)(f)(iii) of MARPOL, that the amendments to the IBC Code shall be deemed to have been accepted on 1 January 2024 unless, prior to that date, not less than one-third of the Parties or Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet have communicated to the Organization their objection to the amendments;

3 INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of MARPOL, the amendments to the IBC Code shall enter into force on 1 July 2024 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, in conformity with article 16(2)(e) of MARPOL, to transmit certified copies of the present resolution and the text of the amendments to the IBC Code contained in the annex to all parties to MARPOL;

5 ALSO REQUESTS the Secretary-General to transmit copies of the present resolution and its annex to the Members of the Organization which are not Parties to MARPOL.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

(Watertight doors)

CHAPTER 2

SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

2.9 Survival requirements

1 Paragraph 2.9.2.1 is replaced by the following:

".1 the waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding or downflooding may take place. Such openings shall include air pipes and openings which are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers which maintain the high integrity of the deck, remotely operated sliding watertight doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type;"

ANNEX 4

UNIFIED INTERPRETATION OF APPENDIX I TO THE BWM CONVENTION (FORM OF INTERNATIONAL BALLAST WATER MANAGEMENT CERTIFICATE)

Appendix I of the BWM Convention reads as follows:

"…Method of ballast water management used .....
Date installed (if applicable) (dd/mm/yyyy) .....
Name of manufacturer (if applicable) .....

The principal ballast water management method(s) employed on this ship is/are:
☐ in accordance with regulation D-1
☐ in accordance with regulation D-2
(describe) .....
☐ the ship is subject to regulation D-4
☐ other approach in accordance with regulation....."

Interpretation

1 For a ship which is occasionally engaged in an international voyage and is not intending to discharge ballast water back to the original location, having been granted an exemption by its Administration taking into account BWM.2/Circ.52/Rev.1, on the condition that the ship implements the D-1 standard in lieu of the D-2 standard, the principal ballast water management method(s) employed is:

"☒ other approach in accordance with regulation D-1 taking into account BWM.2/Circ.52/Rev.1."

2 For a ship granted an exemption in accordance with regulation A-4 of the BWM Convention, the principal ballast water management method employed on the ship is:

"☒ other approach in accordance with regulation A-4 ."

3 For a ship which is fitted with a BWMS on board and is certified in accordance with the D-2 standard, even if the ship will also use other ballast water management methods as contingency measures, as reflected in its Ballast Water Management Plan, the principal ballast water management method employed on this ship is:

"☒ in accordance with regulation D-2
(describe) ..... "

4 For a ship which has employed an "other approach" in accordance with regulation B-3.6 or B-3.7 of the BWM Convention, the Ballast Water Management Plan should describe the other approach that has been approved for the ship.

5 In the case of an Administration that requires its ships which are subject to equivalent compliance under regulation A-5 to carry International Ballast Water Management Certificates, those certificates should refer to regulation A-5 in the item "other approach" as their principal ballast water management method employed.

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ANNEX 5

REVISED UNIFIED INTERPRETATION OF PARAGRAPH 4.4.6.1 OF THE NO_X TECHNICAL CODE 2008

"**Paragraph 4.4.6.1**

Paragraph 4.4.6.1 reads as follows:

> "The engine group may be defined by basic characteristics and specifications in addition to the parameters defined in 4.3.8 for an engine family."

Interpretation:

2.1 Paragraph 4.4.6.1 cross-references paragraph 4.3.8, which provides guidance for selection of an engine family. For engines fitted with an SCR system to reduce NO_X emissions, it is recognized that some of the parameters provided may not be common to all engines within a group; in particular, paragraphs 4.3.8.2.3 and 4.3.8.2.4 state that:

".3 individual cylinder displacement:
- to be within a total spread of 15%

.4 number of cylinders and cylinder configuration:
- applicable in certain cases only, e.g. in combination with exhaust gas cleaning devices"

2.2 For engines fitted with an SCR system to reduce NO_X emissions, the number and arrangement of cylinders may not be common to all members of the engine group. These parameters may be replaced with new parameters derived from the SCR chamber and catalyst blocks, such as the SCR space velocity (SV), catalyst block geometry and catalyst material.

2.3 This interpretation may be applied to the engine family where the applicant has provided clear evidence that an engine family concept, allowing for different numbers and arrangements of cylinders, will result in same or lower NO_X emissions of the engines with different cylinder numbers compared to the NO_X emissions of the related parent engine."

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ANNEX 6

UNIFIED INTERPRETATION OF REGULATION 18.3 OF MARPOL ANNEX VI

Application of regulation 18.3 for biofuels

Regulation 18.3 reads as follows:

"Fuel oil for combustion purposes delivered to and used on board ships to which this Annex applies shall meet the following requirements."

Interpretation

1 A fuel oil which is a blend of not more than 30% by volume of biofuel should meet the requirements of regulation 18.3.1 of MARPOL Annex VI. A fuel oil which is a blend of more than 30% by volume of biofuel should meet the requirements of regulation 18.3.2 of MARPOL Annex VI. For the purposes of this interpretation, a biofuel is a fuel oil which is derived from biomass and hence includes, but is not limited to, processed used cooking oils, fatty-acid-methyl-esters (FAME) or fatty-acid-ethyl-esters (FAEE), straight vegetable oils (SVO), hydrotreated vegetable oils (HVO), glycerol or other biomass to liquid (BTL) type products. The Product Name, as entered onto the bunker delivery note, should be of sufficient detail to identify whether, and to what extent, a biofuel is blended into the product as supplied.

Regulation 18.3.2.2 reads as follows:

> "fuel oil for combustion purposes derived by methods other than petroleum refining shall not cause an engine to exceed the applicable NO_X emission limit set forth in paragraphs 3, 4, 5.1.1 and 7.4 of regulation 13."

Interpretation

2 A marine diesel engine certified in accordance with the requirements of regulation 13 of MARPOL Annex VI, which can operate on a biofuel or a biofuel blend without changes to its NO_X critical components or settings/operating values outside those as given by that engine's approved Technical File, should be permitted to use such a fuel oil without having to undertake the assessment as given by regulation 18.3.2.2 of MARPOL Annex VI. For the purposes of this interpretation, parent engine emissions tests undertaken on DM or RM grade fuels to the ISO 8217:2005 standard, as required by paragraph 5.3.2 of the NO_X Technical Code, should be valid for all DM or RM grade fuels used in operation, or that the engine may be designed for, or capable of operation on, including those meeting the ISO 8217 standards superseding ISO 8217:2005.

3 Where fuel oils are derived from methods other than petroleum refining, or fuel oil which is a blend of more than 30% by volume of biofuel and does not fall under 2 of this unified interpretation, or other fuels required to undertake the assessment as given by regulation 18.3.2.2 of MARPOL Annex VI and for which have not been specifically certified in accordance with the regulation 13 limits at test bed for that specific fuel and engine group/family, the following is interpreted as an acceptable route to demonstrate compliance with regulation 18.3.2.2:

.1 the ship's IAPP Certificate may continue to be issued where the overall NO_X emissions performance has been verified to not cause the specified engine to exceed the applicable NO_X emissions limit when burning said fuels using

the onboard simplified measurement method in accordance with 6.3 of the NO_X Technical Code 2008, or the direct measurement and monitoring method in accordance with 6.4 of the NO_X Technical Code 2008, or by reference to relevant test-bed testing. For the purposes of this interpretation and demonstration of compliance with regulation 18.3.2.2 of MARPOL Annex VI, and as applicable to possible deviations when undertaking measurements on board, an allowance of 10% of the applicable limit may be accepted."

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ANNEX 7

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(Regional reception facilities within Arctic waters, information to be included in the bunker delivery note (BDN) and information to be submitted to the IMO Ship Fuel Oil Consumption Database)

Regulation 17
Reception facilities

1 Paragraph 2 is replaced by the following:

"2 The following States may satisfy the requirements in paragraph 1 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

Appendix V
Information to be included in the bunker delivery note (regulation 18.5)

2 The following new item and associated note are added to the list, below "Sulphur content (% m/m)":

"Flashpoint (˚C) or a statement that flashpoint has been measured at or above 70˚C*"

"* ISO 2719:2016, Determination of flash point – Pensky-Martens closed cup method, Procedure A (for Distillate Fuels) or Procedure B (for Residual Fuels)."

Appendix IX
Information to be submitted to the IMO Ship Fuel Oil Consumption Database (regulation 27)

3 Appendix IX is replaced by the following:

" Appendix IX

Information to be submitted to the IMO Ship Fuel Oil Consumption Database (regulation 27)

Identity of the ship

IMO number . . . . . .

Period of calendar year for which the data is submitted

Start date (dd/mm/yyyy) ……

End date (dd/mm/yyyy) ……

Technical characteristics of the ship

Year of delivery……..……

Ship type, as defined in regulation 2 of this Annex or other (to be stated) ……

Gross tonnage (GT)[1] ……

Net tonnage (NT)[2] ……..

Deadweight tonnage (DWT)[3] ……

Power output (rated power)[4] of main and auxiliary reciprocating internal combustion engines over 130 kW (to be stated in kW) ……

Attained EEDI[5] (if applicable)……..……..……

Attained EEXI[6] (if applicable)……..

Ice class[7] ……

1 Gross tonnage should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969.

2 Net tonnage should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969. If not applicable, note "N/A".

3 DWT means the difference in tonnes between the displacement of a ship in water of relative density of 1,025 kg/m^3 at the summer load draught and the lightweight of the ship. The summer load draught should be taken as the maximum summer draught as certified in the stability booklet approved by the Administration or an organization authorized by it. If not applicable, note "N/A".

4 Rated power means the maximum continuous rated power as specified on the nameplate of the engine.

5 Refer to the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73), as amended by resolutions MEPC.322(74) and MEPC.332(76)), and as may be further amended.

6 Refer to the *2022 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)* (resolution MEPC.350(78)).

7 Ice class should be consistent with the definition set out in the International Code for Ships Operating in Polar Waters (Polar Code) (resolutions MEPC.264(68) and MSC.385(94)). If not applicable, note "N/A".

Fuel oil consumption, by fuel oil type in metric tonnes and methods used for collecting fuel oil consumption data ……

Distance travelled ……

Hours under way……

For ships to which regulation 28 of MARPOL Annex VI applies:

Applicable CII:[8] □ AER □ cgDIST

Required annual operational CII[9]……

Attained annual operational CII before any correction[10]……

Attained annual operational CII[11]……

Operational carbon intensity rating:[12] □A □B □C □D □E

CII for trial purpose (none, one or more on voluntary basis):[13]

☐ EEPI (gCO_2/t/nm): ……

☐ cbDIST (gCO_2/berth/nm): ……

☐ clDIST (gCO_2/m/nm): ……

☐ EEOI (gCO_2/t/nm or others):[14] ……."

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8 Refer to the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (resolution MEPC.352(78)).

9 Refer to the *2022 Guidelines on the reference lines for use* with operational carbon intensity indicators *(CII reference lines guidelines, G2)* (resolution MEPC.353(78)) and *2021 Guidelines on the* operational carbon intensity *reduction factors relative to reference lines (CII reduction factors guidelines, G3)* (resolution MEPC.338(76)).

10 As calculated in accordance with the *2022 Guidelines on operational carbon intensity indicators and the calculation methods* (*CII guidelines, G1*) (resolution MEPC.352(78)) before any correction using Interim guidelines on correction factors and voyage adjustments for CII calculations (G5) (resolution MEPC.355(78)).

11 As calculated in accordance with the *2021 Guidelines on operational carbon intensity indicators and the calculation methods* (*CII guidelines, G1*) (resolution MEPC.352(78)) and having been corrected taking into account Interim guidelines on correction factors and voyage adjustments for CII calculations (G5) (resolution MEPC.355(78)).

12 Refer to the *2022 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)* (resolution MEPC.354(78)).

13 Refer to the *2022 Guidelines on operational carbon intensity indicators and the calculation methods* (*CII guidelines, G1*) (resolution MEPC.352(78)).

14 Refer to the *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI))* (MEPC.1/Circ.684).

ANNEX 8

RESOLUTION MEPC.346(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee, at its seventy-sixth session, adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the 2021 revised MARPOL Annex VI (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce the carbon intensity of international shipping,

NOTING FURTHER that regulation 26 of MARPOL Annex VI requires each ship to keep on board a Ship Energy Efficiency Management Plan (SEEMP), to be developed and reviewed, taking into account the guidelines adopted by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that the Committee, at its seventieth session, adopted, by resolution MEPC.282(70), the *2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*,

HAVING CONSIDERED, at its seventy-eighth session, the draft *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*,

1 ADOPTS the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 26 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulations 25.3 and 28.11 of MARPOL Annex VI a review of the technical and operational measures to reduce the carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)* adopted by resolution MEPC.282(70).

2022 GUIDELINES FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

CONTENTS

APPENDIX 3 – STANDARDIZED DATA REPORTING FORMAT FOR THE DATA COLLECTION SYSTEM AND OPERATIONAL CARBON INTENSITY TO THE ADMINISTRATION

APPENDIX 4 – STANDARDIZED DATA REPORTING FORMAT FOR THE PARAMETERS TO CALCULATE THE TRIAL CARBON INTENSITY INDICATORS ON A VOLUNTARY BASIS

1 INTRODUCTION

1.1 The *Guidelines for the development of a Ship Energy Efficiency Management Plan* have been developed to assist with the preparation of the Ship Energy Efficiency Management Plan (SEEMP) required by regulation 26 of MARPOL Annex VI.

1.2 Taken together, the aims of the SEEMP should assist the international shipping sector to achieve the goal of Chapter 4 of MARPOL Annex VI set out in regulation 20, which is reducing the carbon intensity of international shipping. The aims of the SEEMP are threefold:

1.2.1 To encourage companies to incorporate actions to improve the energy efficiency and carbon intensity of their ships and ship management practices.

1.2.2 To specify the methodology the ship should use to collect the data required by regulation 27.1 of MARPOL Annex VI and the processes that should be used to report the data to the ship's Administration or any organization duly authorized by it.

1.2.3 To specify the methodology the ship should use to calculate the attained annual operational carbon intensity indicator (CII) as required by regulation 28.1 of MARPOL Annex VI and the processes that should be used to report the data to the ship's Administration or any organization duly authorized by it.

1.3 There are three parts to a SEEMP:

1.3.1 Guidance for Part I of the SEEMP required by regulation 26.1 of MARPOL Annex VI, is addressed in sections 3, 4, and 5 of these Guidelines. The purpose of this part is to provide an approach to monitor ship and fleet efficiency performance over time and describe ways to improve the ship's energy efficiency performance and carbon intensity. Part I of the SEEMP applies to any ship of 400 GT and above.

1.3.2 Guidance for part II of the SEEMP required by regulation 26.2 of MARPOL Annex VI, is addressed in sections 6, 7, and 8 of these Guidelines. The purpose of this part is to provide a description of the methodologies that should be used to collect the data required pursuant to regulation 27 of MARPOL Annex VI and the processes that the ship should use to report the data to the ship's Administration or any organization duly authorized by it. Part II of the SEEMP applies to any ship of 5,000 GT and above.

1.3.3 Guidance for part III of the SEEMP required by regulations 26.3 and 28.8 of MARPOL Annex VI is addressed in sections 9, 10, 11, 12, 13, 14 and 15 of these Guidelines. The purpose of this part is to provide:

.1 a description of the methodology that should be used to calculate the ship's attained annual operational CII required by regulation 28 of MARPOL Annex VI;

.2 the processes that should be used to report this value to the ship's Administration or any organization duly authorized by it;

.3 the required annual operational CII for the next three years;

.4 an implementation plan documenting how the required annual operational CII should be achieved during the next three years;

.5 a procedure for self-evaluation and improvement; and

.6 for ships rated as D for three consecutive years or rated as E, a plan of corrective actions to achieve the required annual operational CII.

1.3.4 Part III of the SEEMP applies to any ship of 5,000 GT and above which falls into one or more of the categories in regulations 2.2.5, 2.2.7, 2.2.9, 2.2.11, 2.2.14 to 2.2.16, 2.2.22, and 2.2.26 to 2.2.29 of MARPOL Annex VI.

1.3.5 Sample forms of the various sections of the SEEMP are presented in appendices 1, 2, and 2*bis* for illustrative purposes. A standardized data-reporting format for the data collection system and operational carbon intensity is presented in appendix 3. A standardized data reporting format for the trial carbon intensity indicators on voluntary basis is presented in appendix 4.

2 DEFINITIONS

2.1 For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

2.2 "Ship fuel oil consumption data" means the data required to be collected on an annual basis and reported as specified in appendix IX to MARPOL Annex VI.

2.3 "Safety management system" means a structured and documented system enabling company personnel to implement effectively the company safety and environmental protection policy, as defined in paragraph 1.1 of International Safety Management Code.

2.4 "Carbon Intensity Indicator" means a performance indicator by which it is possible to measure the carbon intensity of the ship, as defined in the guidelines developed by the Organization,[1] taking into account data listed for reporting in appendix IX to MARPOL Annex VI.

PART I OF THE SEEMP: SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY

3 GENERAL

3.1 Regulation 26.1 of MARPOL Annex VI requires each ship of 400 gross tonnage and above, subject to chapter 4 to keep on board a ship-specific Ship Energy Efficiency Management Plan (SEEMP).

3.2 The purpose of part I of the SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency and reduce the carbon intensity of a ship's operation. Preferably, this aspect of the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates or controls the ship, recognizing that no two shipping companies are the same, and that ships operate under a wide range of different conditions.

3.3 Many companies will already have an environmental management system (EMS) in place under ISO 14001 which contains procedures for selecting the best measures for particular ships and then setting objectives for the measurement of relevant parameters, along with relevant control and feedback features. Monitoring of operational environmental efficiency should therefore be treated as an integral element of broader company management systems.

[1] Refer to the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (Resolution MEPC.336(76)) and the *2022 Guidelines on correction factors and voyage adjustments for CII calculations (G5)* (Resolution MEPC.XXX(78)).

3.4 In addition, many companies already develop, implement and maintain a safety management system. In such case, part I of SEEMP may form part of the ship's safety management system.

3.5 This section provides guidance for the development of part I of SEEMP that should be adjusted to the characteristics and needs of individual companies and ships. Part I of the SEEMP is intended to be a management tool to assist a company in managing the ongoing environmental performance of its ships and, as such, it is recommended that a company develop procedures for implementing the plan in a manner which limits any onboard administrative burden to the minimum necessary.

3.6 Part I of the SEEMP should be developed as a ship-specific plan by the company, and should reflect efforts to improve the energy efficiency and reduce carbon intensity of a ship through four steps: planning, implementation, monitoring, and self-evaluation and improvement. These components play a critical role in the continuous cycle to improve ship energy efficiency management and reduce its carbon intensity. With each iteration of the cycle, some elements of part I will necessarily change while others may remain as before.

3.7 At all times safety considerations should be paramount. The trade a ship is engaged in may determine the feasibility of the energy efficiency and carbon intensity reduction measures under consideration. For example, ships that perform services at sea (pipe laying, seismic survey, OSVs, dredgers, etc.) may choose different methods of improving energy efficiency when compared to conventional cargo carriers. The nature of operations and influence of prevailing weather conditions, tides and currents combined with the necessity of maintaining safe operations may require adjustment of general procedures to maintain the efficiency of the operation, for example the ships which are dynamically positioned. The length of a voyage and the need to avoid high risk areas may also be important parameters as well as trade specific safety considerations.

4 FRAMEWORK AND STRUCTURE OF PART I OF THE SEEMP

4.1 Planning

4.1.1 Planning is the most crucial stage of part I of the SEEMP, in that it primarily determines both the current status of ship energy usage and carbon intensity and the expected improvement of ship energy efficiency and reduction of carbon intensity. Therefore, it is encouraged to devote sufficient time to planning so that the most appropriate, effective and implementable plan can be developed.

Ship-specific measures

4.1.2 Recognizing that there are a variety of options to improve energy efficiency and reduce carbon intensity (e.g. speed optimization, confirming berth availability and arrival time with port of destination, weather routeing, hull maintenance, retrofitting of energy efficiency devices, and use of alternative fuels), the best package of measures for a ship to improve energy efficiency and reduce carbon intensity depends to a great extent upon ship type, cargoes, routes and other factors that should be identified in the first place. These measures should be listed as a package of measures to be implemented, thus providing the overview of the actions to be taken for that ship.

4.1.3 During the planning process, therefore, it is important to determine and understand the ship's current status of energy usage. Part I of the SEEMP should identify energy-saving and carbon intensity reducing measures that already have been undertaken, and should determine how effective these measures are in terms of improving energy efficiency and

reducing carbon intensity. Part I also should identify what measures can be adopted to further improve the energy efficiency and reduce the carbon intensity of the ship. It should be noted, however, that not all measures can be applied to all ships, or even to the same ship under different operating conditions and that some of them are mutually exclusive. Ideally, initial measures could yield energy (and cost) saving results that then can be reinvested in more difficult or expensive efficiency upgrades identified by part I.

4.1.4 Guidance on best practices for fuel-efficient operation of ships, set out in chapter 5, can be used to facilitate this part of the planning phase. Also, in the planning process, particular consideration should be given to minimize any onboard administrative burden.

Company-specific measures

4.1.5 The improvement of energy efficiency and reduction of carbon intensity of ship operation does not necessarily depend on single ship management only. Rather, it may depend on many stakeholders including ship repair yards, shipowners, operators, charterers, cargo owners, fuel suppliers, ports and traffic management services. For example, "just in time" – as explained in paragraph 5.2.4 – requires good early communication among operators, ports and traffic management services. The better the coordination among such stakeholders, the more improvement can be expected. In most cases, such coordination or total management is better made by a company rather than by a ship. In this sense, it is recommended that a company should also establish an energy efficiency and carbon intensity management plan to improve the performance of its fleet (should it not have one in place already) and make necessary coordination among stakeholders.

Human resource development

4.1.6 For effective and steady implementation of the adopted measures, raising awareness of and providing necessary training for personnel both on shore and on board are an important element. Such human resource development is encouraged and should be considered as an important component of planning as well as a critical element of implementation.

Goal setting

4.1.7 The last part of planning is goal setting.

.1 For ships also subject to regulation 28 of MARPOL Annex VI, the goal setting should be consistent with the continuous CII improvements set out by that regulation, and should include the relevant information (see paragraph 9.7). These ships are also encouraged to consider setting ship-specific goals in addition to the applicable CII requirements that strive for additional energy efficiency improvements and carbon intensity reductions.

.2 For ships or companies not subject to regulation 28, there are no requirements to define a goal and to communicate it to the public, or to be a subject to external inspection, surveys, or audits with respect to the SEEMP. Nevertheless, a meaningful goal should be defined to serve as a signal on a company's commitment to improve the energy efficiency and carbon intensity of the ship. The goal can be set using different indicators, including the annual fuel consumption, Annual Efficiency Ratio (AER), cgDIST, Energy

Efficiency Operational Indicator (EEOI) or other carbon intensity indicators (CIIs).[2] In all cases, the goal should be measurable and easy to understand.

4.2 Implementation

Establishment of implementation system

4.2.1 After a ship and a company identify the energy efficiency and carbon intensity measures to be implemented, it is essential to establish a system for their implementation. This is done by developing the procedures for energy management, defining tasks associated with those procedures, and assigning those tasks to responsible personnel. The implementation system should include procedures to ensure execution of measures and specify defined levels of authority and lines of communication. Also, it should include procedures for internal audits and management review, where relevant. In sum, part I of the SEEMP should describe how each measure should be implemented and who the responsible person or persons are. The implementation period (start and end dates) of each selected measure should be indicated. The development of such an implementation system can be considered as a part of planning, and therefore may be completed at the planning stage.

Implementation and record-keeping

4.2.2 The planned measures should be carried out in accordance with the predetermined implementation system. Record-keeping for the implementation of each measure is beneficial for self-evaluation at a later stage and should be encouraged. If any identified measure cannot be implemented for any reason, the reason or reasons should be recorded for internal use. It is recommended that events and operational conditions outside the control of the ship's crew (for example, waiting for berths, extended port dwell times, operation in severe adverse weather) which may affect the ships rating be documented.

4.3 Monitoring

Monitoring tools

4.3.1 The energy efficiency of a ship should be monitored quantitatively. This should be done by an established method, preferably by an international standard. In many cases, the monitoring tool should target the goal indicator set out in paragraph 4.1.7 (e.g. AER, cgDIST, EEOI, or other CIIs as agreed by the Organization). If a quantitative goal is not defined for a ship, a quantitative performance indicator developed by the Organization (e.g. AER, EEOI, CII) or another internationally established tool should be selected. A ship subject to regulation 28 is likely to use the CII as its monitoring tool.

4.3.2 If used, these CIIs should be calculated in accordance with the guidelines developed by the Organization,[3] adjusted, as necessary, to a specific ship and trade.

4.3.3 Ships subject to regulation 28 may use other measurement tools in addition to the CII, if convenient and/or beneficial for a ship or a company. In the case where other monitoring

[2] Refer to the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (Resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (Resolution MEPC.355(78)).

[3] Refer to the *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* (MEPC.1/Circ.684) and the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (Resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (Resolution MEPC.355(78)).

tools are used, the reason for the use of the tool and the method of monitoring should be clarified at the planning stage.

4.3.4 It is highly advised to conduct monitoring at regular intervals for checking consistency of data and verification assistance. The ship's fuel oil consumption should be monitored using daily reporting, such as noon reports, or higher frequency data.

Establishment of monitoring system

4.3.5 It should be noted that whatever measurement tools are used, continuous and consistent and reliable data collection is the foundation of monitoring. To allow for meaningful and consistent monitoring, a monitoring system, including the procedures for collecting data and the assignment of responsible personnel, should be developed. The development of such a system can be considered as a part of planning, and therefore should be completed at the planning stage.

4.3.6 It should be noted that, in order to avoid unnecessary administrative burdens on ships' staff, monitoring should be carried out as much as possible by shore staff when the data can be automatically transferred, utilizing data obtained from existing required records such as the official and engineering logbooks and oil record books. Additional data could be obtained as appropriate.

Search and rescue

4.3.7 When a ship diverts from its scheduled passage to engage in search and rescue operations, and for which emissions are excluded pursuant to regulation 3, it is recommended that data obtained during such operations is not used in ship energy efficiency monitoring, and that such data should be recorded separately.

4.4 Self-evaluation and improvement

4.4.1 Self-evaluation and improvement is the final phase of the management cycle. This phase should produce meaningful feedback for the coming first stage, i.e. planning stage of the next improvement cycle.

4.4.2 The purpose of self-evaluation is to:

.1 evaluate the effectiveness of the planned measures and their implementation;

.2 deepen the understanding of the overall characteristics of the ship's operation such as what types of measures can or cannot function effectively, and how and/or why;

.3 comprehend the trend of the efficiency improvement of that ship; and

.4 develop the improved management plan for the next cycle through identification of further opportunities for improving energy efficiency and reducing carbon intensity.

4.4.3 For this process, procedures for self-evaluation of the ship energy efficiency management plan should be developed. Furthermore, self-evaluation should be implemented periodically by using data collected through monitoring. In addition, it is recommended that time be invested in identifying the cause and effect of the performance during the evaluated

period so lessons learned can be taken into account when revising and improving the next stage of the ship's energy efficiency management plan.

5 GUIDANCE ON BEST PRACTICES FOR FUEL-EFFICIENT OPERATION OF SHIPS

5.1 The search for energy efficiency and carbon intensity improvement across the entire transport chain takes responsibility beyond what can be delivered by the company alone. A list of all the possible stakeholders in the efficiency of a single voyage is long: obvious parties are designers, shipyards and engine manufacturers for the characteristics of the ship; and charterers, fuel suppliers, ports and vessel traffic management services, etc. for the specific voyage. All parties involved should consider the inclusion of efficiency measures in their operations both individually and collectively.

5.2 Fuel-efficient operations

Improved voyage planning

5.2.1 The optimum route and improved efficiency can be achieved through the careful planning and execution of voyages. Thorough voyage planning needs time, but a number of software tools are available to assist in voyage planning.

5.2.2 The *Guidelines for voyage planning*, adopted by resolution A.893(21), provide essential guidance for the ship's crew and voyage planners.

Weather routeing

5.2.3 Weather routeing has a high potential for efficiency savings on specific routes. It is commercially available for all types of ship and for many trade areas.

Just in time

5.2.4 Good early communication with the next port should be an aim in order to give maximum notice of berth availability and facilitate the use of optimum speed where port operational procedures support this approach.

5.2.5 Optimized port operation could involve a change in procedures involving different ship handling arrangements in ports. Port authorities should be encouraged to maximize efficiency and minimize delay.

Speed optimization

5.2.6 Speed optimization can produce significant savings. However, optimum speed means the speed at which the fuel used per tonne mile is at a minimum level for that voyage. It does not mean minimum speed; in fact, sailing at less than optimum speed will consume more fuel rather than less. Reference should be made to the engine manufacturer's power/consumption curve and the ship's propeller curve. Possible adverse consequences of slow speed operation may include increased vibration and problems with soot deposits in combustion chambers and exhaust systems. These possible consequences should be taken into account. For LNG carriers speed optimization means, quite often, a higher speed at the start of laden passages to control tanks pressure and at the end of ballast passages to use the operational LNG quantity needed for cargo tank cooling in propulsion instead of wasting in GCU or condenser steam dump. Charterers are generally aware of the improved efficiency of this speed pattern.

5.2.7 As part of the speed optimization process, due account may need to be taken of the need to coordinate arrival times with the availability of loading/discharge berths, etc. The number of ships engaged in a particular trade route may need to be taken into account when considering speed optimization.

5.2.8 A gradual increase in speed when leaving a port or estuary whilst keeping the engine load within certain limits may help to reduce fuel consumption.

5.2.9 It is recognized that under many charter parties the speed of the ships is determined by the charterer and not the operator. Efforts should be made when agreeing charter party terms to encourage the ship to operate at optimum speed in order to maximize energy efficiency.

Optimized shaft power

5.2.10 Operation at constant shaft RPM can be more efficient than continuously adjusting speed through engine power. The use of automated engine management systems to control speed rather than relying on human intervention may be beneficial.

5.2.11 When optimizing shaft power, due attention should be given to overall power system efficiency. For example, in some cases reducing load or shaft speed below the minimum necessary to operate energy recovery systems and shaft generators may increase overall emissions.

5.3 Optimized ship handling

Optimum trim

5.3.1 Most ships are designed to carry a designated amount of cargo at a certain speed for a certain fuel consumption. This implies the specification of set trim conditions. Loaded or unloaded, trim has a significant influence on the resistance of the ship through the water and optimizing trim can deliver significant fuel savings. For any given draft there is a trim condition that gives minimum resistance. In some ships, it is possible to assess optimum trim conditions for fuel efficiency continuously throughout the voyage. Design or safety factors may preclude full use of trim optimization.

Optimum ballast

5.3.2 Ballast should be adjusted taking into consideration the requirements to meet optimum trim and steering conditions and optimum ballast conditions achieved through good cargo planning.

5.3.3 When determining the optimum ballast conditions, the limits, conditions and ballast management arrangements set out in the ship's Ballast Water Management Plan are to be observed for that ship.

5.3.4 Ballast conditions have a significant impact on steering conditions and autopilot settings, and it needs to be noted that less ballast water does not necessarily mean improved energy efficiency.

Optimum propeller and propeller inflow considerations

5.3.5 Selection of the propeller is normally determined at the design and construction stage of a ship's life but new developments in propeller design have made it possible for retrofitting of later designs to deliver greater fuel economy. Whilst it is certainly for consideration, the

propeller is but one part of the propulsion train and a change of propeller in isolation may have no effect on efficiency and may even increase fuel consumption.

5.3.6 Improvements to the water inflow to the propeller using arrangements such as fins and/or nozzles could increase propulsive efficiency power and hence reduce fuel consumption.

Optimum use of rudder and heading control systems (autopilots)

5.3.7 There have been large improvements in automated heading and steering control systems technology. Whilst originally developed to make the bridge team more effective, modern autopilots can achieve much more. An integrated Navigation and Command System can achieve significant fuel savings by simply reducing the distance sailed "off track". The principle is simple: better course control through less frequent and smaller corrections will minimize losses due to rudder resistance. Retrofitting of a more efficient autopilot to existing ships could be considered.

5.3.8 During approaches to ports and pilot stations the autopilot cannot always be used efficiently as the rudder has to respond quickly to given commands. Furthermore, at certain stages of the voyage it may have to be deactivated or very carefully adjusted, i.e. during heavy weather and approaches to ports.

5.3.9 Consideration may be given to the retrofitting of improved rudder blade design (e.g. "twist-flow" rudder).

Hull maintenance

5.3.10 Docking intervals should be integrated with the company's ongoing assessment of ship performance. Hull resistance can be optimized by new technology-coating systems, possibly in combination with cleaning intervals. Regular in-water inspection of the condition of the hull is recommended.

5.3.11 Propeller cleaning and polishing or even appropriate coating may significantly increase fuel efficiency. The need for ships to maintain efficiency through in-water hull cleaning should be recognized and facilitated by port States.

5.3.12 Consideration may be given to the possibility of timely full removal and replacement of underwater paint systems to avoid the increased hull roughness caused by repeated spot blasting and repairs over multiple dockings.

5.3.13 Generally, the smoother the hull, the better the fuel efficiency.

Propulsion system

5.3.14 Marine diesel engines have a very high thermal efficiency (~50%). This excellent performance is only exceeded by fuel cell technology with an average thermal efficiency of 60%. This is due to the systematic minimization of heat and mechanical loss. In particular, the new breed of electronic controlled engines can provide efficiency gains. However, specific training for relevant staff may need to be considered to maximize the benefits.

Propulsion system maintenance

5.3.15 Maintenance in accordance with manufacturers' instructions in the company's planned maintenance schedule will also maintain efficiency. The use of engine condition monitoring can be a useful tool to maintain high efficiency.

5.3.16 Additional means to improve engine efficiency might include use of fuel additives, adjustment of cylinder lubrication oil consumption, valve improvements, torque analysis, and automated engine monitoring systems.

5.4 Waste heat recovery

5.4.1 Waste heat recovery systems use thermal heat losses from the exhaust gas for either electricity generation, heating or additional propulsion with a shaft power take in.

5.4.2 It may not be possible to retrofit such systems into existing ships. However, they may be a beneficial option for new ships. Shipbuilders should be encouraged to incorporate new technology into their designs.

5.5 Improved fleet management

5.5.1 Better utilization of fleet capacity can often be achieved by improvements in fleet planning. For example, it may be possible to avoid or reduce long ballast voyages through improved fleet planning. There is opportunity here for charterers to promote efficiency. This can be closely related to the concept of "just in time" arrivals.

5.5.2 Efficiency, reliability and maintenance-oriented data sharing within a company can be used to promote best practice among ships within a company and should be actively encouraged.

5.6 Improved cargo handling

Cargo handling is in most cases under the control of the port or terminal operators and optimum solutions matched to ship and port or terminal requirements should be explored. However, in cases where ships use their own cargo handling equipment (e.g. cargo cranes, self-unloading booms, cargo pumps (tankers)), procedures should be in place to efficiently utilize the energy produced from any additional generators required to operate the equipment.

5.7 Energy management

5.7.1 A review of electrical services on board can reveal the potential for unexpected efficiency gains. However, care should be taken to avoid the creation of new safety hazards when turning off electrical services (e.g. lighting). Thermal insulation is an obvious means of saving energy. Also see comment below on shore power.

5.7.2 Optimization of reefer container stowage locations may be beneficial in reducing the effect of heat transfer from compressor units. This might be combined as appropriate with cargo tank heating, ventilation, etc. The use of water-cooled reefer plant with lower energy consumption might also be considered.

5.8 Fuel type

The use of emerging alternative fuels may be considered as a CO_2 reduction method, but availability will often determine the applicability.

5.9 Other measures

5.9.1 Development of computer software for the calculation of current fuel consumption, for the establishment of an emissions "footprint," to optimize operations, and the establishment of goals for improvement and tracking of progress may be considered.

5.9.2 Renewable energy sources, such as solar (or photovoltaic) cell technology, have improved enormously in recent years and should be considered for onboard application.

5.9.3 In some ports shore power may be available for some ships but this is generally aimed at improving air quality in the port area. If the shore-based power source is carbon efficient, there may be a net efficiency benefit. Ships may consider using onshore power if available.

5.9.4 Even wind-assisted propulsion may be worthy of consideration. Various systems are available for retrofit, including Flettner rotors, wing sails and aerofoil kites.

5.9.5 Efforts could be made to source fuel of improved quality in order to minimize the amount of fuel required to provide a given power output.

5.10 Compatibility of measures

5.10.1 These Guidelines indicate a wide variety of possibilities for energy efficiency improvements for the existing fleet. While there are many options available, they are not necessarily cumulative, are often area and trade dependent and likely to require the agreement and support of a number of different stakeholders if they are to be utilized most effectively.

Age and operational service life of a ship

5.10.2 All measures identified in this document as applied to part I of the SEEMP are potentially cost-effective in case of high oil prices. The financial feasibility of a specific energy efficiency enhancement can be evaluated by various means. One way would be to estimate the return on investment (ROI) time. However, while measures with lower ROI may have the lowest cost, this does not guarantee the best results in energy efficiency performance improvement. Clearly, this equation is heavily influenced by the remaining service life of a ship and the cost of fuel.

Trade and sailing area

5.10.3 The feasibility of many of the measures described in this guidance will be dependent on the trade and sailing area of the ship. Sometimes ships will change their trade areas as a result of a change in chartering requirements, but this cannot be taken as a general assumption. For example, certain types of wind-enhanced power sources might not be feasible for short sea shipping as these ships generally sail in areas with high traffic densities or in restricted waterways. Air draft limitations may also affect the feasibility of wind assistance technology and certain other emission reduction measures. Another aspect is that the world's oceans and seas each have characteristic conditions and so ships designed for specific routes and trades may not obtain the same energy efficiency benefits by adopting the same measures or combination of measures as other ships that operate in different areas. It is also likely that some measures will have a greater or lesser effect in different sailing areas.

5.10.4 The trade a ship is engaged in may also determine the feasibility of the efficiency measures under consideration. For example, ships that perform services at sea (pipe laying, seismic survey, OSVs, dredgers, etc.) may choose different methods of improving energy efficiency when compared to conventional cargo carriers. The length of voyage may also be an important parameter as may trade specific safety considerations. The pathway to the most efficient combination of measures will be unique to each vessel within each shipping company.

5.10.5 Environmental conditions and the nature of cargo carried also varies between regions. For example, some routes may carry greater volumes of goods requiring careful temperature conditioning, or some transit regions may be subject to frequent severe adverse weather conditions. This may lead to an increase of emissions of ships serving those routes and regions.

PART II OF THE SEEMP: SHIP FUEL OIL CONSUMPTION DATA COLLECTION PLAN

6 GENERAL

6.1 Regulation 26.2 of MARPOL Annex VI specifies that, "in the case of a ship of 5,000 gross tonnage and above, the SEEMP shall include a description of the methodology that will be used to collect the data required by regulation 27.1 of this Annex and the processes that will be used to report the data to the ship's Administration". Part II of the SEEMP, the Ship Fuel Oil Consumption Data Collection Plan (hereinafter referred to as "Data Collection Plan") contains such methodology and processes.

6.2 With respect to Part II of the SEEMP, these Guidelines provide guidance for developing a ship-specific method to collect, aggregate and report ship data with regard to annual fuel oil consumption, distance travelled, hours under way and other data required by regulation 27 of MARPOL Annex VI to be reported to the Administration.

6.3 Pursuant to regulation 5.4.5 of MARPOL Annex VI, the Administration should ensure that each covered ship's SEEMP complies with regulation 26.2 of MARPOL Annex VI prior to collecting any data.

7 GUIDANCE ON METHODOLOGY FOR COLLECTING DATA ON FUEL OIL CONSUMPTION, DISTANCE TRAVELLED AND HOURS UNDER WAY

Fuel oil[4] consumption

7.1 Fuel oil consumption should include all the fuel oil consumed on board including but not limited to the fuel oil consumed by the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, for each type of fuel oil consumed, regardless of whether a ship is under way or not. Methods for collecting data on annual fuel oil consumption in metric tonnes include (in no particular order):

.1 method using bunker delivery notes (BDNs):

This method determines the annual total amount of fuel oil used based on BDNs, which are required for fuel oil for combustion purposes delivered to and used on board a ship in accordance with regulation 18 of MARPOL Annex VI; BDNs are required to be retained on board for three years after the fuel oil has been delivered. The Data Collection Plan should set out how the ship will operationalize the summation of BDN information and conduct tank readings. The main components of this approach are as follows:

[4] Regulation 2.1.14 of MARPOL Annex VI defines "fuel oil" as "fuel oil means any fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including gas, distillate and residual fuels."

.1 annual fuel oil consumption would be the total mass of fuel oil used on board the vessel as reflected in the BDNs. In this method, the BDN fuel oil quantities would be used to determine the annual total mass of fuel oil consumption, plus the amount of fuel oil left over from the last calendar year period and less the amount of fuel oil carried over to the next calendar year period;

.2 to determine the difference between the amount of remaining tank oil before and after the period, the tank reading should be carried out at the beginning and the end of the period;

.3 in the case of a voyage that extends across the data reporting period, the tank reading should occur by tank monitoring at the ports of departure and arrival of the voyage and by statistical methods such as rolling average using voyage days;

.4 fuel oil tank readings should be carried out by appropriate methods such as automated systems, soundings and dip tapes. The method for tank readings should be specified in the Data Collection Plan;

.5 the amount of any fuel oil offloaded should be subtracted from the fuel oil consumption of that reporting period. This amount should be based on the records of the ship's oil record book; and

.6 any supplemental data used for closing identified difference in bunker quantity should be supported with documentary evidence;

.2 method using flow meters:

This method determines the annual total amount of fuel oil consumption by measuring fuel oil flows on board by using flow meters. In case of the breakdown of flow meters, manual tank readings or other alternative methods will be conducted instead. The Data Collection Plan should set out information about the ship's flow meters and how the data will be collected and summarized, as well as how necessary tank readings should be conducted:

.1 annual fuel oil consumption may be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters;

.2 the flow meters applied to monitoring should be located so as to measure all fuel oil consumption on board. The flow meters and their link to specific fuel oil consumers should be described in the Data Collection Plan;

.3 note that it should not be necessary to correct this fuel oil measurement method for sludge if the flow meter is installed after the daily tank as sludge will be removed from the fuel oil prior to the daily tank;

.4 the flow meters applied to monitoring fuel oil flow should be identified in the Data Collection Plan. Any consumer not monitored with a flow meter should be clearly identified, and an alternative fuel oil consumption measurement method should be included; and

.5 calibration of the flow meters should be specified. Calibration and maintenance records should be available on board;

.3 method using bunker fuel oil tank monitoring on board:

.1 to determine the annual fuel oil consumption, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods such as automated systems, soundings and dip tapes will be aggregated. The tank readings will normally occur daily when the ship is at sea and each time the ship is bunkering or de-bunkering; and

.2 the summary of monitoring data containing records of measured fuel oil consumption should be available on board;

.4 method using LNG cargo tank monitoring on board:

LNG ships use the Custody Transfer Monitoring System (CTMS) to monitor/record the cargo volumes inside the tanks. When calculating the consumption:

.1 the LNG liquid volume consumed is converted to mass using the methane density of 422 kg/m^3. This is because LNG is transported at methane boiling point, while other heavier hydrocarbons have a higher boiling point and remain at liquid state; and

.2 nitrogen mass content is subtracted for each laden voyage from LNG consumption as it does not contribute to CO_2 emissions;

.5 method using cargo tank monitoring on board for ships using cargo other than LNG as a fuel:

.1 to determine the annual fuel oil consumption, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods to the cargo used as a fuel. The method for tank readings should be specified in the SEEMP Data Collection Plan; and

.2 the tank readings will normally occur daily when the ship is at sea and each time the ship is loading or discharging cargo; and the summary of monitoring data containing records of measured fuel oil consumption should be available on board.

7.2 Any corrections, e.g. density, temperature, nitrogen content for LNG, if applied, should be documented.[5]

Conversion factor CF

7.3 If fuel oils are used that do not fall into one of the categories as described in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)), as amended, and have no CF-factor assigned (e.g. some "hybrid fuel oils"), the fuel oil supplier should provide a CF-factor for the respective product supported by documentary evidence.

Distance travelled

7.4 Appendix IX of MARPOL Annex VI specifies that distance travelled should be submitted to the Administration and:

.1 distance travelled over ground in nautical miles should be recorded in the logbook in accordance with SOLAS regulation V/28.1;[6]

.2 the distance travelled while the ship is under way under its own propulsion should be included in the aggregated data of distance travelled for the calendar year; and

.3 other methods to measure distance travelled accepted by the Administration may be applied. In any case, the method applied should be described in detail in the Data Collection Plan.

Hours under way

7.5 Appendix IX of MARPOL Annex VI specifies that hours under way should be submitted to the Administration. Hours under way should be an aggregated duration while the ship is under way under its own propulsion.

Data quality

7.6 The Data Collection Plan should include data quality control measures which should be incorporated into the existing safety management system. Additional measures to be considered could include:

.1 the procedure for identification of data gaps and correction thereof; and

.2 the procedure to address data gaps if monitoring data is missing, for example, flow meter malfunctions.

A standardized data reporting format

7.7 Regulation 27.3 of MARPOL Annex VI states that the data specified in appendix IX of the Annex are to be communicated electronically using a standardized form developed by the

[5] For example, ISO 8217 provides a method for liquid fuel.

[6] Distance travelled measured using satellite data is distance travelled over the ground.

Organization. The collected data should be reported to the Administration in the standardized format shown in appendix 3.

8 DIRECT CO_2 EMISSIONS MEASUREMENT

8.1 Direct CO_2 emission measurement is not required by regulation 27 of MARPOL Annex VI.

8.2 Direct CO_2 emissions measurement, if used, should be carried out as follows:

.1 this method is based on the determination of CO_2 emission flows in exhaust gas stacks by multiplying the CO_2 concentration of the exhaust gas with the exhaust gas flow. In case of the absence or/and breakdown of direct CO_2 emissions measurement equipment, manual tank readings will be conducted instead;

.2 the direct CO_2 emissions measurement equipment applied to monitoring is located so as to measure all CO_2 emissions from the ship. The locations of all equipment applied are described in the monitoring plan; and

.3 calibration of the CO_2 emissions measurement equipment should be specified. Calibration and maintenance records should be available on board.

PART III OF THE SEEMP: SHIP OPERATIONAL CARBON INTENSITY PLAN

9 GENERAL

9.1 Regulation 26.3.1 of MARPOL Annex VI specifies that, for certain categories of ships of 5,000 GT and above, on or before 1 January 2023, the SEEMP shall include:

.1 a description of the methodology that will be used to calculate the ship's attained annual operational CII required by regulation 28 of MARPOL Annex VI and the processes that will be used to report this value to the ship's Administration;

.2 the required annual operational CIIs, as specified in regulation 28 of MARPOL Annex VI, for the next three years;

.3 an implementation plan documenting how the required annual operational CIIs will be achieved during the next three years; and

.4 a procedure for self-evaluation and improvement.

9.2 Sections 9 to 15 of these Guidelines provide guidance for ships to which regulation 26.3 of MARPOL Annex VI applies for the following purposes:

.1 to assist them in developing part III of the ship's SEEMP, including guidance on developing a ship-specific method to collect necessary data;

.2 to describe the methodology that will be used to calculate the ship's attained annual operational CII value and report this to the ship's Administration;

.3 to determine the ship's required annual operational CII for the next three years;

.4 to develop and apply an implementation plan documenting how the required annual operational CIIs will be achieved during the next three years;

.5 to define a procedure for self-evaluation and improvement; and

.6 to develop corrective actions, as applicable.

9.3 The required annual operational CII is to be calculated in accordance with regulation 28 and taking into account the guidelines developed by the Organization.[7]

9.4 In addition, pursuant to regulation 28 of MARPOL Annex VI, part III of the SEEMP is further to include calculation methodologies and a plan of corrective actions for ships that are rated D for three consecutive years or rated as E.

9.5 The ship's attained annual operational carbon intensity is to be calculated taking into account the guidelines developed by the Organization.[8]

9.6 Ships of 5,000 gross tonnage and above that are subject to regulations 26.3 and 28 of MARPOL Annex VI are strongly encouraged to review part I of their SEEMP to revise it as needed to reflect the actions taken to achieve the ship's CII requirements.

9.7 The goal setting, as referred to in paragraph 4.1.7 in part I, should be consistent with the requirements of regulation 28 of MARPOL Annex VI and should include the ship's required annual operational CII for the next three years following the updating of the SEEMP.

9.8 In addition, while ships subject to regulation 28 of MARPOL Annex VI may relay on the CII requirements when defining goals under part I of the SEEMP, they are encouraged to consider setting additional ship-specific goals that go beyond the applicable CII requirements and strive for energy efficiency improvements and carbon intensity reductions beyond such requirements.

9.9 Ships subject to regulation 28 of MARPOL Annex VI may consider voluntarily using one or more of the trial CIIs (EEPI, cbDIST, clDIST or EEOI), where applicable, for the purpose of providing supporting data for decision-making to support the review clause set out in regulation 28.11 of MARPOL Annex VI. A standardized data reporting format for the parameters to calculate the trial carbon intensity indicators on a voluntary basis is presented in appendix 4. A description of the methodology that should be used to calculate the trial CII should be included in the SEEMP.

9.10 Part III of the ship's SEEMP should be updated in case of voluntary modifications or necessary corrective actions are involved (every three years).

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[7] Refer to the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)* (Resolution MEPC.353(78) and the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)* (Resolution MEPC.338(76).

[8] Refer to the *2022 Guidelines on operational carbon intensity indicators and calculation methods (CII Guidelines, G1)* (Resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (Resolution MEPC.355(78)).

10 ATTAINED ANNUAL OPERATIONAL CII CALCULATION METHODOLOGY; DATA COLLECTION PLAN AND DATA QUALITY

10.1 Taking into account the guidelines developed by the Organization,[9] part III of the SEEMP provides detailed information on how the ship's attained annual operational CII should be calculated. Regulation 28 of MARPOL Annex VI states that the attained annual operational CII shall be calculated, using the data collected in accordance with regulation 27 (Fuel Oil Data Collection System).

10.2 In describing the calculation methodology, part III of the SEEMP should include a detailed description of the data required for the calculation of the attained annual operational CII. The data collection should follow the relevant methodology and requirements on the Fuel Oil Data Collection System pursuant to regulation 27 of MARPOL Annex VI (see part II of these Guidelines).

10.3 In case of transfer of the ship from one company to another according to regulation 27.5 or 27.6 of MARPOL Annex VI, all relevant data necessary for the calculation of the attained annual operational CII should be submitted by the former company to the receiving company within one month after the date of transfer. The data should have been verified by the Administration or any organization duly authorized by it according to regulation 6.7 of MARPOL Annex VI before they are transferred to the receiving company. The format of the transfer should be consistent with appendix 3 and such that the receiving company can use it in the calculations of the attained annual operational CII for the whole year in which the transfer takes place.

10.4 In case the former company does not transfer the required data, the Administration may make relevant data submitted to the IMO Fuel Oil Consumption Database available to the receiving company. In case of a transfer of both company and Administration concurrently, the incoming Administration may make a request to the Organization for access to the data according to regulation 27.11. If no such data is available, the attained annual operational CII can be calculated and verified using the available data covering a period of the preceding calendar year as long as practically possible.

10.5 In case of transfer of a ship from one Administration to another according to regulation 27.4 of MARPOL Annex VI the data needed for calculating the annual attained CII is already in the possession of the relevant company and no further exchange of data is needed.

11 REQUIRED ANNUAL OPERATIONAL CII FOR NEXT THREE YEARS

11.1 Part III of the SEEMP describes the required annual operational CII values for the ship for each of the next three years, calculated in accordance with regulation 28 of MARPOL Annex VI and taking into account the guidelines developed by the Organization,[10] as the basis for those calculations.

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[9] Refer to the *2022 Guidelines on operational carbon intensity indicators and calculation methods (CII Guidelines, G1)* (Resolution MEPC.352(78)) and the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)* (Resolution MEPC.355(78)).

[10] Refer to the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)* (Resolution MEPC.353(78)) and the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)* (Resolution MEPC.338(76)).

12 THREE-YEAR IMPLEMENTATION PLAN

12.1 The three-year implementation plan describes the measures the ship plans to take to continue to achieve the required annual operational CII over the next three-year period. These may include, but are not limited to, measures as outlined in section 5 of these Guidelines.

12.2 The three-year implementation plan is ship-specific.

12.3 The three-year implementation plan should be SMART (Specific, Measurable, Achievable, Realistic, and Time-bound) to the extent envisaged and feasible. It should include:

.1 a list of measures that improve the energy efficiency and reduce the carbon intensity of the ship, with time and method of implementation necessary for achieving the required operational CII;

.2 a description of how, when the listed measures are implemented, the required operational CII will be achieved, taking into consideration the combined effect of the measures on operational carbon intensity;

.3 the company personnel responsible for the three-year implementation plan, and for monitoring and recording performance throughout the year for the reviewing of the effectiveness of the three-year implementation plan; and

.4 identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible contingency measures put in place to overcome these impediments.

12.4 The three-year implementation plan should be monitored and adjusted when necessary, and the data to be monitored, identified.

13 PROCESS FOR SELF-EVALUATION AND IMPROVEMENT (IN ADDITION TO SECTION 4.4. OF THESE GUIDELINES)

13.1 The purpose of self-evaluation is to evaluate the effectiveness of the planned measures and their implementation, to deepen the understanding of the overall characteristics of the ship's operation, such as what types of measures can function effectively, and how or why, to comprehend the trend of the efficiency improvement of that ship, to understand trends in the ship's utilization in terms of cargo carried and areas of operation, and to develop an improved action plan for the next cycle. This evaluation should produce meaningful feedback based on experience in the previous period, to enhance performance in the next period.

13.2 Procedures for self-evaluation of the ship's energy usage and carbon intensity should be developed and included in this section of the SEEMP. Self-evaluation should be carried out periodically based on data collected through monitoring. It is recommended that the cause and effect of the ship's performance in the evaluated period be identified in order to identify measures for improving performance during the next period.

13.3 The process of self-evaluation and improvement could consist of the following elements:

.1 regular internal shipboard and company audits to verify implementation and the effectiveness of the system;

.2 improvement, i.e. implementing preventive or modifying measures (responsible personnel within the company should evaluate such audit reports and implement corrective actions including preventive or modifying measures); and

.3 periodical review of the SEEMP and associated documents, to update the SEEMP in a manner which minimizes any administrative and unnecessary burdens on company's personnel and ship's staff.

13.4 The content of the self-evaluation and improvement could include the following elements:

.1 criteria for evaluation, including elements to evaluate, such as quality of monitoring, record-keeping, effectiveness of implemented measures (including cause and effect) and achievement of the goal;

.2 the evaluation of the effectiveness of the different measures taken, in terms of energy efficiency and carbon intensity;

.3 which measures contribute the most and how much, which measures do not contribute and are therefore not efficient, which ship and/or company-specific elements adversely affect the CII and how these could be improved;

.4 timeline for starting the review process ahead of the end of the compliance period and for implementation of new measures in the subsequent year;

.5 measures identified to address deficiencies and discrepancies including correction of data gaps and system weaknesses, new measures to improve implementation (e.g. training) as well as new carbon intensity improvement measures as needed;

.6 where relevant, actions that will be taken to bring the ship into better CII ratings including estimated quantification of the additional expected reduction in carbon intensity;

.7 where applicable, if a plan of corrective actions is required, the plan should include items listed under 15.4.5 to bring the ship out of inferior performance; and

.8 where relevant, identification of critical factors that contributed to missing the CII target.

14 REVIEW AND UPDATE OF PART III OF THE SEEMP

14.1 Regulation 26.1 of MARPOL Annex VI provides: "Each ship shall keep on board a ship-specific Ship Energy Efficiency Management Plan (SEEMP). This may form part of the ship's safety management system. The SEEMP shall be developed and reviewed, taking into account guidelines adopted by the Organization". Regulation 26.3.2 of MARPOL Annex VI provides: "For ships rated as D for three consecutive years or rated as E, in accordance with regulation 28 of this Annex, the SEEMP shall be reviewed in accordance with regulation 28.8 of this Annex to include a plan of corrective actions to achieve the required annual operational CII".

14.2 The company should ensure that the SEEMP is reviewed and updated when necessary, as per paragraph 9.10.

14.3 The SEEMP should include a log for when it has been reviewed and updated and identify which parts have been changed.

15 PLAN OF CORRECTIVE ACTIONS

15.1 A plan of corrective actions is not required to be included in the SEEMP unless a ship has been rated D for three consecutive years or E for one year.

15.2 For a ship that is required to develop a plan of corrective actions in accordance with regulation 28.7 of MARPOL Annex VI, a revised SEEMP including the corrective actions for CII reduction shall be submitted to the Administration or any organization duly authorized by it for verification in accordance regulation 28.8 of MARPOL Annex VI. The revised SEEMP should be submitted together with, but in no case later than one month after reporting the attained annual operational CII in accordance with regulation 28.2.

15.3 Regulation 28.9 of MARPOL Annex VI further provides that "A ship rated as D for three consecutive years or rated as E shall duly undertake the planned corrective actions in accordance with the revised SEEMP."

15.4 Developing the plan of corrective actions

15.4.1 The purpose of the plan of corrective actions is to set out what actions a ship that was rated D for three consecutive years or E for one year should take to achieve at least a C rating for the calendar year following the adoption of the plan of corrective actions and ultimately the required annual operational CII.

15.4.2 The plan of corrective actions is ship-specific.

15.4.3 Many of the approaches described in section 5 of these guidelines or any other suitable measure may be applied to a ship to improve its fuel efficiency and thus its CII rating.

15.4.4 The plan for corrective action should describe the actions that the ship plans to take, the timeline in which those actions will be applied, and the expected impact their application will have on the ship's CII rating. It should be demonstrated how the corrective actions will contribute to achieving the required annual operational CII, so as to ascertain the effectiveness of the corrective actions. Experience gained from previously taken corrective actions and their degree of effectiveness should be taken into account when selecting the proper corrective actions.

15.4.5 The plan of corrective actions should be SMART (Specific, Measurable, Achievable, Realistic, and Time-bound). It should include:

.1 an analysis of the cause of the inferior CII rating;

.2 an analysis of the performance of implemented measures;

.3 a list of additional measures and revised measures to be added to the implementation plan with time and method of implementation necessary for achieving the required operational CII;

.4 designation of a company person to be responsible for the added and revised measures in the implementation plan, monitoring and recording performance throughout and reviewing of the effectiveness of the corrective actions; and

.5 identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible additional contingency measures put in place to overcome and how these impediments will be overcome.

15.4.6 The implementation of the plan of corrective actions should be monitored and adjusted when necessary. Additional measures should be taken to strengthen corrective actions in case of insufficient intermediate results.

15.4.7 The company should ensure that it is in a position to perform the actions set out in the plan of corrective actions and confirm that it is able to do so when submitting its updated SEEMP.

APPENDIX 1

SAMPLE FORM OF SHIP MANAGEMENT PLAN TO IMPROVE ENERGY EFFICIENCY (PART I OF THE SEEMP)

Name of ship:		Gross tonnage:	
Ship type:		Capacity:	
IMO number:			

Date of development:		Developed by:	
Implementation period:	From: Until:	Implemented by:	
Planned date of next evaluation:			

Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

1 MEASURES

Energy efficiency measures	**Implementation** (including the starting date)	**Responsible personnel**

2 MONITORING

Description of monitoring tools

3 GOAL

Measurable goals

4 EVALUATION

Procedures of evaluation

APPENDIX 2

SAMPLE FORM OF SHIP FUEL OIL CONSUMPTION DATA COLLECTION PLAN (PART II OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by

2 Ship particulars

Name of ship	
IMO number	
Company	
Flag	
Year of delivery	
Ship type	
Gross tonnage	
NT	
DWT	
Attained EEDI (if applicable)	
Attained EEXI (if applicable)	
Ice class	

3 Record of revision of Fuel Oil Consumption Data Collection Plan

Date of revision	Revised provision

4 Ship engines and other fuel oil consumers and fuel oil types used

	Engines or other fuel oil consumers	Power	Fuel oil types
1	Type/model of main engine	(kW)	
2	Type/model of auxiliary engine	(kW)	
3	Boiler	(…)	
4	Inert gas generator	(…)	

5 Emission factor

C_F is a non-dimensional conversion factor between fuel oil consumption and CO_2 emission in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)), as amended. The annual total amount of CO_2 is calculated by multiplying annual fuel oil consumption and C_F for the type of fuel.

Fuel oil type	C_F ($t\text{-}CO_2$ / t-Fuel)
Diesel/Gas oil (e.g. ISO 8217 grades DMX through DMB)	3.206
Light fuel oil (LFO) (e.g. ISO 8217 grades RMA through RMD)	3.151
Heavy fuel oil (HFO) (e.g. ISO 8217 grades RME through RMK)	3.114
Liquefied petroleum gas (LPG) (Propane)	3.000
Liquefied petroleum gas (LPG) (Butane)	3.030
Liquefied natural gas (LNG)	2.750
Methanol	1.375
Ethanol	1.913
Other (……)	

6 Method to measure fuel oil consumption

The applied method for measurement for this ship is given below. The description explains the procedure for measuring data and calculating annual values, measurement equipment involved, etc.

Method	Description

7 Method to measure distance travelled

Description

8 Method to measure hours under way

Description

9 Processes that will be used to report the data to the Administration

Description

10 Data quality

Description

APPENDIX 2*bis*

SAMPLE FORM OF SHIP OPERATIONAL CARBON INTENSITY PLAN (PART III OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by
<1st time>			
<2nd time>			
Etc.			

2 Required CII over the next three years, attained CII and rating over three consecutive years

Name of the ship		IMO number		
Company		Year of delivery		
Flag		Ship type		
Gross tonnage		DWT		
Applicable CII		☐AER ; ☐cgDIST		
Year	Required annual operational CII	Attained annual operational CII (before any correction)	Attained annual operational CII	Operational carbon intensity rating (A, B, C, D or E):
<year -1>				
<year -2>				
<year -3>				

	Required annual operational CII
<year>:	
<year + 1>	
<year + 2>	

3 Calculation methodology of the ship's attained annual CII, including required data and how to obtain these data as far as not addressed in part II

Description

4 Three-year implementation plan

Description

Company personnel to be responsible for the three-year implementation plan, monitoring and recording performance

List of measures to be considered and implemented

Measure	Impact on CII	Time and method of implementation and responsible personnel	Impediments and contingency measures
		Milestone / **Due** / **Responsible**	**Impediment** / **Contingencies**
		Milestone / **Due** / **Responsible**	**Impediment** / **Contingencies**
		Milestone / **Due** / **Responsible**	**Impediment** / **Contingencies**
		Milestone / **Due** / **Responsible**	**Impediments** / **Contingencies**

Calculation showing the combined effect of the measures and that the required operational CII will be achieved

Year	Required annual operational CII	Targeted operational annual CII	Targeted rating
<year>:			
<year + 1>			
<year + 2>			

5 Self-evaluation and improvement

Description

6 Plan of corrective actions (if applicable)

Analysis of causes for inferior CII rating

Cause	Analysis of effect	Actions

Analysis of measures in the implementation plan

Measure	Analysis of effect	Actions

List of additional measures and revised measures to be added to the implementation plan

Measure	Impact on CII	Time and method of implementation and responsible personnel			Impediments and contingency measures	
		Milestone	Due	Responsible	Impediments	Contingencies

APPENDIX 3

STANDARDIZED DATA REPORTING FORMAT FOR THE DATA COLLECTION SYSTEM AND OPERATIONAL CARBON INTENSITY TO THE ADMINISTRATION

Name of the ship		IMO number	
Company		Year of delivery	
Flag		Ship type	
Gross tonnage		DWT	
Applicable CII		☐AER ; ☐cgDIST	
Operational carbon intensity rating		□A ; □B ; □C ; □D ; □E	
CII for trial purpose (none, one or more on voluntary basis)		□EEPI ; □cbDIST ; □clDIST ; □EEOI	

Attained annual operational CII before any correction (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
Attained annual operational CII (AER in g CO_2/dwt.nm or cgDIST in g CO_2/gt.nm)	
End date for annual CII (dd/mm/yy)*	
Start date for annual CII (dd/mm/yy)*	
Attained EEDI (if applicable)	
Attained EEXI (if applicable)	
EEPI (gCO_2/dwt.nm)	
cbDIST (gCO_2/berth.nm)	
clDIST (gCO_2/m.nm)	
EEOI (gCO_2/t.nm or others)	
……	
……	
IMO number	
End date for DCS (dd/mm/yy)	
Start date for DCS (dd/mm/yy)	

APPENDIX 4

STANDARDIZED DATA REPORTING FORMAT FOR THE PARAMETERS TO CALCULATE THE TRIAL CARBON INTENSITY INDICATORS ON VOLUNTARY BASIS*

Attained annual EEOI	
Metric of Cargo Mass Carried or Work Done in EEOI calculation (gCO_2/t.nm or others)*****	
Transport work*****	
Attained annual EEPI (gCO_2/dwt.nm)	
Laden distance travelled (n.m)	
Attained annual clDIST (gCO_2/m.nm) ****	
Length of lanes (metre) ****	
Attained annual cbDIST(gCO_2/berth.nm) ***	
Available lower berths***	
End date for trial CII (dd/mm/yy)**	
Start date for trial CII (dd/mm/yy)**	
IMO number**	
End date for DCS (dd/mm/yy)**	
Start date for DCS (dd/mm/yy)**	

* For reporting a trial CII, the data should be reported as applicable taking into account the information already provided in appendix 3.
** Consistent with appendix 3.
*** Only applicable to cruise passenger ships.
**** Only applicable to ro-ro ships.
***** As defined in section 3 of *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* circulated by MEPC.1/Circ.684. The distance travelled shall be determined from berth of the port of departure to berth of the port of arrival and shall be expressed in nautical miles.

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ANNEX 9

RESOLUTION MEPC.347(78)
(adopted on 10 June 2022)

GUIDELINES FOR THE VERIFICATION AND COMPANY AUDITS BY THE ADMINISTRATION OF PART III OF THE SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, at its seventy-sixth session, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI* which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 26 of MARPOL Annex VI requires each ship to keep on board a Ship Energy Efficiency Management Plan (SEEMP), to be developed and reviewed, taking into account the guidelines adopted by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

HAVING CONSIDERED, at its seventy-eighth session, draft *Guidelines for the verification and company audits by the Administration of part III of the Ship Energy Efficiency Management Plan (SEEMP)*,

1 ADOPTS the *Guidelines for the verification and company audits by the Administration of part III of the Ship Energy Efficiency Management Plan (SEEMP)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 26 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that, in accordance with regulations 25.3 and 28.11 of MARPOL Annex VI, a review of the technical and operational measures to reduce carbon intensity of international shipping shall be completed by 1 January 2026.

ANNEX

GUIDELINES FOR THE VERIFICATION AND COMPANY AUDITS BY THE ADMINISTRATION OF PART III OF THE SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

CONTENTS

1 INTRODUCTION

1.1 The *Guidelines for the verification and company audits by the Administration of part III* of *the Ship Energy Efficiency Management Plan (SEEMP)* have been developed to assist Administrations with carrying out the verifications and company audits required by regulation 26.3.3 of MARPOL Annex VI.

1.2 The aim of these Guidelines is to:

.1 provide guidance to Administrations to effectively and efficiently carry out verifications of, and company audits related to, the Ship Energy Efficiency Management Plan (SEEMP) to ensure compliance with regulation 26.3 and with regulation 28 of MARPOL Annex VI; and

.2 ensure that the SEEMP includes the relevant elements in accordance with regulation 26.3 of MARPOL Annex VI, as applicable, and that the SEEMP is reliable, while minimizing the costs and associated burdens to the ship and the Administration.

1.3 The verification of and the company audits related to the SEEMP may be carried out by the Administration or an organization recognized by it.[1]

1.4 It should be noted that the Organization has adopted separate *2022 Guidelines for Administration verification of ship fuel oil consumption data and operational carbon intensity* (resolution MEPC.348(78), adopted 10 June 2022).

2 DEFINITIONS

For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

3 RESPONSIBILITIES

3.1 The responsibilities of Administrations and ships are set out in MARPOL Annex VI. These Guidelines do not change those responsibilities or create any new obligations.

3.2 An Administration may authorize an organization to carry out verifications of, and company audits related to, the SEEMP, and issue the Confirmation of Compliance, submit the data to the Organization and perform other actions authorized by the Administration. In every case, the Administration assumes full responsibility for all tasks conducted by the Administration, or any organization duly authorized by it (hereinafter referred to as "the Administration").

3.3 Verification of, and company audits related to, the SEEMP do not relieve the company, management, those undertaking delegated SEEMP tasks, officers or seafarers of their obligations as to compliance with those requirements in regulation 28 of MARPOL Annex VI.

3.4 The company is responsible for:

.1 informing relevant personnel and those undertaking the delegated SEEMP tasks about the content of the SEEMP;

[1] Refer to the *Code for Recognized Organizations (RO Code)*, as adopted by the Organization by resolution MEPC.237(65), as may be amended by the Organization.

.2 appointing responsible members of staff to accompany the verifier; and

.3 providing access and evidential materials as requested by the verifier.

4 VERIFICATION OF THE SEEMP AND DOCUMENTATION

4.1 To facilitate the verification, the Administration should indicate what documentation, if any, the company should submit along with its SEEMP.

5 INITIAL, PERIODICAL, ADDITIONAL VERIFICATIONS AND COMPANY AUDITS

5.1 The verification and audit process for the SEEMP according to regulation 26.3.3 of MARPOL Annex VI should normally involve the following:

.1 initial verification;

.2 periodical verifications;

.3 additional verifications; and

.4 company audits.

5.2 The initial, periodical, additional verifications and company audits should be based on documentary evidence.

Initial verification (regulation 5.4.6 of MARPOL Annex VI)

5.3 The Administration should perform an initial verification to ensure that for each ship to which regulation 26.3 of MARPOL Annex VI applies, the SEEMP complies with regulation 26.3.1 of MARPOL Annex VI. In accordance with regulation 5.4.6 of MARPOL Annex VI, this process must be done prior to 1 January 2023 for existing ships or before a new ship is put in service.

5.4 On satisfactory assessment of the SEEMP part III, the Administration can issue the Confirmation of Compliance (sample format in the annex to this document).

Periodical verification (regulation 5.4.6 of MARPOL Annex VI)

5.5 If any of the elements in regulation 26.3.1 is updated, and in any case every three years, the Administration should perform a periodical verification to ensure the SEEMP complies with regulation 26.3.1 of MARPOL Annex VI in accordance with regulation 5.4.6 of MARPOL Annex VI.

5.6 On satisfactory assessment of SEEMP part III, the Administration should issue the Confirmation of Compliance (sample format in the annex to this document).

Additional verifications (regulation 6.8 of MARPOL Annex VI)

5.7 The Administration should, in the case of a ship rated as D for three consecutive years or a ship rated as E, perform an additional verification to ensure that a plan of corrective actions has been established in accordance with regulations 28.7 and 28.8.

5.8 On satisfactory verification of the plan of corrective actions, the Administration can issue the Statement of Compliance according to regulation 6.8.

Company audits

5.9 The Administration should, in accordance with regulation 26.3.3, perform periodical company audits to:

.1 verify that the SEEMP for which the Confirmation of Compliance has previously been issued complies with regulation 26.3.1 and, in the case of non-compliance, require remedial action;

.2 confirm that the ship is being operated in accordance with SEEMP part III, regardless of its rating;

.3 verify the progress made in the (corrective) actions to be taken in the execution of the three-year implementation plan and the plan of corrective actions;

.4 verify self-assessment and improvement of actions taken; and

.5 verify the assignment of responsibilities related to the implementation and monitoring of measures.

5.10 The periodical company audits may include annual audits of the company (company audits) and verifications on board the ship (shipboard audits).

5.11 These additional shipboard verifications and company audits, if undertaken, should be six months after the issuance of the Statement of Compliance at the latest.

6 ELEMENTS OF VERIFICATION

6.1 Verification could consist of, but not be limited to, the following elements:

.1 verification of the method of calculations of the CII and that there is a proper description of the method to report ship data to the Administration;

.2 assessment of the effectiveness (of the combination) of measures, so that when implemented the ship will with reasonable assurance achieve the required annual operational CII, including the goal as set in accordance with paragraph 4.1.7 and 9.7 of the SEEMP Guidelines; and

.3 robustness of the three-year implementation plan and, where applicable, the plan of corrective actions, including whether realistic timelines for implementation of actions have been included.

7 COMBINATION WITH ISM AUDITS

7.1 Verification of implementation aspects of the SEEMP on board (monitoring, self-evaluation and improvements, etc.) could be combined with the ISM audits.

7.2 The verifications may be carried out in accordance with guidelines on implementation of the ISM Code referred to in Chapter 15 of the ISM Code.

ANNEX

SAMPLE FORMAT FOR CONFIRMATION OF COMPLIANCE

CONFIRMATION OF COMPLIANCE – SEEMP PART III

Issued under the provisions of the Protocol of 1997, as amended, to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 related thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

. . . .

(full designation of the Country)

by . . . .

(full designation of the competent person or organization authorized under the provisions of the Convention)

Particulars of ship*

Name of ship . . . .

Distinctive number or letters. . . . .

IMO number†. . . . .

Port of registry . . . .

Gross tonnage. . . . .

SEEMP part III date of revision, as applicable . . . .

THIS IS TO CONFIRM:

Taking into account the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)* adopted by resolution MEPC.346(78), the ship's SEEMP has been developed and complies with regulation 26.3.1 of Annex VI of the Convention.

Issued at: . . . .

(place of issue of the Confirmation)

Date (dd/mm/yyyy) . . . .

(date of issue) *(signature of duly authorized official issuing the Confirmation)*

(seal or stamp of the authority, as appropriate)

* Alternatively, the particulars of the ship may be placed horizontally in boxes.

† In accordance with the IMO Ship Identification Number Scheme, adopted by the Organization by resolution A.1117(30).

***

ANNEX 10

RESOLUTION MEPC.348(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR ADMINISTRATION VERIFICATION OF SHIP FUEL OIL CONSUMPTION DATA AND OPERATIONAL CARBON INTENSITY

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING ALSO that regulation 27.7 of MARPOL Annex VI requires that ship fuel oil consumption data be verified according to procedures established by the Administration, taking into account guidelines developed by the Organization,

NOTING FURTHER that regulation 28.6 of MARPOL Annex VI specifies that the attained annual operational CII shall be documented and verified against the required annual operational CII to determine operational carbon intensity rating, taking into account the guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that the Committee, at its seventy-first session, adopted, by resolution MEPC.292(71), the *2017 Guidelines for Administration verification of ship fuel oil consumption data,*

HAVING CONSIDERED, at its seventy-eighth session, draft *2022 Guidelines for Administration verification of ship fuel oil consumption data and operational carbon intensity*,

1 ADOPTS the *2022 Guidelines for Administration verification of ship fuel oil consumption data and operational carbon intensity*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 27 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulations 25.3 and 28.11 of MARPOL Annex VI a review of the technical and operational measures to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2017 Guidelines for Administration verification of ship fuel oil consumption data* adopted by resolution MEPC.292(71).

ANNEX

2022 GUIDELINES FOR ADMINISTRATION VERIFICATION OF SHIP FUEL OIL CONSUMPTION DATA AND OPERATIONAL CARBON INTENSITY

1 INTRODUCTION

1.1 Regulation 27 of MARPOL Annex VI establishes the IMO Ship Fuel Oil Consumption Database, to be administered by the Organization, to which each Administrations will submit relevant data for their registered ships of 5,000 gross tonnage (GT) and above. Regulation 27.7 specifies that "the data shall be verified according to procedures established by the Administration, taking into account guidelines developed by the Organization".

1.2 Regulation 28 of MARPOL Annex VI establishes the operational carbon intensity rating mechanism. Regulation 28.6 specifies that the attained annual operational CII shall be documented and verified against the required annual operational CII to determine operational carbon intensity rating A, B, C, D or E, either by the Administration or by any organization duly authorized by it, taking into account the guidelines developed by the Organization.

1.3 This document contains the Guidelines referred to in regulations 27.7 and 28.6 and is intended to assist Administrations in developing their own verification programme.

1.4 A verification procedure should ensure the reliability of the collected data and the correctness of the attained annual operational CII, while minimizing the costs and associated burdens to the ship and the Administration.

2 DEFINITIONS

For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

3 RESPONSIBILITIES

3.1 The responsibilities of Administrations and ships are set out in MARPOL Annex VI. These Guidelines do not change those or create any new obligations.

3.2 Under the data collection system for fuel oil consumption and the operational carbon intensity rating of ships, as specified in MARPOL Annex VI, an Administration may authorize an organization[1] to receive the data from a ship, verify the data for compliance with the requirements, verify the attained annual operational CII against the required annual operational CII, determine the operational carbon intensity rating, issue the Statement of Compliance, and submit the data to the Organization. In every case, the Administration assumes full responsibility for all tasks conducted by the Administration or any organization duly authorized by it (hereinafter referred to as "the Administration").

4 VERIFICATION OF THE REPORTED DATA

4.1 To facilitate data verification, the Administration should indicate what additional documentation a ship should submit along with its annual data report. Specification of this

[1] Refer to the *Guidelines for the authorization of organizations acting on behalf of the Administration*, adopted by the Organization by resolution A.739(18), as amended by resolution MSC.208(81), and the *Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration*, adopted by the Organization by resolution A.789(19), as may be amended by the Organization.

documentation can be done on a ship basis, as part of the assessment of the Data Collection Plan,[2] or it may be done as a general policy statement or through such other policy instruments as the Administration deems appropriate. Additional documentation to facilitate data verification may include the following, as well as other documentation that the Administration deems relevant:

.1 a copy of the verified ship's Data Collection Plan (SEEMP Part II);

.2 summaries of bunker delivery notes (BDNs), in sufficient detail to show that all fuel oil consumed by the ship is accounted for (see sample form of BDN summary set out in appendix 1);

.3 summaries of disaggregated data of fuel oil consumption, distance travelled and hours under way, in a format specified by the Administration (see sample form of data summary set out in appendix 2);

.4 information to demonstrate that the ship followed the Data Collection Plan set out in its SEEMP, including information on data gaps and how they were filled as well as how the event that caused the data gap was resolved;

.5 copies of documents containing information on the amount of fuel oil consumption, distance travelled and hours under way for the ship's voyages during the reporting period (e.g. the ship's official logbook, oil record book, BDNs, arrival/noon/departure reports, and from auto-log data files); and

.6 supported by documentary evidence, copies of the fuel oil mass to CO_2 mass conversion factor provided by fuel supplier in case the type of fuel is not covered by the guidelines developed by the Organization.[3]

4.2 In addition to the documentation described in paragraph 4.1, the Administration may request a ship to submit such documentation needed to perform a comprehensive review of a ship's annual fuel oil consumption, distance travelled, and hours under way. The Administration may request that this documentation be submitted by all ships or a subset of the ships under its jurisdiction. This documentation may be used by the Administration to verify whether the ship followed the methodology specified in its Data Collection Plan, with a view to confirming:

.1 consistency of reported data and calculated values, including with previous reporting periods (if applicable), through recalculating the annual reported values using the underlying data, etc.;

.2 completeness of data (e.g. perform substantive testing based on reconciliation, recalculations, and document cross-check, for example with official logbook and/or arrival/noon/departure reports, auto-log report files; recalculate total quantities of fuel oil used, distance travelled and hours under way); and

.3 reliability and accuracy of the data (e.g. test that the data quality procedures as described in the Data Collection Plan have been properly implemented, carry out site visits (typically to the company's offices rather than to the ship) to test the systems, processes and the control activities) through

[2] Refer to the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)*, adopted by resolution MEPC.346(78).

[3] Refer to the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)), as may be amended.

corroborating fuel oil consumption data with distance travelled and hours under way, comparing reported fuel oil consumption with that which is expected for the ship size, operational profile, and technical characteristics, and/or comparing reported fuel oil consumption total fuel bunkered, etc.

4.3 For a ship which has undergone a transfer addressed in regulations 27.4, 27.5 or 27.6 of MARPOL Annex VI, the losing Administration needs to verify the data before the transfer.

5 VERIFICATION OF THE ATTAINED ANNUAL OPERATIONAL CII AND DETERMINATION OF THE CII RATING

5.1 To facilitate the verification of the attained annual operational CII, the Administration should indicate what additional documentation a ship should submit along with its annual data report. Additional documentation to facilitate the verification may include the following, as well as other documentation that the Administration deems relevant:

.1 a copy of the verified ship's Operational Carbon Intensity Plan (SEEMP part III);

.2 documents (IEE certificate, Stability Booklet or International Tonnage Certificate) evidencing the capacity parameter of the ship in the metric relevant for the calculation of its operational carbon intensity (deadweight or gross tonnage);

.3 aggregated data of fuel oil consumption and distance travelled covering the entire calendar year to calculate the attained annual operational CII (AER or cgDIST) (see sample form of data summary set out in appendix 2);

. 4 the aggregated values of the parameters and associated calculation methods to determine the annual metric value of the trial CIIs on voluntary basis, if any (see sample form of data summary set out in appendix 2 – Add.1);

.5 supported by documentary evidence, the correction factors and voyage adjustments[4] applied in the attained annual operational CII calculation, if any, during the reporting period (see sample form of data summary set out in appendix 2); and

.6 statements of compliance for previous two calendar years where applicable.

5.2 The attained annual operational CII should be verified using the data over a 12-month period from 1 January to 31 December for the preceding calendar year, by the Administration. In cases where the calculation of the attained annual operational CII is not possible due to the unavailability of some data, such as where a new ship is delivered after 1 January in the preceding year, the attained annual operational CII should be verified using the available data covering the corresponding period of the preceding calendar year.

5.3 In case of a ship with multiple load line certificates or with a load line certificate containing multiple load lines, the highest deadweight value should be used to calculate and verify the required and attained annual operational CII.

[4] Refer to the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations* (G5), adopted by resolution MEPC.355(78).

5.4 For a ship which permanently changes its deadweight (DWT) and/or its gross tonnage (GT) during the year, which the SEEMP or a corrective action plan identifies as being undertaken to improve the ship's operational carbon intensity performance:

.1 the required annual operational CII should always be calculated and verified using the original DWT or GT value before conversion; however, the attained CII which is used to assess compliance should be calculated and verified using the new DWT or GT value after conversion; and

.2 for the year when the conversion is made, the attained annual operational CII should be calculated and verified for the entire calendar year on the average DWT or GT value weighted on distance travelled before and after conversion.

5.5 Except for those specified in 5.4, for a ship which is regarded by the Administration as a newly constructed ship as per regulation 5.4.3 of MARPOL Annex VI due to major conversion, including extensive changes of carrying capacity and/or ship type during the year, the required and attained annual operational CII should be calculated and verified as per a newly constructed ship for the period after conversion. For the year when the major conversion is made, the data for partial year before conversion should still be reported for verification but will not be included in the calculation and verification of the attained annual operational CII.

5.6 For a ship which has undergone a transfer addressed in regulations 27.4, 27.5 or 27.6 of MARPOL Annex VI, the losing Administration neither needs to verify the attained annual operational CII nor to determine the annual CII rating of the ship for partial year. The attained annual operational CII should be verified by the receiving Administration using the data over an entire calendar year. In such cases, the aggregated data necessary to calculate the attained annual operational CII before transfer, which should have already been verified by the losing Administration, can be directly used by the receiving Administration without further verification (see sample form set out in appendix 3 and appendix 3 – Add.1).

5.7 The administration should determine the operational carbon intensity rating for the ship, taking into account the guidelines developed by the Organization.[5] The attained and required annual operational CII, as well as the rating boundaries, should be all given with three decimal places. If the attained annual operational CII happens to land on a rating boundary, the ship should be rated as the better of the two ratings.

5.8 The trial CIIs (e.g. EEPI, cbDIST, clDIST or EEOI),[6] if voluntarily calculated and reported, should be verified by the Administration following the same procedure as for the attained annual operational CII (AER or cgDIST). The Administration does not need to assign a rating to a ship based on trial CIIs.

6 ISSUE OF A STATEMENT OF COMPLIANCE

6.1 In accordance with regulation 6.6 of MARPOL Annex VI, upon receipt of reported data pursuant to regulation 27 of MARPOL Annex VI and attained annual operational CII pursuant to regulation 28 of MARPOL Annex VI and satisfactory completion of the verification, the Statement of Compliance should be issued by the Administration.

[5] Refer to the *2022 Guidelines on the operational carbon intensity rating of ships (CII Rating Guidelines, G4)* adopted by resolution MEPC.354(78).

[6] Refer to the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)* adopted by resolution MEPC.352(78).

6.2 Notwithstanding paragraph 6.1, the Administration should consider whether a corrective action plan is required according to regulation 6.8 of MARPOL Annex VI. In the case of a corrective actions plan being required but not submitted together with the attained annual operational CII, the administration should inform the company in a timely manner that a revised SEEMP including a plan of corrective actions, must be submitted for verification no later than one month after reporting the attained annual operational CII. The Statement of Compliance should not be issued in such a case unless a corrective action plan is duly developed and reflected in the SEEMP and verified by the Administration, taking into account the guidelines developed by the Organization.[7]

6.3 Should any material discrepancy be identified by the Administration in the reported data and/or the calculation of required/attained annual operational CII, it should be communicated to the company on a timely basis for clarification or correction. A discrepancy is considered material if the discrepancy or aggregation of discrepancies could influence the reported total by more than ±5%. The Statement of Compliance should not be issued in such a case unless the material discrepancy is clarified or corrected.

[7] Refer to the *Guidelines for the verification and company audits by the Administration of part III of the Ship Energy Efficiency Management Plan (SEEMP)* adopted by resolution MEPC.347(78).

APPENDIX 1

SAMPLE OF THE BDN SUMMARIES

Date of Operations (dd/mm/yyyy)	Fuel Oil Type/Mass(MT)									Descriptions
	DO/GO	LFO	HFO	LPG(P)	LPG(B)	LNG	Methanol	Ethanol	Others(CF)	
① BDN										
09/01/2023										
02/05/2023			150							
08/07/2023										
09/10/2023										
10/12/2023			300							
①Annual Supply Amount	0	0	450	0	0	0	0	0	0	
② Correction for the tank oil remainings										
01/01/2023			400							
31/12/2023			200							
②Correction for the tank oil remaining	0	0	200	0	0	0	0	0	0	The difference in the amount of the remaining tank oil at the beginning/end of the data collection period.
③ Other corrections										
30/03/2023										
15/09/2023										
31/12/2023										
③Annual other corrections	0	0	0	0	0	0	0	0	0	
Annual Fuel Consumption										
Annual Fuel Consumption (①+②+③)	0	0	650	0	0	0	0	0	0	

Explanatory remarks;
If bunker supply/correction data have been recorded in a Company's electronic reporting system,the data is acceptable to be submitted in the existing format instead of submitting the data by this format.

APPENDIX 2

SAMPLE OF THE COLLECTED DATA SUMMARIES

Date and time from (dd/mm/ yyyy; hh:mm UTC)	* Date and time to (dd/mm/ yyyy; hh:mm UTC)	Distance travelled (n.m)	Hours under way (hh:mm)	**exceptional conditions specified in regulation 3.1 of MARPOL Annex VI (Y/N)	**Sailing in ice condition (Y/N)	**STS Operation (Y/N)	Fuel consumption (metric tons)							
							total mass		**mass to be deducted from the total					
									consumed for production of electrical power($FC_{electrical}$)		consumed by oil-fired boiler for cargo heating/discharge on tankers (FC_{boiler})		consumed by standalone engine driven cargo pumps during discharge operations on tankers(FC_{others})	
							***DO/GO	…	DO/GO	…	DO/GO	…	DO/GO	…
01/01/2023 00:00	01/01/2023 13:20	150	13:20	N	N	N								
01/01/2023 13:20	01/01/2023 24:00	60	10:40	N	Y	N								
02/01/2023 00:00	02/01/2023 24:00	288	24:00	N	N	Y								
03/01/2023 00:00	03/01/2023 24:00	260	24:00	N	N	Y								
……	……	……	……	……	……	……								
……	……	……	……	……	……	……								
31/12/2023 00:00	31/12/2023 24:00	290	24:00	N	N	N								
Annual total														

* In the case of daily underlying data, this column would be left blank.
** Refer to the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)*, adopted by resolution MEPC.355(78). Supporting documentation may be additionally submitted to facilitate the verification when necessary, such as Baplie files where the number of in-use reefer containers on board are recorded. Note that voyages in different sailing or operational conditions should be recorded in separate rows so that the correction factors and voyage adjustments can be duly calculated and verified.
*** Refer to fuel types specified in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73), as may be amended)

Explanatory remarks: If bunker supply/correction data have been recorded in a company's electronic reporting system, the data is acceptable to be submitted in the existing format instead of submitting the data by this format.

APPENDIX 2 – ADD.1

SAMPLE OF THE COLLECTED DATA SUMMARIES TO CALCULATE TRIAL CII ON A VOLUNTARY BASIS

The following aggregated data should be additionally included in the table in appendix 2, if one or more trial CII metrics have been applied on a voluntary basis:

Date from (dd/mm/yyyy)	*Date to (dd/mm/yyyy)	Laden distance travelled (n.m)	****Transport work (metric of transport work)
01/01/2023			
02/01/2023			
03/01/2023			
31/12/2023			
Annual total			

* In the case of daily underlying data, this column would be left blank.
**** As defined in section 3 of the *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* circulated by MEPC.1/Circ.684.

Explanatory remarks: If bunker supply/correction data have been recorded in a Company's electronic reporting system, the data is acceptable to be submitted in the existing format instead of submitting the data by this format.

APPENDIX 3

SAMPLE OF THE AGGREGATED DATA BEFORE A TRANSFER OF FLAG/COMPANY ADDRESSED IN REGULATIONS 27.4, 27.5 OR 27.6 OF MARPOL ANNEX VI

Date of transfer (dd/mm/yyyy)	Type of transfer (flag/ company/ both)	Reporting period		Distance Travelled (n.m)		Hours under way (hh:mm)	Fuel consumption (metric tons)					
		Date from (dd/mm/yyyy)	Date to (dd/mm/yyyy)	Total distance travelled	*distance to be deducted from CII calculation		total mass		*mass to be deducted from the total		**mass consumed in STS operations	
							***DO/GO	…	DO/GO	…	DO/GO	…
12/05/2023	Flag	01/01/2023	11/05/2023									
15/06/2023	Company	12/05/2023	14/06/2023									
02/11/2023	Both	15/06/2023	01/11/2023									
……												

* Refer to the aggregated mass of fuel consumption to calculate FC_{voyage}, $FC_{electrical}$, FC_{boiler} and FC_{others} in the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)*, (resolution MEPC.355(78).
** Refer to the aggregated mass of fuel consumption to calculate $AF_{Tanker,STS}$ in the *2022 Interim guidelines on correction factors and voyage adjustments for CII calculations (G5)*, (resolution MEPC.355(78).
*** Refer to fuel types specified in *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73), as may be amended).

APPENDIX 3 – ADD.1

SAMPLE OF THE AGGREGATED DATA BEFORE A TRANSFER OF FLAG/COMPANY ADDRESSED IN REGULATIONS 27.4, 27.5 OR 27.6 OF MARPOL ANNEX VI TO CALCULATE TRIAL CII METRICS ON A VOLUNTARY BASIS

The following aggregated data may be additionally included in the table in appendix 3, if one or more trial CII metrics have been applied on a voluntary basis:

Date of transfer (dd/mm/yyyy)	Type of transfer (flag/ company/ both)	Reporting period		Laden dstance travelled (n.m)	****Transport work (metric of transport work)
		Date from (dd/mm/yyyy)	Date to (dd/mm/yyyy)		
12/05/2023	Flag	01/01/2023	11/05/2023		
15/06/2023	Company	12/05/2023	14/06/2023		
02/11/2023	Both	15/06/2023	01/11/2023		
……					

**** As defined in section 3 of *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI)* circulated by MEPC.1/Circ.684.

***

ANNEX 11

RESOLUTION MEPC.349(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR THE DEVELOPMENT AND MANAGEMENT OF THE IMO SHIP FUEL OIL CONSUMPTION DATABASE

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee, at its seventy-sixth session, adopted, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING ALSO that regulation 27.12 of MARPOL Annex VI specifies that the Secretary-General of the Organization shall maintain an anonymized database such that identification of a specific ship will not be possible,

NOTING FURTHER that regulation 27.13 of MARPOL Annex VI requires that the IMO Ship Fuel Oil Consumption Database be undertaken and managed by the Secretary-General of the Organization, pursuant to guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that the Committee, at its seventy-first session, adopted, by resolution MEPC.293(71), the *2017 Guidelines the development and management of the IMO Ship Fuel Oil Consumption Database,*

HAVING CONSIDERED, at its seventy-eighth session, draft *2022 Guidelines for the development and management of the IMO Ship Fuel Oil Consumption Database*,

1 ADOPTS the *2022 Guidelines for the development and management of the IMO Ship Fuel Oil Consumption Database*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 27 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulations 25.3 and 28.11 of MARPOL Annex VI a review of the technical and operational measures to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2017 Guidelines the development and management of the IMO Ship Fuel Oil Consumption Database* adopted by resolution MEPC.293(71).

ANNEX

2022 GUIDELINES FOR THE DEVELOPMENT AND MANAGEMENT OF THE IMO SHIP FUEL OIL CONSUMPTION DATABASE

1 INTRODUCTION

1.1 These Guidelines provide guidance on the development and management of the IMO Ship Fuel Oil Consumption Database (hereafter "the database"), and describe methods that will be used to anonymize ship data for use by Parties, in accordance with regulation 27 of MARPOL Annex VI, and to ensure the completeness of the database.

1.2 In general, the purpose of the database is to provide data for establishing annual CO_2 emissions from ships and support consideration of further measures for reducing carbon intensity of international shipping.

1.3 With regard to data confidentiality, regulation 27.12 stipulates that "The Secretary-General of the Organization shall maintain an anonymized database such that identification of a specific ship will not be possible. Parties shall have access to the anonymized data strictly for their analysis and consideration." These Guidelines balance data anonymization with the usability of data for analysis by the Parties and Organization.

1.4 Regulation 27.13 states that "The IMO Ship Fuel Oil Consumption Database shall be undertaken and managed by the Secretary-General of the Organization, pursuant to guidelines to be developed by the Organization." With regard to the establishment of the database and for data visualization, it will be developed as a module within the Global Integrated Shipping Information System (GISIS) platform and associated web application, as necessary, with the integrated IMO Web Accounts framework utilized to manage secure access to the module.

2 DEFINITIONS

For the purpose of these Guidelines, the definitions in MARPOL Annex VI apply.

3 DATA ANONYMIZATION

Pursuant to regulation 27.12 of MARPOL Annex VI, the data are to be anonymized such that identification of a specific ship will not be possible. For the purpose of the anonymization of the fuel oil consumption data, the following should apply for the database:

.1 the IMO number and ship flag should not be shown;

.2 gross tonnage (GT), net tonnage (NT), deadweight tonnage (DWT) and power output (rated power) should be rounded to two significant digits, for example, a ship tonnage of 167,430 GT should be shown as 170,000 GT;

.3 attained EEDI and attained EEXI should be rounded to two decimal places;

.4 required annual operational CII (AER or cgDIST), attained annual operational CII (AER or cgDIST), attained annual operational CII (AER or cgDIST) before any correction and operational carbon intensity indicators for trial purpose on voluntary basis (e.g. EEPI, cbDIST, clDIST and EEOI)[1] should be rounded to one decimal place;

[1] Refer to *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1)* (resolution MEPC.352(78)).

.5 the annual data of fuel oil consumption, distance travelled and hours under way should be provided in full without modification;

.6 ship types other than those defined in regulation 2 should be shown as "others"; and

.7 ice class should be shown as "Yes" or "No".

4 DATA SUBMISSION AND ACCESS

4.1 An Administration should be able to log in to the online database to submit its data via an online form. The data input into the database should be checked by the database system to ensure that the data are being submitted in the standardized format and be cross-referenced with the data from the Ship Particulars module of GISIS.

4.2 The Administration should designate a contact person for the purposes of the database who is responsible for communication with the Secretariat if any matter arises with regard to the submission of data by the respective Administration.

4.3 To encourage the consistent submission of data and improve the usability of the database, automatic notifications and reminders concerning data submission, modification and database update could be incorporated as features in the database.

4.4 An Administration will have access to non-anonymized data of ships flying its flag. Furthermore, the Administration of a ship, to which regulation 28 of MARPOL Annex VI applies, will have access to all reported data for the preceding calendar year for that ship regardless of flag history.

4.5 An Administration should be able to log in to the online database to download the anonymized dataset.

5 MEASURES TO ENSURE THE COMPLETENESS OF THE DATABASE

In accordance with the requirements of regulation 27.10 of MARPOL Annex VI concerning reporting of the status of missing data, the Secretary-General should:

.1 at the beginning of each calendar year, produce a list of ships falling under the scope of regulation 27 by cross-referencing with the data from the Ship Particulars module of GISIS;

.2 send the aforementioned list of ships to the Administration for reference, in order to receive feedback in case of any discrepancies;

.3 check the completeness of the database by comparing the list produced under .1 with the reported data;

.4 remind Administrations which have failed to submit the data in the required form;

.5 report the status of missing data to the Committee on an annual basis; and

.6 request non-reporting Administrations to submit the data of all their registered ships falling under the scope of regulation 27.

6 ANNUAL REPORT TO THE MARINE ENVIRONMENT PROTECTION COMMITTEE

Regulation 27.10 states that "the Secretary-General of the Organization shall produce an annual report to the Marine Environment Protection Committee summarizing the data collected, the status of missing data, and such other relevant information as may be requested by the Committee." At a minimum, each annual report should include the following and also any other information as requested by the Committee:

.1 an aggregated annual amount of each type of fuel oil consumed by all ships of 5,000 GT and above engaged on international voyages;

.2 the aggregated annual amount of each type of fuel oil consumed, distance travelled and hours under way for ships of 5,000 GT and above engaged on international voyages, by ship type and size category as defined in MARPOL Annex VI,[2] including the "other" category for ships not defined in MARPOL Annex VI regulation 2;

.3 the number of ships of 5,000 GT and above engaged on international voyages reported to the database, by ship type and size category as defined in MARPOL Annex VI,**Error! Bookmark not defined.** including the "other" category for ships not defined in MARPOL Annex VI regulation 2;

.4 the number of ships of 5,000 GT and above engaged on international voyages registered with the Party of Annex VI for which data was not received, by ship type and size category as defined in MARPOL Annex VI,**Error! Bookmark not defined.** including the "other" category for ships not defined in MARPOL Annex VI regulation 2; and

.5 the annual development in operational carbon intensity of the ship types and international shipping, as well as the uncertainties in the data and results, using both demand-based measurement and supply-based measurement, as stated in paragraph 1.5 of the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)*.

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[2] In order to facilitate year-over-year comparison, the Secretariat may also consider using ship type and size categories as used in the Fourth IMO GHG Study 2020, as appropriate.

ANNEX 12

RESOLUTION MEPC.350(78)
(adopted on 10 June 2022)

2022 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, at its seventy-sixth session, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 23 of MARPOL Annex VI requires that the attained Energy Efficiency Existing Ship Index (EEXI) shall be calculated taking into account the guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that, at its seventy-sixth session, the Committee adopted, by resolution MEPC.333(76), the *2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI),*

HAVING CONSIDERED, at its seventy-eighth session, the draft *2022 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI),*

1 ADOPTS the *2022 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI),* as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 23 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulation 25.3 of

MARPOL Annex VI a review of the technical measure to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)* adopted by resolution MEPC.333(76).

ANNEX

2022 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)

CONTENTS

1 Definitions

1.1 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

1.2 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

2 Energy Efficiency Existing Ship Index (EEXI)

2.1 EEXI formula

The attained Energy Efficiency Existing Ship Index (EEXI) is a measure of ship's energy efficiency (g/t*nm) and calculated by the following formula:

$$\frac{\left(\prod_{j=1}^{n} f_j\right)\left(\sum_{i=1}^{nME} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)}\right) + \left(P_{AE} \cdot C_{FAE} \cdot SFC_{AE}*\right) + \left(\left(\prod_{j=1}^{n} f_j \cdot \sum_{i=1}^{nPTI} P_{PTI(i)} - \sum_{i=1}^{neff} f_{eff(i)} \cdot P_{AEeff(i)}\right) C_{FAE} \cdot SFC_{AE}\right) - \left(\sum_{i=1}^{neff} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME}**\right)}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

* If part of the Normal Maximum Sea Load is provided by shaft generators, SFC_{ME} and C_{FME} may – for that part of the power – be used instead of SFC_{AE} and C_{FAE}

** In case of $P_{PTI(i)} > 0$, the average weighted value of ($SFC_{ME} \cdot C_{FME}$) and ($SFC_{AE} \cdot C_{FAE}$) to be used for calculation of P_{eff}

Note: This formula may not be applicable to a ship having diesel-electric propulsion, turbine propulsion or hybrid propulsion system, except for cruise passenger ships and LNG carriers.

Ships falling into the scope of EEDI requirement can use their attained EEDI calculated in accordance with the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73), as amended, the "EEDI Calculation Guidelines" hereafter) as the attained EEXI if the value of the attained EEDI is equal to or less than that of the required EEXI.

2.2 Parameters

For calculation of the attained EEXI by the formula in paragraph 2.1, parameters under the EEDI Calculation Guidelines apply, unless expressly provided otherwise. In referring to the aforementioned guidelines, the terminology "EEDI" should be read as "EEXI".

2.2.1 $P_{ME(i)}$; Power of main engines

In cases where overridable Shaft / Engine Power Limitation is installed in accordance with the *2021 Guidelines on the shaft / engine power limit to comply with the EEXI requirements and use of a power reserve* (resolution MEPC.335(76)), $P_{ME(i)}$ is 83% of the limited installed power (MCR_{lim}) or 75% of the original installed power (MCR), whichever is lower, for each main engine *(i)*. In cases where the overridable Shaft / Engine Power Limitation and shaft generator(s) are installed, in referring to paragraph 2.2.5.2 (option 1) of the EEDI Calculation Guidelines, "MCR_{ME}" should be read as "MCR_{lim}".

For LNG carriers having steam turbine or diesel electric propulsion, $P_{ME(i)}$ is 83% of the limited installed power (MCR_{lim}, MPP_{lim}), divided by the electrical efficiency in case of diesel electric propulsion system, for each main engine *(i)*. For LNG carriers, the power from combustion of

the excessive natural boil-off gas in the engines or boilers to avoid releasing to the atmosphere or unnecessary thermal oxidation should be deducted from $P_{ME(i)}$ with the approval of the verifier.

2.2.2 $P_{AE(i)}$; Power of auxiliary engines

2.2.2.1 $P_{AE(i)}$ is calculated in accordance with paragraph 2.2.5.6 of the EEDI Calculation Guidelines.

2.2.2.2 For ships where power of auxiliary engines (P_{AE}) value calculated by paragraphs 2.2.5.6.1 to 2.2.5.6.3 of the EEDI Calculation Guidelines is significantly different from the total power used at normal seagoing, e.g. in cases of passenger ships, the P_{AE} value should be estimated by the consumed electric power (excluding propulsion) in conditions when the ship is engaged in a voyage at reference speed (V_{ref}) as given in the electric power table, divided by the average efficiency of the generator(s) weighted by power (see appendix 2 of the EEDI Calculation Guidelines).

2.2.2.3 In cases where the electric power table is not available, the P_{AE} value may be approximated either by:

.1 annual average figure of P_{AE} at sea from onboard monitoring obtained prior to the EEXI certification;

.2 for cruise passenger ships, approximated value of power of auxiliary engines ($P_{AE,app}$), as defined below:

$$P_{AE,app} = 0.1193 \times GT + 1814.4 \quad [\text{kW}]$$

.3 for ro-ro passenger ships, approximated value of power of auxiliary engines ($P_{AE,app}$), as defined below:

$$P_{AE,app} = 0.866 \times GT^{0.732} \quad [\text{kW}]$$

2.2.3 V_{ref} ; Ship speed

2.2.3.1 For ships falling into the scope of the EEDI requirement, the ship speed V_{ref} should be obtained from an approved speed-power curve as defined in the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, as amended (resolution MEPC.254(67), as amended).

2.2.3.2 For ships not falling into the scope of the EEDI requirement, the ship speed V_{ref} should be obtained from an estimated speed-power curve as defined in the *2022 Guidelines on survey and certification of the attained EEXI* (resolution MEPC.351(78)).

2.2.3.3 For ships not falling into the scope of the EEDI requirement but whose sea trial results, which may have been calibrated by the tank test, under the EEDI draught and the sea condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines are included in the sea trial report, the ship speed V_{ref} may be obtained from the sea trial report:

$$V_{ref} = V_{S,EEDI} \times \left[\frac{P_{ME}}{P_{S,EEDI}}\right]^{\frac{1}{3}} \quad [\text{knot}]$$

where,

$V_{S,EEDI,}$ is the sea trial service speed under the EEDI draught; and

$P_{S,EEDI}$ is power of the main engine corresponding to $V_{S,EEDI}$.

2.2.3.4 For containerships, bulk carriers or tankers not falling into the scope of the EEDI requirement but whose sea trial results, which may have been calibrated by the tank test, under the design load draught and sea condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines are included in the sea trial report, the ship speed V_{ref} may be obtained from the sea trial report:

$$V_{ref} = k^{\frac{1}{3}} \times \left(\frac{DWT_{S,service}}{Capacity}\right)^{\frac{2}{9}} \times V_{S,service} \times \left[\frac{P_{ME}}{P_{S,service}}\right]^{\frac{1}{3}} \quad [\text{knot}]$$

where,

$V_{S,service}$ is the sea trial service speed under the design load draught;

$DWT_{S,service}$ is the deadweight under the design load draught;

$P_{S,service}$ is the power of the main engine corresponding to $V_{S,service}$;

k is the scale coefficient, which should be:

.1 0.95 for containerships with 120,000 DWT or less;

.2 0.93 for containerships with more than 120,000 DWT;

.3 0.97 for bulk carrier with 200,000 DWT or less;

.4 1.00 for bulk carrier with more than 200,000 DWT;

.5 0.97 for tanker with 100,000 DWT or less; and

.6 1.00 for tanker with more than 100,000 DWT.

2.2.3.5 In cases where the speed-power curve is not available or the sea trial report does not contain the EEDI or design load draught condition, the ship speed V_{ref} can be obtained from the in-service performance measurement method conducted and verified in accordance with the methods and procedures as specified in the *Guidance on methods, procedures and verification of in-service performance measurements* (MEPC.1/Circ.901).

2.2.3.6 In cases where the speed-power curve is not available or the sea trial report does not contain the EEDI or design load draught condition, the ship speed V_{ref} can be approximated by $V_{ref,app}$ to be obtained from statistical mean of distribution of ship speed and engine power, as defined below:

$$V_{ref,app} = (V_{ref,avg} - m_V) \times \left[\frac{\sum P_{ME}}{0.75 \times MCR_{avg}}\right]^{\frac{1}{3}} \quad [\text{knot}]$$

For LNG carriers having diesel electric propulsion system and cruise passenger ships having non-conventional propulsion,

$$V_{ref,app} = (V_{ref,avg} - m_V) \times \left[\frac{\sum MPP_{Motor}}{MPP_{avg}}\right]^{\frac{1}{3}} \quad [\text{knot}]$$

where,

V_{ref}

$_{,avg}$ is a statistical mean of distribution of ship speed in given ship type and ship size, to be calculated as follows:

$$V_{ref,avg} = A \times B^C$$

where

A, B and C are the parameters given in the appendix;

m_V is a performance margin of a ship, which should be 5% of $V_{ref,avg}$ or one knot, whichever is lower; and

MCR_{avg} is a statistical mean of distribution of MCRs for main engines and MPP_{avg} is a statistical mean of distribution of MPPs for motors in given ship type and ship size, to be calculated as follows:

$$MCR_{avg} or\ MPP_{avg} = D \times E^F$$

where

D, E and F are the parameters given in the appendix;

In cases where the overridable Shaft / Engine Power Limitation is installed, the ship speed V_{ref} approximated by $V_{ref,app}$ should be calculated as follows:

$$V_{ref,app} = (V_{ref,avg} - m_V) \times \left[\frac{\sum P_{ME}}{0.75 \times MCR_{avg}}\right]^{\frac{1}{3}} \quad [\text{knot}]$$

For LNG carriers having diesel electric propulsion system and cruise passenger ship having non-conventional propulsion, the ship speed V_{ref} approximated by $V_{ref,app}$ should be calculated as follows:

$$V_{ref,app} = \left(V_{ref,avg} - m_V\right) \times \left[\frac{\sum MPP_{lim}}{MPP_{avg}}\right]^{\frac{1}{3}}$$

2.2.3.7 Notwithstanding the above, in cases where the energy-saving device* is installed, the effect of the device may be reflected in the ship speed V_{ref} with the approval of the verifier, based on the following methods in accordance with defined quality and technical standards:

.1 sea trials after installation of the device; and/or

.2 in-service performance measurement method; and/or

.3 dedicated model tests; and/or

* Devices that shift the power curve, which results in the change of P_P and V_{ref}, as specified in MEPC.1/Circ.896 on *2021 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI and EEXI*.

.4 numerical calculations.

2.2.4 *SFC*; Certified specific fuel consumption

In cases where overridable Shaft / Engine Power Limitation is installed, the *SFC* corresponding to the P_{ME} should be interpolated by using *SFC*s listed in an applicable test report included in an approved NO_x Technical File of the main engine as defined in paragraph 1.3.15 of the NO_x Technical Code.

Notwithstanding the above, the *SFC* specified by the manufacturer or confirmed by the verifier may be used.

For those engines which do not have a test report included in the NO_X Technical File and which do not have the *SFC* specified by the manufacturer or confirmed by the verifier, the *SFC* can be approximated by SFC_{app} defined as follows:

$$SFC_{ME,app} = 190\ [g/kWh]$$

$$SFC_{AE,app} = 215\ [g/kWh]$$

2.2.5 C_F ; Conversion factor between fuel consumption and CO_2 emission

For those engines which do not have a test report included in the NO_x Technical File and which do not have the *SFC* specified by the manufacturer, the C_F corresponding to SFC_{app} should be defined as follows:

$C_F = 3.114\ [t \cdot CO_2/t \cdot Fuel]$ for diesel ships (incl. HFO use in practice)

Otherwise, paragraph 2.2.1 of the EEDI Calculation Guidelines applies.

2.2.6 Correction factor for ro-ro cargo and ro-ro passenger ships (f_{jRoRo})

For ro-ro cargo and ro-ro passenger ships, f_{jRoRo} is calculated as follows:

$$f_{jRoRo} = \frac{1}{F_{n_L}^{\alpha} \cdot \left(\frac{Lpp}{B_S}\right)^{\beta} \cdot \left(\frac{B_S}{d_S}\right)^{\gamma} \cdot \left(\frac{Lpp}{\nabla^{1/3}}\right)^{\delta}}$$; if $f_{jRoRo} > 1$ then $f_j = 1$

where the Froude number, F_{n_L}, is defined as:

$$F_{n_L} = \frac{0.5144 \cdot V_{ref,F}}{\sqrt{L_{pp} \cdot g}}$$

where $V_{ref,F}$ is the ship design speed corresponding to 75% of MCR_{ME}.:

and the exponents α, β, γ and δ are defined as follows:

Ship type	Exponent:			
	α	β	γ	δ
Ro-ro cargo ship	2.00	0.50	0.75	1.00
Ro-ro passenger ship	2.50	0.75	0.75	1.00

2.2.7 Cubic capacity correction factor for ro-ro cargo ships (vehicle carrier) ($f_{cVEHICLE}$)

For ro-ro cargo ships (vehicle carrier) having a DWT/GT ratio of less than 0.35, the following cubic capacity correction factor, $f_{cVEHICLE}$, should apply:

$$f_{cVEHICLE} = \left(\frac{\left({DWT}/{GT} \right)}{0.35} \right)^{-0,8}$$

Where DWT is the capacity and GT is the gross tonnage in accordance with the International Convention of Tonnage Measurement of Ships 1969, annex I, regulation 3.

APPENDIX

Parameters to calculate $V_{ref,avg}$

Ship type	A	B	C
Bulk carrier	10.6585	DWT of the ship	0.02706
Gas carrier	7.4462	DWT of the ship	0.07604
Tanker	8.1358	DWT of the ship	0.05383
Containership	3.2395	DWT of the ship where DWT ≤ 80,000 80,000 where DWT > 80,000	0.18294
General cargo ship	2.4538	DWT of the ship	0.18832
Refrigerated cargo carrier	1.0600	DWT of the ship	0.31518
Combination carrier	8.1391	DWT of the ship	0.05378
LNG carrier	11.0536	DWT of the ship	0.05030
Ro-ro cargo ship (vehicle carrier)	16.6773	DWT of the ship	0.01802
Ro-ro cargo ship	8.0793	DWT of the ship	0.09123
Ro-ro passenger ship	4.1140	DWT of the ship	0.19863
Cruise passenger ship having non-conventional propulsion	5.1240	GT of the ship	0.12714

Parameters to calculate MCR_{avg} or MPP_{avg} (= D x E^F)

Ship type	D	E	F
Bulk carrier	23.7510	DWT of the ship	0.54087
Gas carrier	21.4704	DWT of the ship	0.59522
Tanker	22.8415	DWT of the ship	0.55826
Containership	0.5042	DWT of the ship where DWT ≤ 95,000 95,000 where DWT > 95,000	1.03046
General cargo ship	0.8816	DWT of the ship	0.92050
Refrigerated cargo carrier	0.0272	DWT of the ship	1.38634
Combination carrier	22.8536	DWT of the ship	0.55820
LNG carrier	20.7096	DWT of the ship	0.63477
Ro-ro cargo ship (vehicle carrier)	262.7693	DWT of the ship	0.39973
Ro-ro cargo ship	37.7708	DWT of the ship	0.63450
Ro-ro passenger ship	9.1338	DWT of the ship	0.91116
Cruise passenger ship having non-conventional propulsion	1.3550	GT of the ship	0.88664

Calculation of parameters to calculate $V_{ref,avg}$ and MCR_{avg}

Data sources

1 IHS Fairplay (IHSF) database with the following conditions are used.

Ship type	Ship size	Delivered period	Type of propulsion systems	Population
Bulk carrier	≥ 10,000 DWT	From 1 January 1999 to 1 January 2009	Conventional	2,433
Gas carrier	≥ 2,000 DWT		Conventional	292
Tanker	≥ 4,000 DWT		Conventional	3,345
Containership	≥ 10,000 DWT		Conventional	2,185
General cargo ship	≥ 3,000 DWT		Conventional	1,673
Refrigerated cargo carrier	≥ 3,000 DWT		Conventional	53
Combination carrier	≥ 4,000 DWT		Conventional	3,351
LNG carrier	≥ 10,000 DWT		Conventional, Non-conventional	185
Ro-ro cargo ship (vehicle carrier)	≥ 10,000 DWT		Conventional	301
Ro-ro cargo ship	≥ 1,000 DWT	From 1 January 1998 to 31 December 2010	Conventional	188
Ro-ro passenger ship	≥ 250 DWT		Conventional	350
Cruise passenger ship having non-conventional propulsion	≥ 25,000 GT	From 1 January 1999 to 1 January 2009	Non-conventional	93

2 Data sets with blank/zero "Service speed", "Capacity" and/or Total kW of M/E" are removed.

3 Ship type is in accordance with table 1 and table 2 of resolution MEPC.231(65) on *2013 Guidelines for calculation of reference lines for use with the Energy Efficiency Design Index (EEDI)*. However, "Gas carrier" does not include "LNG carrier". Parameters for "LNG carrier" are given separately.

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ANNEX 13

RESOLUTION MEPC.351(78)
(adopted on 10 June 2022)

2022 GUIDELINES ON SURVEY AND CERTIFICATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, at its seventy-sixth session, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 5.4 (Surveys) of MARPOL Annex VI requires that ships to which chapter 4 applies shall also be subject to survey and certification taking into account guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that, at its seventy-sixth session, the Committee adopted, by resolution MEPC.334(76), the *2021 Guidelines on survey and certification of the attained Energy Efficiency Existing Ship Index (EEXI),*

HAVING CONSIDERED, at its seventy-eighth session, draft amendments to the *2021 Guidelines on survey and certification of the attained Energy Efficiency Existing Ship Index (EEXI),*

1 ADOPTS the *2022 Guidelines on survey and certification of the attained Energy Efficiency Existing Ship Index (EEXI),* as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 5 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulation 25.3 of MARPOL Annex VI a review of the technical measure to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2021 Guidelines on survey and certification of the attained Energy Efficiency Existing Ship Index (EEXI),* adopted by resolution MEPC.334(76).

ANNEX

2022 GUIDELINES ON SURVEY AND CERTIFICATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)

Table of contents

1 GENERAL

The purpose of these Guidelines is to assist verifiers of the Energy Efficiency Existing Ship Index (EEXI) of ships in conducting the survey and certification of the EEXI, in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI, and assist shipowners, shipbuilders, manufacturers and other interested parties in understanding the procedures for the survey and certification of the EEXI.

2 DEFINITIONS[1]

2.1 *Verifier* means an Administration, or organization duly authorized by it, which conducts the survey and certification of the EEXI in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI and these Guidelines.

2.2 *Ship of the same type* means a ship the hull form (expressed in the lines such as sheer plan and body plan), excluding additional hull features such as fins, and principal particulars of which are identical to that of the base ship.

2.3 *Tank test* means model towing tests, model self-propulsion tests and model propeller open water tests. Numerical calculations may be accepted as equivalent to model propeller open water tests or used to complement the tank tests conducted (e.g. to evaluate the effect of additional hull features such as fins, etc. on ships' performance), or as a replacement for model tests provided that the methodology and numerical model used have been validated/calibrated against parent hull sea trials and/or model tests, with the approval of the verifier.

2.4 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.5 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

3 APPLICATION

These Guidelines should be applied to ships for which an application for a survey for verification of the ship's EEXI specified in regulation 5 of MARPOL Annex VI has been submitted to a verifier.

4 PROCEDURES FOR SURVEY AND CERTIFICATION

4.1 General

4.1.1 The attained EEXI should be calculated in accordance with regulation 23 of MARPOL Annex VI and the *2022 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)* (resolution MEPC.350(78)) (EEXI Calculation Guidelines).

4.1.2 The *2021 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI and EEXI* (MEPC.1/Circ.896) should be applied for calculation of the attained EEXI, if applicable.

[1] Other terms used in these Guidelines have the same meaning as those defined in the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73), as amended) and the *2022 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)* (resolution MEPC.350(78)).

4.1.3 The information used in the verification process may contain confidential information of submitters, including shipyards, which requires Intellectual Property Rights (IPR) protection. In the case where the submitter wants a non-disclosure agreement with the verifier, the additional information should be provided to the verifier upon mutually agreed terms and conditions.

4.2 Verification of the attained EEXI

4.2.1 For verification of the attained EEXI, an application for a survey and an EEXI Technical File containing the necessary information for the verification and other relevant background documents should be submitted to a verifier, unless the attained EEDI of the ship satisfies the required EEXI.

4.2.2 The EEXI Technical File should be written at least in English. The EEXI Technical File should include, but not be limited to:

.1 deadweight (DWT) or gross tonnage (GT) for ro-ro passenger ship and cruise passenger ship having non-conventional propulsion;

.2 the rated installed power (*MCR*) of the main and auxiliary engines;

.3 the limited installed power (MCR_{lim}) in cases where the overridable Shaft/Engine Power Limitation system is installed;

.4 the ship speed (V_{ref});

.5 the approximate ship speed ($V_{ref,app}$) for pre-EEDI ships in cases where the speed-power curve is not available, as specified in paragraph 2.2.3.5 of the EEXI Calculation Guidelines;

.6 an approved speed-power curve under the EEDI condition as specified in paragraph 2.2 of the EEDI Calculation Guidelines, which is described in the EEDI Technical File, in cases where regulation 22 of MARPOL Annex VI (Attained EEDI) is applied;

.7 an estimated speed-power curve under the EEDI condition, or under a different load draught to be calibrated to the EEDI condition, obtained from tank test and/or numerical calculations, if available;

.8 estimation process and methodology of the power curves, as necessary, including documentation on consistency with the defined quality standards (e.g. ITTC 7.5-03-01-02 and ITTC 7.5-03-01-04 in their latest revisions) and the verification of the numerical set-up with parent hull or the reference set of comparable ships in case of using numerical calculations;

.9 a sea trial report including sea trial results, which may have been calibrated by the tank test, under the sea condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, if available;

.10 an in-service performance measurement report, where applicable, as specified in paragraphs 2.2.3.5 and 2.2.3.7.2 of the EEXI Calculation Guidelines;

.11 calculation process of $V_{ref,app}$ for pre-EEDI ships in cases where the speed-power curve is not available, as specified in paragraph 2.2.3.6 of the EEXI Calculation Guidelines;

.12 type of fuel;

.13 the specific fuel consumption (*SFC*) of the main and auxiliary engines, as specified in paragraph 2.2.4 of the EEXI Calculation Guidelines;

.14 the electric power table[2] for certain ship types, as necessary, as defined in the EEDI Calculation Guidelines;

.15 the documented record of annual average figure of the auxiliary engine load at sea obtained prior to the date of application for a survey for verification of the ship's EEXI, as specified in paragraph 2.2.2.3 of the EEXI Calculation Guidelines, if applicable;

.16 calculation process of $P_{AE,app}$, as specified in paragraph 2.2.2.3 of the EEXI Calculation Guidelines, if applicable;

.17 principal particulars, ship type and the relevant information to classify the ship as such a ship type, classification notations and an overview of the propulsion system and electricity supply system on board;

.18 description of energy-saving equipment, if available;

.19 calculated value of the attained EEXI, including the calculation summary, which should contain, at a minimum, each value of the calculation parameters and the calculation process used to determine the attained EEXI; and

.20 for LNG carriers:

.1 type and outline of propulsion systems (such as direct drive diesel, diesel electric, steam turbine);

.2 LNG cargo tank capacity in m^3 and BOR as defined in paragraph 2.2.5.6.3 of the EEDI Calculation Guidelines;

.3 shaft power of the propeller shaft after transmission gear at 100% of the rated output of motor (MPP_{Motor}) and $\eta_{(i)}$ for diesel electric;

.4 shaft power of the propeller shaft after transmission gear at the de-rated output of motor ($MPP_{Motor,lim}$) in cases where the overridable Shaft / Engine Power Limitation is installed;

.5 maximum continuous rated power ($MCR_{SteamTurbine}$) for steam turbine;

.6 limited maximum continuous rated power ($MCR_{SteamTurbine,lim}$) for steam turbine in cases where the overridable Shaft / Engine Power Limitation is installed; and

[2] Electric power tables should be validated separately, taking into account the guidelines set out in appendix 2 of the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)* (resolution MEPC.254(67), as amended by resolutions MEPC.261(68) and MEPC.309(73)); consolidated text: MEPC.1/Circ.855/Rev.2, as may be further amended).

.7 $SFC_{SteamTurbine}$ for steam turbine, as specified in paragraph 2.2.7.2 of the EEDI Calculation Guidelines. If the calculation is not available from the manufacturer, $SFC_{SteamTurbine}$ may be calculated by the submitter.

A sample of an EEXI Technical File is provided in the appendix.

4.2.3 The *SFC* should be corrected to the value corresponding to the ISO standard reference conditions using the standard lower calorific value of the fuel oil, referring to ISO 15550:2002 and ISO 3046-1:2002. For the confirmation of the *SFC*, a copy of the approved NO_x Technical File and documented summary of the correction calculations should be submitted to the verifier.

4.2.4 For ships equipped with dual-fuel engine(s) using LNG and fuel oil, the C_F-factor for gas (LNG) and the specific fuel consumption (*SFC*) of gas fuel should be used by applying the criteria specified in paragraph 4.2.3 of the *2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, as amended,[3] as a basis for the guidance of the Administration.

4.2.5 Notwithstanding paragraphs 4.2.3 and 4.2.4, in cases where overridable Shaft/Engine Power Limitation is installed, or in cases where engines do not have a test report included in the NO_x Technical File, *SFC* should be calculated in accordance with paragraph 2.2.4 of the EEXI Calculation Guidelines. For this purpose, actual performance records of the engine may be used if satisfactory and acceptable to the verifier.

4.2.6 The verifier may request further information from the submitter, as specified in paragraph 4.2.7 of the EEDI Survey and Certification Guidelines, in addition to that contained in the EEXI Technical File, as necessary, to examine the calculation process of the attained EEXI.

4.2.7 In cases where the sea trial report as specified in paragraph 4.2.2.9 is submitted, the verifier should request further information from the submitter to confirm that:

.1 the sea trial was conducted in accordance with the conditions specified in paragraphs 4.3.3, 4.3.4 and 4.3.7 of the EEDI Survey and Certification Guidelines, as applicable;

.2 sea conditions were measured in accordance with ISO 15016:2002 or the equivalent if satisfactory and acceptable to the verifier;

.3 ship speed was measured in accordance with ISO 15016:2002 or the equivalent if satisfactory and acceptable to the verifier; and

.4 the measured ship speed was calibrated, if necessary, by taking into account the effects of wind, tide, waves, shallow water and displacement in accordance with ISO 15016:2002 or the equivalent which may be acceptable provided that the concept of the method is transparent for the verifier and publicly available/accessible.

4.2.8 In cases where the in-service performance measurement report as specified in paragraph 4.2.2.10 is submitted, the verifier should confirm that the in-service performance measurement was conducted and verified in accordance with the methods and procedures as specified in the *Guidance on methods, procedures and verification of in-service performance measurements* (MEPC.1/Circ.901).

[3] Resolution MEPC.254(67), as amended.

4.2.9 The estimated speed-power curve obtained from the tank test and/or numerical calculations and/or the sea trial results calibrated by the tank test should be reviewed on the basis of the relevant documents in accordance with the EEDI Survey and Certification Guidelines, the defined quality standards (e.g. ITTC 7.5-03-01-02 and ITTC 7.5-03-01-04 in their latest revisions) and the verification of the numerical set-up with parent hull or the reference set of comparable ships.

4.2.10 In cases where the overridable Shaft/Engine Power Limitation system is installed, the verifier should confirm that the system is appropriately installed and sealed in accordance with the *2021 Guidelines on the Shaft/Engine Power Limitation system to comply with the EEXI requirements and use of a power reserve* (resolution MEPC.335(76)) and that a verified Onboard Management Manual (OMM) for overridable Shaft/Engine Power Limitation is on board the ship.

4.3 Verification of the attained EEXI in case of major conversion

4.3.1 In cases of a major conversion of a ship taking place at or after the completion date of the survey for EEXI verification specified in regulation 5.4.7 of MARPOL Annex VI, the shipowner should submit to a verifier an application for a general or partial survey with the EEXI Technical File duly revised, based on the conversion made and other relevant background documents.

4.3.2 The background documents should include as a minimum, but are not limited to:

.1 details of the conversion;

.2 EEXI parameters changed after the conversion and the technical justifications for each respective parameter;

.3 reasons for other changes made in the EEXI Technical File, if any; and

.4 calculated value of the attained EEXI with the calculation summary, which should contain, as a minimum, each value of the calculation parameters and the calculation process used to determine the attained EEXI after the conversion.

4.3.3 The verifier should review the revised EEXI Technical File and other documents submitted and verify the calculation process of the attained EEXI to ensure that it is technically sound and reasonable and follows regulation 23 of MARPOL Annex VI and the EEXI Calculation Guidelines.

4.3.4 For verification of the attained EEXI after the major conversion, speed trials of the ship may be conducted, as necessary.

APPENDIX

SAMPLE OF EEXI TECHNICAL FILE

1 Data

1.1 General information

Shipowner	XXX Shipping Line
Shipbuilder	XXX Shipbuilding Company
Hull no.	12345
IMO no.	94112XX
Ship type	Bulk carrier

1.2 Principal particulars

Length overall	250.0 m
Length between perpendiculars	240.0 m
Breadth, moulded	40.0 m
Depth, moulded	20.0 m
Summer load line draught, moulded	14.0 m
Deadweight at summer load line draught	150,000 tons

1.3 Main engine

Manufacturer	XXX Industries
Type	6J70A
Maximum continuous rating (MCR_{ME})	15,000 kW x 80 rpm
Limited maximum continuous rating with the Engine Power Limitation installed ($MCR_{ME,lim}$)	9,940 kW x 70 rpm
SFC at 75% of MCR_{ME} or 83% of $MCR_{ME,lim}$	166.5 g/kWh
Number of sets	1
Fuel type	Diesel Oil

1.4 Auxiliary engine

Manufacturer	XXX Industries
Type	5J-200
Maximum continuous rating (MCR_{AE})	600 kW x 900 rpm
SFC at 50% MCR_{AE}	220.0 g/kWh
Number of sets	3
Fuel type	Diesel Oil

1.5 Ship speed

Ship speed (V_{ref}) (with the Engine Power Limitation installed)	13.20 knots

2 Power curve

(Example 1; case of the EEDI ship)
An approved speed-power curve contained in the EEDI Technical File is shown in figure 2.1.

(Example 2; case of the pre-EEDI ship)
An estimated speed-power curve obtained from the tank test and/or numerical calculations, if available, is also shown in figure 2.1.

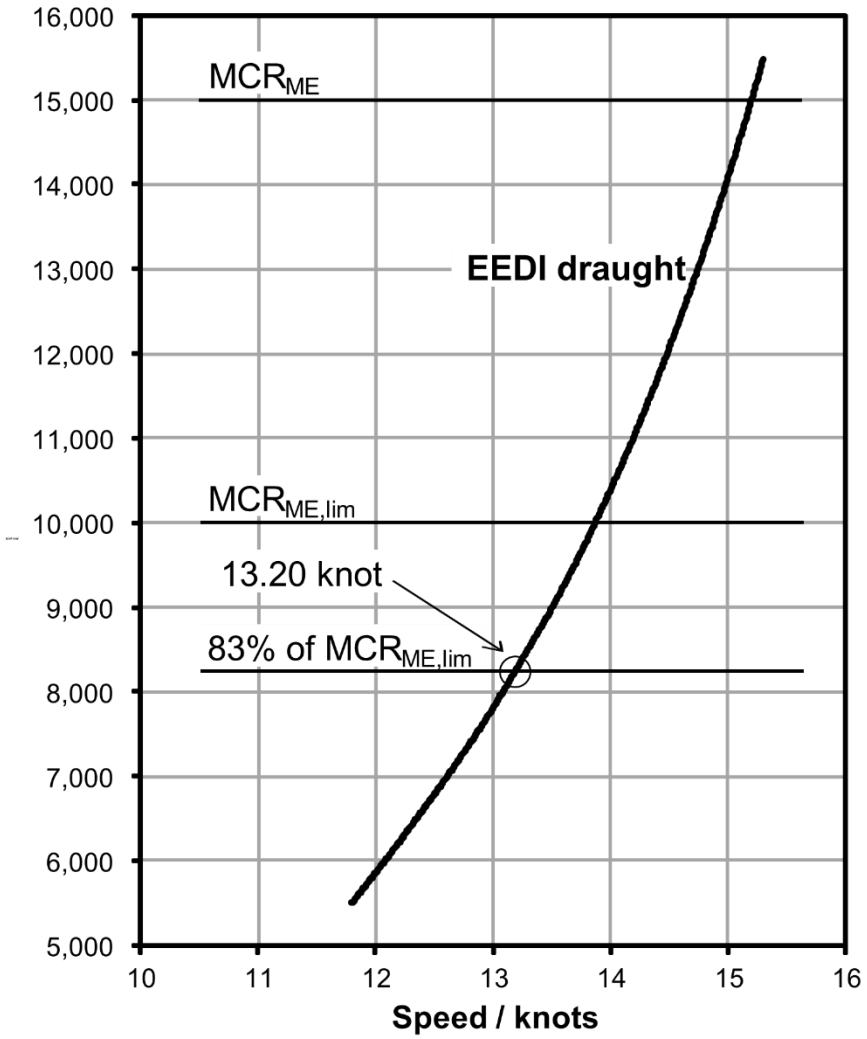

Figure 2.1: Power curve

(Example 3; case of the pre-EEDI ship with sea trial result calibrated to a different load draught)
An estimated speed-power curve under a ballast draught calibrated to the design load draught, obtained from the tank test and/or numerical calculations, if available, is shown in figure 2.2.

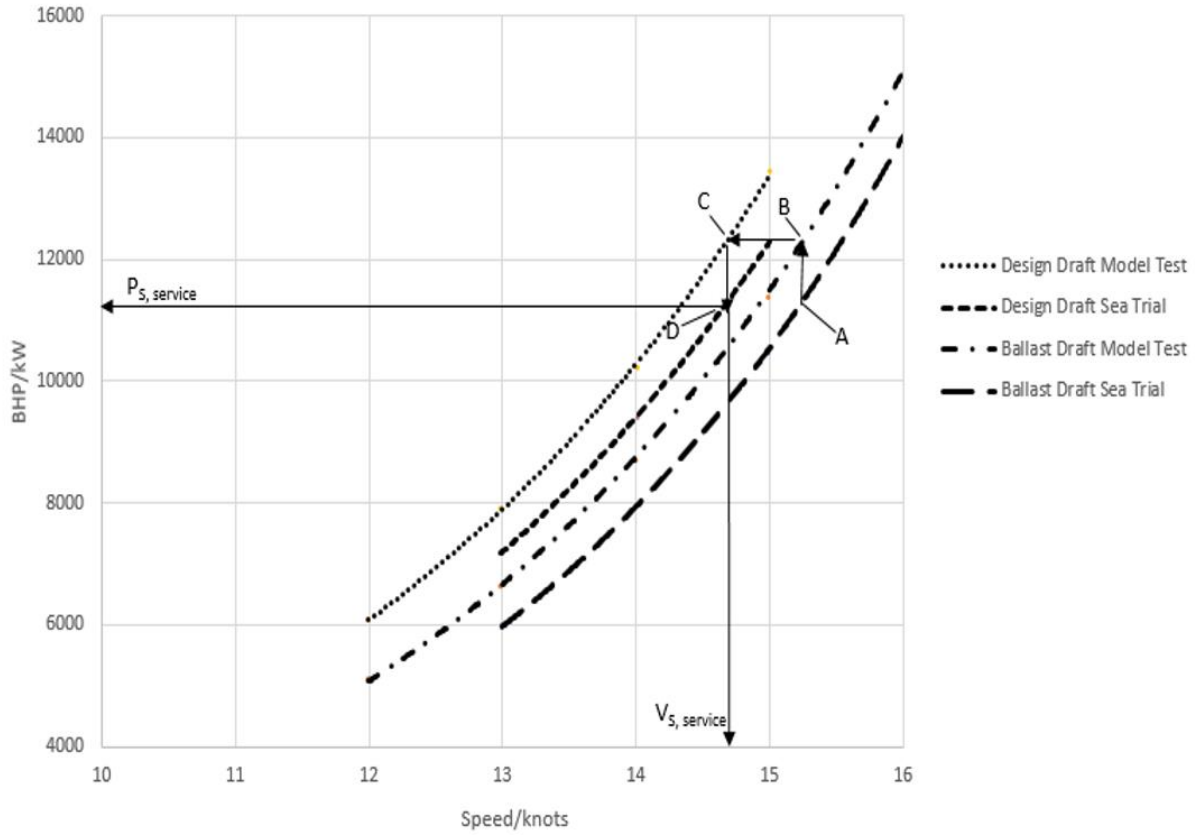

Figure 2.2: Power curve

3 Overview of propulsion system and electric power supply system

3.1 Propulsion system

3.1.1 Main engine
Refer to paragraph 1.3 of this appendix.

3.1.2 Propeller

Type	Fixed pitch propeller
Diameter	7.0 m
Number of blades	4
Number of sets	1

3.2 Electric power supply system

3.2.1 Auxiliary engines
Refer to paragraph 1.4 of this appendix.

3.2.2 Main generators

Manufacturer	XXX Electric
Rated output	560 kW (700 kVA) x 900 rpm
Voltage	AC 450 V
Number of sets	3

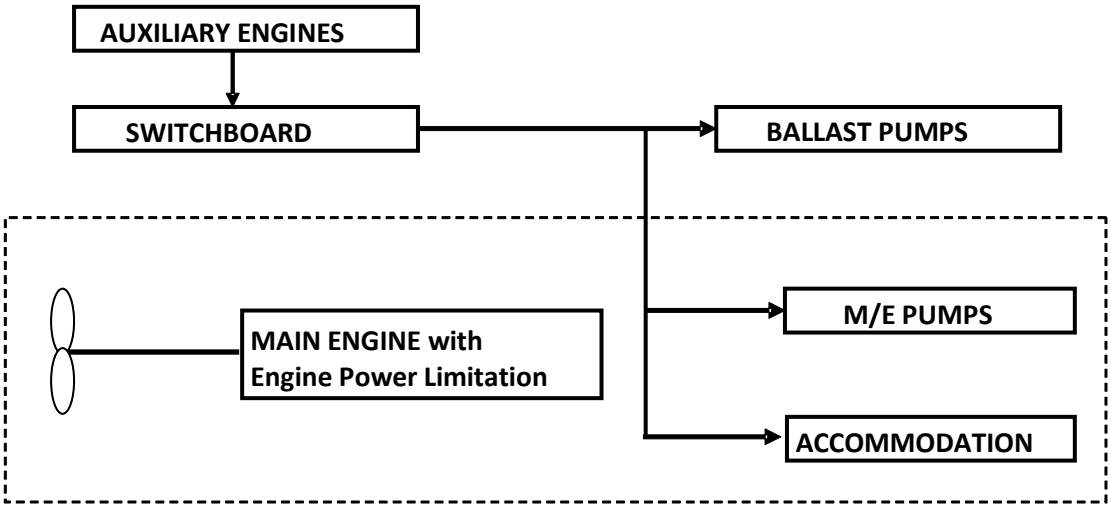

Figure 3.1: Schematic figure of propulsion and electric power supply system

4 Estimation process of speed-power curve

(Example: case of pre-EEDI ship)
Speed-power curve is estimated based on model test results and/or numerical calculations, if available. The flow of the estimation processes is shown below.

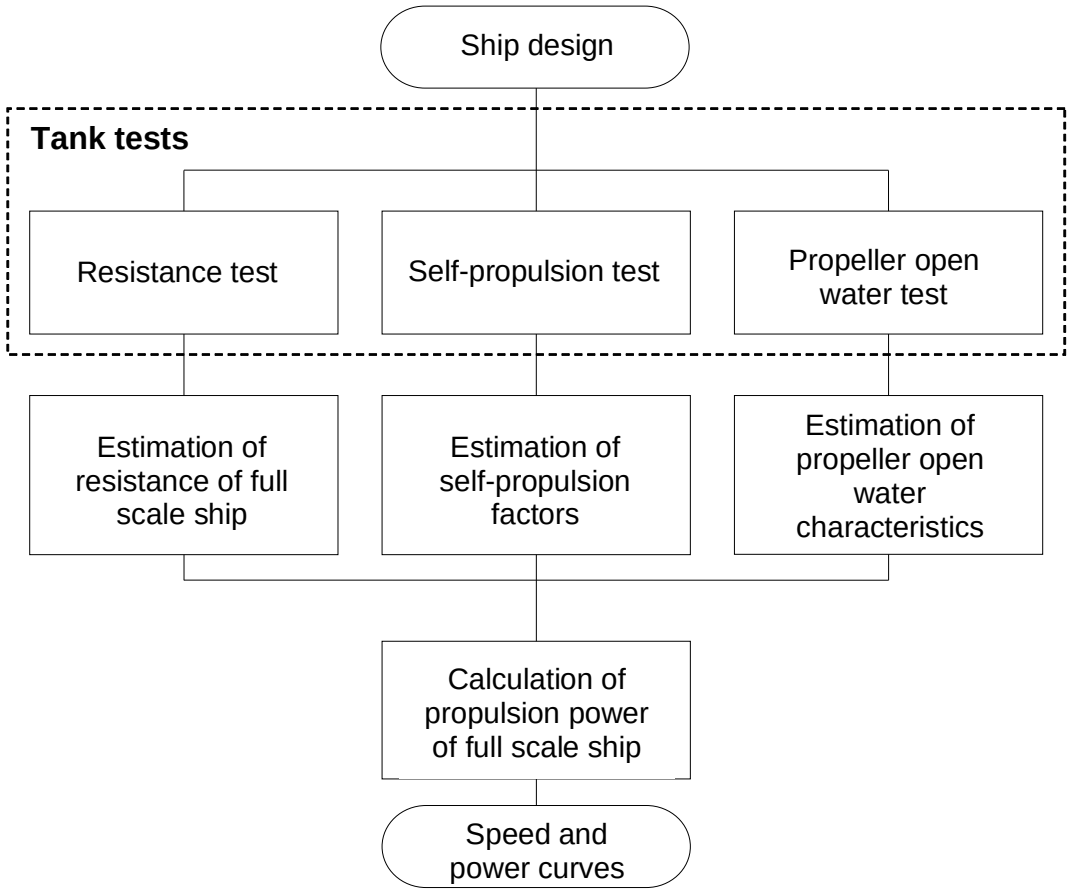

Figure 4: Flow chart of process for estimating speed-power curve from tank tests

5 Description of energy-saving equipment

5.1 Energy-saving equipment the effects of which are expressed as $P_{AEeff(i)}$ and/or $P_{eff(i)}$ in the EEXI calculation formula

N/A

5.2 Other energy-saving equipment

(Example)

5.2.1 Rudder fins

5.2.2 Rudder bulb

……

(Specifications, schematic figures and/or photos, etc. for each piece of equipment or device should be indicated. Alternatively, attachment of a commercial catalogue may be acceptable.)

6 Calculated value of attained EEXI

6.1 Basic data

Type of ship	Capacity DWT	Speed V_{ref} (knots)
Bulk carrier	150,000	13.20

6.2 Main engine

MCR_{ME} (kW)	$MCR_{ME,lim}$ (kW)	P_{ME} (kW)	Type of fuel	C_{FME}	SFC_{ME} (g/kWh)
15,000	9,940	8,250	Diesel oil	3.206	166.5

6.3 Auxiliary engines

P_{AE} (kW)	Type of fuel	C_{FAE}	SFC_{AE} (g/kWh)
625	Diesel oil	3.206	220.0

6.4 Ice class

N/A

6.5 Innovative electrical energy-efficient technology

N/A

6.6 Innovative mechanical energy-efficient technology

N/A

6.7 Cubic capacity correction factor

N/A

6.8 Calculated value of attained EEXI

$$EEXI = \frac{\left(\prod_{j=1}^{M} f_j\right)\left(\sum_{i=1}^{nME} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)}\right) + \left(P_{AE} \cdot C_{FAE} \cdot SFC_{AE}\right)}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$+ \frac{\left\{\left(\prod_{j=1}^{M} f_j \cdot \sum_{i=1}^{nPTI} P_{PTI(i)} - \sum_{i=1}^{neff} f_{eff(i)} \cdot P_{AEeff(i)}\right) \cdot C_{FAE} \cdot SFC_{AE}\right\}}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$- \frac{\left(\sum_{i=1}^{neff} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME}\right)}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m}$$

$$= \frac{1 \times (8250 \times 3.206 \times 166.5) + (625 \times 3.206 \times 220.0) + 0 - 0}{1 \times 1 \times 1 \times 150000 \times 1 \times 13.20 \times 1}$$

$$= 2.45\ (g - CO_2/ton \cdot mile)$$

attained EEXI: 2.45 g-CO_2/ton mile

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ANNEX 14

RESOLUTION MEPC.352(78)
(adopted on 10 June 2022)

2022 GUIDELINES ON OPERATIONAL CARBON INTENSITY INDICATORS AND THE CALCULATION METHODS (CII GUIDELINES, G1)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee, the Committee, conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, at its seventy-sixth session, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 28.1 of MARPOL Annex VI requires ships to which this regulation apply to calculate the attained annual operational CII taking into account the guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that the Committee, at its seventy-sixth session, adopted, by resolution MEPC.336(76), the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1),*

HAVING CONSIDERED, at its seventy-eighth session, the draft *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)*,

1 ADOPTS the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 28.1 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulation 28.11 of

MARPOL Annex VI a review of the operational measure to reduce carbon intensity of international shipping shall be completed by 1 January 2026,

5 REVOKES the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)* adopted by resolution MEPC.336(76).

ANNEX

2022 GUIDELINES ON OPERATIONAL CARBON INTENSITY INDICATORS AND THE CALCULATION METHODS (CII GUIDELINES, G1)

1 Introduction

1.1 In the *Initial IMO Strategy on Reduction of GHG Emissions from Ships* (Resolution MEPC.304(72)), the level of ambition on carbon intensity of international shipping is quantified by the CO_2 emissions per transport work, as an average across international shipping.

1.2 These Guidelines address the calculation methods and the applicability of the operational carbon intensity indicator (CII) for individual ships to which chapter 4 of MARPOL Annex VI, as amended, applies.

2 Definitions

2.1 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 *IMO DCS* means the data collection system for fuel oil consumption of ships referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

2.4 The metrics indicating the average CO_2 emissions per transport work of a ship are generally referred to as operational carbon intensity indicator (CII) in these Guidelines.

.1 A specific CII calculated based on the actual or estimated mass or volume of the shipment carried on board a ship is generally referred to as *demand-based CII*; and

.2 A specific CII, in which calculation the capacity of a ship is taken as proxy of the actual mass or volume of the shipment carried on board, is generally referred to as *supply-based CII*.

2.5 The supply-based CII which uses DWT as the capacity is referred to as *AER*, and the supply-based CII which uses GT as the capacity is referred to as *cgDIST*.

3 Application

3.1 For all ships to which regulation 28 of MARPOL Annex VI applies, the operational carbon intensity indicators defined in section 4 should be applied.

3.2 The operational carbon intensity indicators defined in section 5 are encouraged to be additionally used by ships, where applicable, for trial purposes.

4 Operational carbon intensity indicator (CII) of individual ships for use in implementing regulation 28 of MARPOL Annex VI

In its most simple form, the attained annual operational CII of individual ships is calculated as the ratio of the total mass of CO_2 (*M*) emitted to the total transport work (*W*) undertaken in a given calendar year, as follows:

$$attained\ CII_{ship} = M / W \qquad (1)$$

4.1 Mass of CO_2 emissions (M)

The total mass of CO_2 is the sum of CO_2 emissions (in grams) from all the fuel oil consumed on board a ship in a given calendar year, as follows:

$$M = FC_j \times C_{F_j} \qquad (2)$$

where:

- j is the fuel oil type;
- FC_j is the total mass (in grams) of consumed fuel oil of type j in the calendar year, as reported under IMO DCS; and
- C_{F_j} represents the fuel oil mass to CO_2 mass conversion factor for fuel oil type j, in line with those specified in the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships (resolution MEPC.308(73))*, as may be further amended. In case the type of the fuel oil is not covered by the guidelines, the conversion factor should be obtained from the fuel oil supplier supported by documentary evidence.

4.2 Transport work (W)

In the absence of the data on actual transport work, the supply-based transport work (W_s) can be taken as a proxy, which is defined as the product of a ship's capacity and the distance travelled in a given calendar year, as follows:

$$W_s = C \times D_t \qquad (3)$$

where:

- *C* represents the ship's capacity:
  - For bulk carriers, tankers, container ships, gas carriers, LNG carriers, general cargo ships, refrigerated cargo carrier and combination carriers, deadweight tonnage (DWT)[1] should be used as Capacity;
  - For cruise passenger ships, ro-ro cargo ships (vehicle carriers), ro-ro cargo

[1] Deadweight tonnage (DWT) means the difference in tonnes between the displacement of a ship in water of relative density of 1,025 kg/m3 at the summer load draught and the lightweight of the ship. The summer load draught should be taken as the maximum summer draught as certified in the stability booklet approved by the Administration or any organization recognized by it.

ships and ro-ro passenger ships, gross tonnage (GT)[2] should be used as Capacity; and

- D_t represents the total distance travelled (in nautical miles), as reported under IMO DCS.

5 Operational carbon intensity indicator (CII) of individual ships for trial purpose

The following metrics are encouraged to be used for trial purposes, where applicable:

.1 Energy Efficiency Performance Indicator (EEPI)

$$EEPI = \frac{M}{C \times D_l}$$

.2 cbDIST

$$cbDIST = \frac{M}{ALB \times D_t}$$

.3 clDIST

$$clDIST = \frac{M}{Lanemeter \times D_t}$$

.4 EEOI, as defined in MEPC.1/Circ.684 on *Guidelines for voluntary use of the ship energy efficiency operational indicator (EEOI).*

In the formulas above:

- the mass of CO_2 (M), the ship's capacity (C) and the total distance travelled (D_t) are identical with those used to calculate the attained CII of individual ships, as specified in section 4.1 and 4.2;
- D_l means the laden distance travelled (in nautical miles) when the ship is loaded;
- *ALB* means the number of available lower berths of a cruise passenger ship; and
- *Lanemeter* means the length (in metres) of the lanes of a ro-ro ship.

***

[2] Gross tonnage (GT) should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969.

ANNEX 15

RESOLUTION MEPC.353(78)
(adopted on 10 June 2022)

2022 GUIDELINES ON THE REFERENCE LINES FOR USE WITH OPERATIONAL CARBON INTENSITY INDICATORS (CII REFERENCE LINES GUIDELINES, G2)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, at its seventy-sixth session, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 28.4 of MARPOL Annex VI requires reference lines to be established for each ship type to which regulation 28 is applicable,

NOTING that the Committee, at its seventy-sixth session, adopted, by resolution MEPC.337(76), *2021 Guidelines on the reference lines for use with operational carbon intensity indicators (CII Reference Lines Guidelines, G2)*

HAVING CONSIDERED, at its seventy-eighth session, the draft *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)*,

1 ADOPTS the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 28.4 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulation 28.11 of MARPOL Annex VI a review of the operational measures to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2021 Guidelines on the reference lines for use with operational carbon intensity indicators (CII Reference Lines Guidelines, G2)*.

ANNEX

2022 GUIDELINES ON THE REFERENCE LINES FOR USE WITH OPERATIONAL CARBON INTENSITY INDICATORS (CII REFERENCE LINES GUIDELINES, G2)

1 Introduction

1.1 These Guidelines provide the methods to calculate the reference lines for use with operational carbon intensity indicators, and the ship type specific carbon intensity reference lines as referred to in regulation 28 of MARPOL Annex VI.

1.2 One reference line is developed for each ship type to which regulation 28 of MARPOL Annex VI applies, based on the specific indicators stipulated in *2022 Guidelines on operational carbon intensity indicators and the calculation methods* (G1) developed by the Organization, ensuring that only data from comparable ships are included in the calculation of each reference line.

2 Definition

2.1 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 *IMO DCS* means the data collection system for fuel oil consumption of ships referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

2.4 An operational carbon intensity indicator (CII) reference line is defined as a curve representing the median attained operational carbon intensity performance, as a function of Capacity, of a defined group of ships in year of 2019.

3 Method to develop the CII reference lines

3.1 Given the limited data available for the year of 2008, the operational carbon intensity performance of ship types in year 2019 is taken as the reference.

3.2 For a defined group of ships, the reference line is formulated as follows:

$$\boldsymbol{CII_{ref} = aCapacity^{-c}} \qquad (1)$$

where CII_{ref} is the reference value of year 2019, $Capacity$ is identical with the one defined in the specific carbon intensity indicator (CII) for a ship type, as shown in Table. 1; *a* and *c* are parameters estimated through median regression fits, taking the attained CII and the Capacity of individual ships collected through IMO DCS in year 2019 as the sample.

4 Ship type specific operational carbon intensity reference lines

The parameters for determining the ship type specific reference lines, for use in Eq.(1), are specified as follows:

Table 1: Parameters for determining the 2019 ship type specific reference lines

Ship type			Capacity	*a*	*c*
Bulk carrier	279,000 DWT and above		279,000	4745	0.622
	less than 279,000 DWT		DWT	4745	0.622
Gas carrier	65,000 and above		DWT	14405E7	2.071
	less than 65,000 DWT		DWT	8104	0.639
Tanker			DWT	5247	0.610
Container ship			DWT	1984	0.489
General cargo ship		20,000 DWT and above	DWT	31948	0.792
		less than 20,000 DWT	DWT	588	0.3885
Refrigerated cargo carrier			DWT	4600	0.557
Combination carrier			DWT	5119	0.622
LNG carrier	100,000 DWT and above		DWT	9.827	0.000
	65,000 DWT and above, but less than 100,000 DWT		DWT	14479E10	2.673
	less than 65,000 DWT		65,000	14779E10	2.673
Ro-ro cargo ship (vehicle carrier)		57,700 GT and above	57,700	3627	0.590
		30,000 GT and above, but less than 57,700 GT	GT	3627	0.590
		Less than 30,000 GT	GT	330	0.329
Ro-ro cargo ship			GT	1967	0.485
Ro-ro passenger ship		Ro-ro passenger ship	GT	2023	0.460
		High-speed craft designed to SOLAS chapter X	GT	4196	0.460
Cruise passenger ship			GT	930	0.383

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ANNEX 16

RESOLUTION MEPC.354(78)
(adopted on 10 June 2022)

2022 GUIDELINES ON THE OPERATIONAL CARBON INTENSITY RATING OF SHIPS (CII RATING GUIDELINES, G4)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee adopted, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI*, which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that regulation 28.6 of MARPOL Annex VI requires ships to which this regulation apply to determine operational carbon intensity rating taking into account guidelines developed by the Organization,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

NOTING that, at its seventy-sixth session, the Committee adopted, by resolution MEPC.339(76) the *2021 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)*,

HAVING CONSIDERED, at its seventy-eighth session, draft *2022 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)*,

1 ADOPTS the *2022 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 28.6 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, of additional data collected and analysed, also taking into consideration that

in accordance with regulation 28.11 of MARPOL Annex VI a review of the operational measure to reduce carbon intensity of international shipping shall be completed by 1 January 2026;

5 REVOKES the *2021 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)*, adopted by resolution MEPC.339(76).

ANNEX

2022 GUIDELINES ON THE OPERATIONAL CARBON INTENSITY RATING OF SHIPS (CII RATING GUIDELINES, G4)

1 Introduction

1.1 These Guidelines provide the methods to assign operational energy efficiency performance ratings to ships, as referred to in regulation 28 of MARPOL Annex VI. On this basis, the boundaries for determining a ship's annual operational carbon intensity performance from year 2023 to 2030 are also provided.

2 Definitions

2.1 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 *IMO DCS* means the data collection system for fuel oil consumption of ships referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

2.4 *Operational carbon intensity rating* means to assign a ranking label from among the five grades (A, B, C, D and E) to the ship based on the attained annual operational carbon intensity indicator, indicating a major superior, minor superior, moderate, minor inferior, or inferior performance level.

3 Framework of the operational energy efficiency performance rating

3.1 An operational energy efficiency performance rating should be assigned annually to each ship to which regulation 28 of MARPOL Annex VI applies, in a transparent and robust manner, based on the deviation of the attained annual operational carbon intensity indicator (CII) of a ship from the required value.

3.2 To facilitate the rating assignment, for each year from 2023 to 2030, four boundaries are defined for the five-grade rating mechanism, namely superior boundary, lower boundary, upper boundary, and inferior boundary. Thus, a rating can be assigned through comparing the attained annual operational CII of a ship with the boundary values.

3.3 The boundaries are set based on the distribution of CIIs of individual ships in year 2019. The appropriate rating boundaries are expected to generate the following results: the middle 30% of individual ships across the fleet segment, in terms of the attained annual operational CIIs, are to be assigned rating C, while the upper 20% and further upper 15% of individuals are to be assigned rating D and E respectively, and the lower 20% and further lower 15% of the individuals are to be assigned rating B and A, respectively, as illustrated in figure 1.

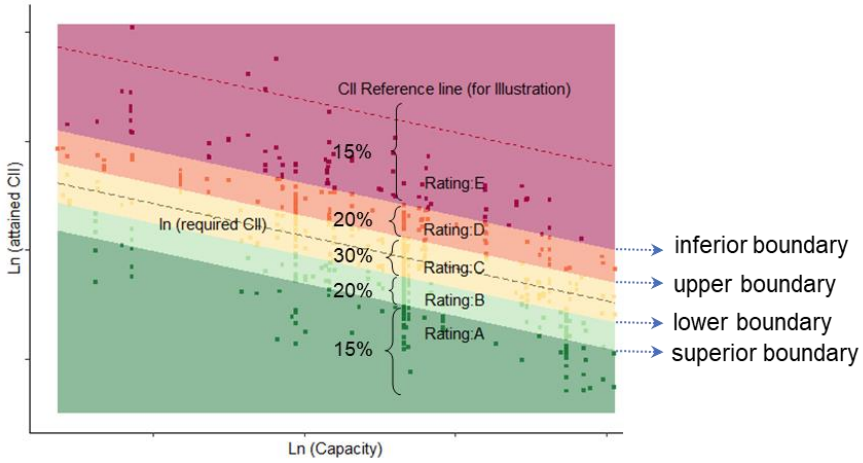

Figure 1: Operational energy efficiency performance rating scale

3.4 Given the incremental operational carbon intensity reduction factors over time, the boundaries for defining performance ratings should be synchronized accordingly, although the relative distance between the boundaries should not change. The rating of a ship would be determined by the attained CII and the predetermined rating boundaries, rather than the attained CII of other ships. Note that the distribution of ship individual ratings in a specific year may not be always identical with the scenario in 2019, where for example 20% may achieve A, 30% may achieve B, 40% may achieve C, 8% may achieve D and 2% may achieve E in a given year.

4 Method to determine the rating boundaries

4.1 The boundaries can be determined by the required annual operational CII in conjunction with the vectors, indicating the direction and distance they deviate from the required value (denoted as dd vectors for easy reference), as illustrated in figure 2.

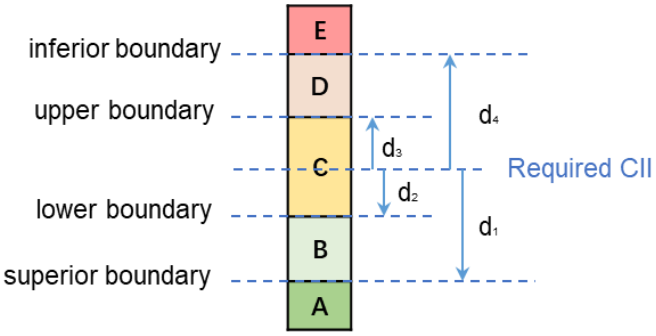

Figure 2: dd vectors and rating bands

4.2 Statistically, the dd vectors depend on the distribution of the attained annual operational CII of ships of the type concerned, which can be estimated through a quantile regression, taking data collected through DCS in year 2019 as the sample.

4.3 The quantile regression model for a specific ship type can be developed as follows:

$$\ln(attained\ CII) = \delta^{(p)} - c\ln(Capacity) + \varepsilon^{(p)}, \quad p = \{0.15, 0.35, 0.50, 0.65, 0.85\} \quad (1)$$

where $Capacity$ is identical with the one used in the operation carbon intensity indicator as specified in the Guidelines on operational carbon intensity indicators and the calculation

methods (G1); p is the typical quantile, meaning the proportion of observations with a lower value is $p\%$; $\delta^{(p)}$ is the constant term, and $\varepsilon^{(p)}$ is the error term.

4.4 The quantile regression lines in logarithm form are illustrated in Fig.3.

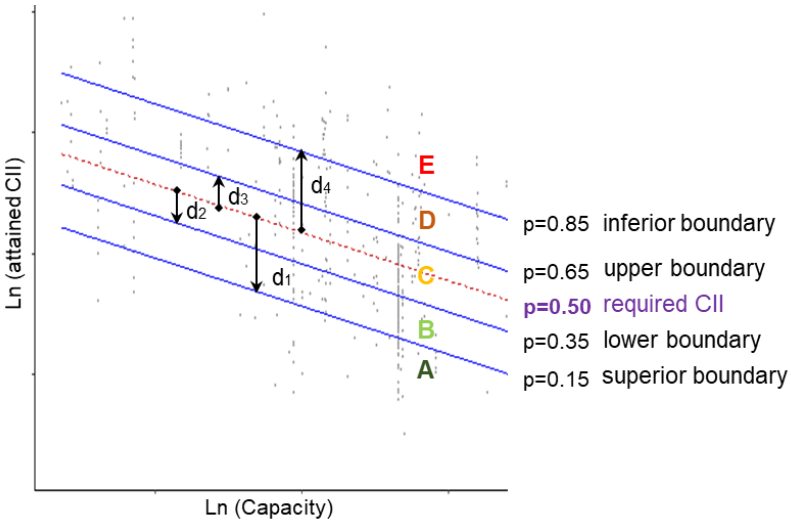

Figure 3: Quantile regression lines in logarithm form

4.5 Then, the dd vectors can be calculated based on the estimates of the intercept ($\hat{\delta}^{(p)}$), in accordance with Eq.(2), as follows:

$$\left.\begin{aligned} d_1 &= \hat{\delta}^{(0.15)} - \hat{\delta}^{(0.50)} \\ d_2 &= \hat{\delta}^{(0.35)} - \hat{\delta}^{(0.50)} \\ d_3 &= \hat{\delta}^{(0.65)} - \hat{\delta}^{(0.50)} \\ d_4 &= \hat{\delta}^{(0.85)} - \hat{\delta}^{(0.50)} \end{aligned}\right\} \quad (2)$$

4.6 Through an exponential transformation of each dd vector, the four boundaries fitted in the original data form can be derived based on the required annual operational carbon intensity indicator ($required\ CII$), as follows:

$$\left.\begin{aligned} \text{superior boundary} &= \exp(d_1)\cdot required\ CII \\ \text{lower boundary} &= \exp(d_2)\cdot required\ CII \\ \text{upper boundary} &= \exp(d_3)\cdot required\ CII \\ \text{inferior boundary} &= \exp(d_4)\cdot required\ CII \end{aligned}\right\} \quad (3)$$

Rating boundaries of ship types

The estimated dd vectors after exponential transformation for determining the rating boundaries of ship types are as follows:

Table 1: *dd* vectors for determining the rating boundaries of ship types

Ship type		Capacity in CII calculation	*dd* vectors (after exponential transformation)			
			exp(d1)	exp(d2)	exp(d3)	exp(d4)
Bulk carrier		DWT	0.86	0.94	1.06	1.18
Gas carrier	65,000 DWT and above	DWT	0.81	0.91	1.12	1.44
	less than 65,000 DWT	DWT	0.85	0.95	1.06	1.25
Tanker		DWT	0.82	0.93	1.08	1.28
Container ship		DWT	0.83	0.94	1.07	1.19
General cargo ship		DWT	0.83	0.94	1.06	1.19
Refrigerated cargo carrier		DWT	0.78	0.91	1.07	1.20
Combination carrier		DWT	0.87	0.96	1.06	1.14
LNG carrier	100,000 DWT and above	DWT	0.89	0.98	1.06	1.13
	less than 100,000 DWT		0.78	0.92	1.10	1.37
Ro-ro cargo ship (vehicle carrier)		GT	0.86	0.94	1.06	1.16
Ro-ro cargo ship		GT	0.76	0.89	1.08	1.27
Ro-ro passenger ship		GT	0.76	0.92	1.14	1.30
Cruise passenger ship		GT	0.87	0.95	1.06	1.16

By comparing the attained annual operational CII of a specific ship with the four boundaries, a rating can then be assigned. For example, given the required CII of a bulk carrier in a specific year as 10 gCO_2/(dwt.nmile), then the superior boundary, lower boundary, upper boundary, and inferior boundary is 8.6, 9.4, 10.6 and 11.8 gCO_2/(dwt.nmile). If the attained CII is 9 gCO_2/(dwt.nmile), the ship would be rated as "B".

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ANNEX 17

RESOLUTION MEPC.355(78)
(adopted on 10 June 2022)

2022 INTERIM GUIDELINES ON CORRECTION FACTORS AND VOYAGE ADJUSTMENTS FOR CII CALCULATIONS (CII GUIDELINES, G5)

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that the Committee, at its seventy-sixth session, adopted, by resolution MEPC.328(76), the *2021 Revised MARPOL Annex VI,* which will enter into force on 1 November 2022,

NOTING IN PARTICULAR that the *2021 Revised MARPOL Annex VI* (MARPOL Annex VI) contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING ALSO that regulation 28.1 of MARPOL Annex VI requires ships to which this regulation apply to calculate the attained annual operational carbon intensity indicator (CII) taking into account the guidelines developed by the Organization,

NOTING FURTHER that the in adopting resolution MEPC.336(76) on the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)*, the Committee agreed to consider substantiated proposals for CII correction factors for certain ship types, operational profiles and/or voyages with a view to enhancing, as appropriate, the CII Guidelines (G1), before entry into force of the aforementioned amendments to MARPOL Annex VI,

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

HAVING CONSIDERED, at its seventy-eighth session, the draft *2022 Interim Guidelines on correction factors and voyage adjustments for CII calculations (CII Guidelines, G5)*,

1 ADOPTS the *2022 Interim Guidelines on correction factors and voyage adjustments for CII calculations (CII Guidelines, G5)*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulation 28.1 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation, also taking into consideration that in accordance with regulation 28.11 of MARPOL Annex VI a review of the operational measure to reduce carbon intensity of international shipping shall be completed by 1 January 2026.

ANNEX

2022 INTERIM GUIDELINES ON CORRECTION FACTORS AND VOYAGE ADJUSTMENTS FOR CII CALCULATIONS (CII GUIDELINES, G5)

CONTENTS

1 Introduction

1.1 These Guidelines address the corrections factors and voyage adjustments which may be applied to the calculation of the attained annual operational carbon intensity indicator (CII_{ship}) of regulation 28 of MARPOL Annex VI, and as defined by the *2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)* (resolution MEPC.352 (78)). It should be noted that the use of correction factors and voyage adjustments should in no way undermine the goal of reducing the carbon intensity of international shipping as set out in regulation 20 of MARPOL Annex VI.

2 Definitions

For the purpose of these Guidelines, the definitions in regulation 2 of MARPOL Annex VI, as amended, apply. In addition and for the scope of these guidelines, the following definitions apply.

2.1 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.2 *IMO DCS* means the IMO Ship Fuel Oil Consumption Database referred to in regulation 27 and related provisions of MARPOL Annex VI.

2.3 A *voyage period* is a period of time where the ship meets the criteria to apply a voyage adjustment in these Guidelines.

2.4 A *voyage adjustment* deducts relevant fuel consumption, as well as the associated distance travelled from the calculation of attained CII for a defined period subject to certain threshold conditions being met.

2.5 A *correction factor* means a factor in the numerator or denominator of the CII formula which adjusts the calculation of the attained CII.

2.6 A *refrigerated container* is an intermodal shipping container that is refrigerated (including chilled and frozen containers) or heated for the transportation of temperature-sensitive cargo, which will receive its power from the ship's power supply.

2.7 *Ice edge* is defined by paragraph 4.4. of the WMO Sea-Ice Nomenclature, March 2014 as the demarcation at any given time between the open sea and sea ice of any kind, whether fast or drifting.

2.8 A tanker should be considered in *Ship-to-Ship (STS)* operation when operating in accordance with regulation 41.2 of MARPOL Annex I and applying the best practices in accordance with the OCIMF Ship to Ship Transfer Guide for Petroleum, Chemical and Liquefied Gases. For the purpose of these guidelines, a tanker is engaged in an STS voyage if a voyage between cargo loading and cargo discharging locations, or a voyage between cargo discharging and cargo loading locations does not exceed 600 nautical miles and the time for each of these voyages (which does not include port or discharge time) is limited to 72 hours.

2.9 A *shuttle tanker* is a tanker which is equipped with dynamic positioning and specialized cargo handling equipment making it capable of loading crude oil at offshore installations.

2.10 A *self-unloading bulk carrier* is a bulk carrier with an onboard cargo handling system that is utilized to discharge dry bulk cargo via a boom conveyor or shipboard cargo pipeline equipment.

3 Application

3.1 For all ships to which regulation 28 of MARPOL Annex VI applies, the operational carbon intensity formula defined in section 4 should be applied when using voyage adjustments or correction factors.

3.2 Rating of ships according to the *2022 Guidelines on the operational carbon intensity rating of ships (CII Rating Guidelines G4)* (resolution MEPC.354(78)) should be carried out using the corrected attained annual operational CII.

3.3 Corrections factors for electrical related fuel consumption $FC_{electrical}$, boiler consumption FC_{boiler} , and other related fuel consumption FC_{others} should not be used for periods where voyage adjustments apply.

4 Attained annual operational CII (CII_{Ship}) formula for voyage adjustments and correction factors

Use of voyage adjustments and correction factors require changes to be made to the overall attained annual operational CII (CII_{Ship}) formula as follows:

$$\frac{\sum_j C_{Fj} \cdot \left\{FC_j - \left(FC_{voyage,j} + TF_j + (0.75 - 0.03y_i) \cdot \left(FC_{electrical,j} + FC_{boiler,j} + FC_{others,j}\right)\right)\right\}}{f_i \cdot f_m \cdot f_c \cdot f_{iVSE} \cdot Capacity \cdot (D_t - D_x)}$$

Where:

- j is the fuel type;
- C_{F_j} represents the fuel mass to CO_2 mass conversion factor for fuel type j, in line with those specified in the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73) as amended by resolutions MEPC.322(74) and MEPC.332(76)), as may be further amended);
- FC_j is the total mass of consumed fuel of type j in the calendar year, as reported under IMO DCS, converted to grams;
- $FC_{voyage,j}$ is the mass (in grams) of fuel of type j, consumed in voyage periods during the calendar year which may be deducted according to paragraph 4.1 of these Guidelines;
- $TF_j = (1 - AF_{Tanker}) \cdot FC_{S,j}$ represents the quantity of fuel j removed for STS or shuttle tanker operation, where $FC_{S,j} = FC_j$ for shuttle tankers and $FC_{S,j}$ is the total quantity of fuel j used on STS voyages for STS ships. If $TF_j > 0$ then $FC_{electrical,j} = FC_{boiler,j} = FC_{others,j} = 0$;
- AF_{Tanker} represents the correction factor to be applied to shuttle tankers or STS voyages according to paragraph 4.2 of these Guidelines;
- y_i is a consecutive numbering system starting at $y_{2023} = 0$, $y_{2024} = 1$, $y_{2025} = 2$,

etc;

- $FC_{electrical,j}$ is the mass (in grams) of fuel type j, consumed for production of electrical power which is allowed to be deducted according to paragraph 4.3 of these Guidelines;

- $FC_{boiler,j}$ is the mass (in grams) of fuel type j, consumed by the boiler which may be deducted according to paragraph 4.4 of these Guidelines;

- $FC_{others,j}$ is the mass (in grams) of fuel type j, consumed by other related fuel consumption devices according to paragraph 4.5 of these Guidelines;

- f_i is the capacity correction factor for ice-classed ships as specified in the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73) as amended by resolutions MEPC.322(74) and MEPC.332(76), as may be further amended);

- f_m is the factor for ice-classed ships having IA Super and IA as specified in the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73) as amended by resolutions MEPC.322(74) and MEPC.332(76), as may be further amended);

- f_c represents the cubic capacity correction factors for chemical tankers as specified in paragraph 2.2.12 of the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73) as amended by resolutions MEPC.322(74) and MEPC.332(76), as may be further amended);

- $f_{i,VSE}$ represents the correction factor for ship-specific voluntary structural enhancement as specified in paragraph 2.2.11.2 of the *2018 Guidelines on the method of calculation of the attained EEDI for new ships* (resolution MEPC.308(73) as amended by resolutions MEPC.322(74) and MEPC.332(76), as may be further amended), to be applied only to self-unloading bulk carriers*;*

- $Capacity$ is deadweight or gross tonnes as defined for each specific ship type in the *2022 Guidelines on the reference lines for use with operational carbon intensity indicators (CII Reference lines Guidelines, G2)* (resolution MEPC.353(78));

- D_t represents the total distance travelled (in nautical miles), as reported under IMO DCS; and

- D_x represents distance travelled (in nautical miles) for voyage periods which may be deducted from CII calculation according to paragraph 4.1 of these Guidelines.

In case the above voyage exclusion or correction factors are applied, the ship should still report total fuel oil consumption (t) of each type of fuel, total hours under way (h) and total distance travelled (nm) to the Administration pursuant to regulation 27 of MARPOL Annex VI.

All relevant data should be recorded in the ship's logbook. Each parameter, if used, should also be reported to the Administration.

4.1 $FC_{voyage,j}$ for voyage adjustment

The parameter $FC_{voyage,j}$ is the total mass (in grams) of fuel of type j, consumed in voyage periods during the calendar year which may be deducted from the calculation of the attained CII in case the ship encounters one of the following situations:

.1 scenarios specified in regulation 3.1 of MARPOL Annex VI, which may endanger safe navigation of a ship; and

.2 sailing in ice conditions, which means sailing of an ice-classed ship in a sea area within the ice edge.

In cases where $FC_{voyage,j}$ is used:

- any associated distance travelled must also be deducted using D_x otherwise ships will benefit from distance travelled without any associated CO_2 emission.
- the ship should report data for the deductions associated with voyage adjustments to the Administration in accordance with appendix 2 of these guidelines.

4.2 AF_{Tanker} for corrections to shuttle tankers or STS voyages on tankers

Tankers engaged in STS voyages as defined above in paragraph 2.8 may apply the correction factor $AF_{Tanker,STS}$ to all fuel consumption relating to STS voyages, including cargo transfer at offshore location, voyage, cargo discharge and waiting periods at anchor or drifting during which the ship reports being part of an STS operation and voyage. The STS operation includes fuel consumption in port where the transferred cargo is discharged after such a voyage.

The correction is calculated as:

$$AF_{Tanker,STS} = 6.1742 \times DWT^{-0.246}$$

Where $AF_{Tanker,STS}$ is applied, $FC_{electrical}$, FC_{boiler} and FC_{others} should not be used.

Shuttle tankers equipped with dynamic positioning as defined above in paragraph 2.9 may apply the correction factor $AF_{Tanker,Shuttle}$ to total fuel consumption:

The correction factor is calculated as:

$$AF_{Tanker,Shuttle} = 5.6805\ x\ DWT^{-0.208}$$

Where $AF_{Tanker,Shuttle}$ is applied, $FC_{electrical}$, FC_{boiler}, FC_{others} and $AF_{Tanker,STS}$ should not be used.

4.3 $FC_{electrical,j}$ for corrections relating to electrical power

The parameter $FC_{electrical,j}$ is the mass (in grams) of fuel of type j, consumed for production of electrical power during the calendar year which may be deducted from the calculation of the attained CII for the following purposes:

.1 Electrical consumption of refrigerated containers (on all ships where they are carried) using the calculation methodology specified in part A of appendix 1.

.2 Electrical consumption of cargo cooling/reliquefaction systems on gas carriers and LNG Carriers.

.3 Electrical consumption of discharge pumps on tankers.

4.4 $FC_{Boiler,j}$ for corrections relating to boiler fuel consumption

The parameter $FC_{Boiler,j}$ is the mass (in grams) of fuel of type j, consumed by the oil-fired boiler during the calendar year which may be deducted from the calculation of the attained CII, for the purposes of cargo heating and cargo discharge on tankers. The calculation methodology for $FC_{Boiler,j}$ is specified in part B of appendix 1.

4.5 $FC_{others,j}$ for corrections relating to other related fuel consumption devices

The parameter $FC_{others,j}$ is the mass (in grams) of fuel of type j, consumed by standalone engine driven cargo pumps during discharge operations on tankers which may be deducted from the calculation of the attained CII.

4.6 EEDI and EEXI Correction factors

The EEDI correction factors as defined above in paragraph 4 may be applied, provided they are included in the ship's EEDI Technical File or EEXI Technical file.

APPENDIX 1

CORRECTION FACTORS FOR USE IN CII CALCULATION

Part A. $FC_{Electrical}$ for Corrections relating to electrical power

1 Refrigerated containers

For ships carrying refrigerated containers, the correction factor $FC_{Electrical}$ may be applied as follows:

.1 For ships that have the ability to monitor reefer electrical consumption, the ship may calculate reefer container kWh consumption as follows:

$$FC_{electrical\_reefer,j} = Reefer\ kWh \times SFOC$$

where:

- $FC_{electrical\_reefer,j}$ (Reefer fuel oil consumption) represents the estimated fuel consumption attributed to in-use refrigerated containers carried.
- $Reefer\ kWh$ is measured on the ship by the kWh meter counter on the ship.
- $SFOC$ represents the specific fuel consumption in g/kWh as a weighted average of the engines used to provide the electrical power, as per the EEDI/EEXI Technical File or the NO_x Technical File. In the case of ships without a Technical File, a default value of 175 g/kWh for 2 stroke engines and 200 g/kWh for 4 stroke engines may be applied. In the case of waste heat recovery systems as defined under Category C1 in MEPC.1/Circ.896 the SFOC to be used will be at the discretion of the Administration.

Alternatives such as derivation of fuel consumption or kWh from auto-logged data may be used subject to approval by the Administration. Note that ship reefer kWh consumption should not include consumption during voyage adjustment periods.

.2 For ships that do not have the ability to monitor reefer electrical consumption, the ship may calculate reefer kWh consumption as follows:

$$FC_{electrical\_reefer,j} = Cx \cdot 24 \cdot SFOC_{avg} \cdot \left(Reefer\_days_{sea} + \sum Reefer\_days_{port}\right)$$

where:

- Cx represents a default reefer consumption of 2.75 kW/h.
- $Reefer\_days_{sea}$ represents the number of in-use reefer-days over the declared period and may be derived using the number of reefer containers as recorded in the BAPLIE file multiplied by the number of days at sea.
- $SFOC_{avg}$ represents the specific fuel consumption in g/kWh as a weighted average of the engines used to provide the electrical power, as per the EEDI/EEXI Technical File or NO_x Technical File. In the case of ships without a Technical File, a default value of 175 g/kWh for 2 stroke engines and 200 g/kWh for 4 stroke

engines may be applied. In the case of waste heat recovery systems as defined under Category C1 in MEPC.1/Circ.896 the SFOC to be used will be at the discretion of the Administration.

In ports where shore-power is not used, the number of in-use reefers at port should be calculated as:

$$Reefer\_days_{port} = \frac{No_c\ Arrival + No_c\ Departure}{2} \times Days_{port}$$

where:

- $Days_{port}$ represents number of days in port.
- $Reefer\_days_{port}$ represents the number of in-use reefer days while at port.*
- $No_c\ Arrival$ represents number of reefer containers on arrival.
- $No_c\ Departure$ *represents* number of reefer containers at departure.

In all cases, the actual number of in-use reefers carried is documented in the BAPLIE file.

Note that ship reefer kWh consumption should not include consumption during voyage adjustment periods.

* The number of reefers on board while in port should be calculated to equal the number of reefers at arrival and at departure as calculated above. Same calculation applies for Reefer days $_{sea}$ in port.

2 Cargo cooling systems on gas carriers and LNG carriers

For gas carriers and LNG carriers with electrical cargo cooling systems or reliquefaction plants, the correction factor $FC_{electrical}$ may be applied as follows:

.1 Gas carriers and LNG carriers may calculate cargo cooling kWh consumption as follows:

$$FC_{electrical\_cooling,j} = Cooling\ kWh \times SFOC$$

where:

- $FC_{electrical\_cooling,j}$ (cargo cooling fuel oil consumption) represents the estimated fuel consumption attributed to cooling of gas cargoes.
- $Cooling\ kWh$ is measured on the ship by the kWh meter counter on the ship.
- $SFOC$ represents the specific fuel consumption in g/kWh associated with the relevant source of electrical power as per the EEDI/EEXI Technical File or NO_x Technical File. In the case of ships without a Technical File, a default value of 175 g/kWh for 2 stroke engines and 200 g/kWh for 4 stroke engines may be applied. In the case of waste heat recovery systems as defined under Category C1 in MEPC.1/Circ.896 the SFOC to be used will be at the discretion of the Administration.

Alternatives such as derivation of fuel consumption or kWh from auto-logged data may be used subject to approval by the Administration. Note that cargo cooling kWh consumption should not include consumption during voyage adjustment periods.

3 Electric cargo discharge pumps on tankers

For tankers with directly or indirectly electrically powered discharge pumps, the correction factor $FC_{electrical}$ may be applied as follows:

.1 Tankers may calculate cargo discharge kWh consumption as follows:

$$FC_{electrical\_discharge,j} = discharge\ kWh \times SFOC$$

where:

- $FC_{electrical\_discharge,j}$ (cargo discharge fuel oil consumption) represents the estimated fuel consumption attributed to use of cargo discharge pumps.
- $Discharge\ kWh$ is measured on the ship by the kWh meter counter on the ship.
- $SFOC$ represents the specific fuel oil consumption in g/kWh associated with the relevant source of electrical power as per the EEDI/EEXI Technical File or NO_x Technical File. In the case of ships without a Technical File, a default value of 175 g/kWh for 2 stroke engines and 200 g/kWh for 4 stroke engines may be applied. In the case of waste heat recovery systems as defined under Category C1 in MEPC.1/Circ.896 the SFOC to be used will be at the discretion of the Administration.

Alternatives such as derivation of actual fuel consumption from auto-logged data may be used subject to approval by the Administration. Note that cargo cooling kWh consumption should not include consumption during voyage adjustment periods.

Part B. FC_{Boiler} and FC_{Others} for corrections relating to cargo heating and discharge on tankers

1 FC_{Boiler} for cargo heating and discharge pumps on tankers

For tankers with fuel fired boilers used for cargo heating or steam driven cargo pumps, the following correction factor may be applied for the period that the cargo heating or discharge pumps are in operation:

.1 In the case of boilers used for cargo heating, the amount of fuel used by the boiler (FC_{Boiler}) should be measured by accepted means, e.g. tank soundings, flow meters.

.2 For tankers which use steam driven cargo pumps, the amount of fuel used by the boiler (FC_{Boiler}) should be measured by accepted means, e.g. tank soundings, flow meters.

Some amount of fuel consumed by the boiler during cargo heating or discharge operations may be attributed to other purposes, e.g. calorifiers. It is not necessary to split these out from reporting.

Note that boiler consumption should not include consumption during voyage adjustment periods.

2 FC_{Others} for discharge pumps on tankers

For tankers with discharge pumps powered by their own generator, the amount of fuel used for the period that the discharge pumps are in operation (FC_{Others}) should be measured by accepted means, e.g. tank soundings, flow meters.

Note that fuel deducted under FC_{Others} should not include consumption during voyage adjustment periods.

APPENDIX 2

GUIDANCE ON REPORTING OF FUEL OIL CONSUMPTION AND DISTANCE TRAVELLED FOR VOYAGE PERIODS WHERE THE SHIP MEETS THE CRITERIA TO APPLY ANY VOYAGE ADJUSTMENT

In this appendix guidance is given for reporting and verification of fuel oil consumption and distance travelled concerning voyage adjustments when a scenario specified in regulation 3.1 of MARPOL Annex VI applies, which may endanger safe navigation of a ship, or when sailing in ice conditions.

1 Fuel oil consumption for voyage periods should include all the fuel oil consumed on board including but not limited to the fuel oil consumed by the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, for each type of fuel oil consumed, regardless of whether a ship is under way or not. Methods for collecting data on fuel oil consumption in metric tonnes include the method using flow meters or method using bunker fuel oil tank monitoring on board as described in paragraphs 7.1.2 and 7.1.3 of the *2022 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP Guidelines)* (resolution MEPC.346(78)) correspondingly.

2 The distance travelled over ground in nautical miles for voyage periods should be recorded in the logbook in accordance with SOLAS regulation V/28.1 and submitted to the Administration.

3 At the end of the voyage, if the ship has encountered ice conditions during its voyage, when the ship was under way sailing between the ice edges or between the ice edge and the port, or when a scenario specified in regulation 3.1 of MARPOL Annex VI applies:

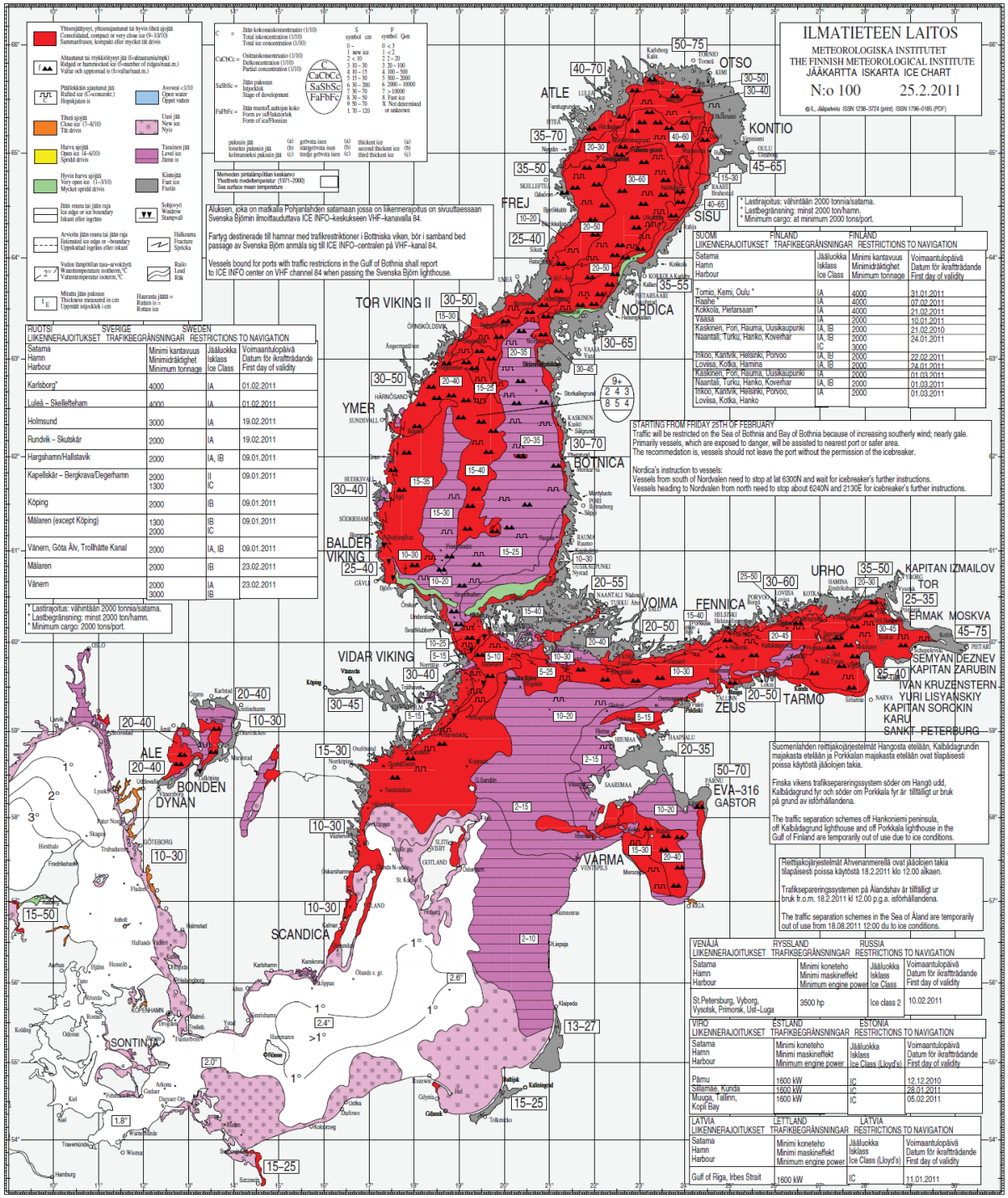
.1 the fuel oil consumed measured in accordance with 7.1.2 or 7.1.3 of the SEEMP Guidelines for the voyage period should not be included in the calculations for the annual average attained CII index value;

.2 if the voyage period is excluded from calculations of the attained CII index value when a scenario specified in regulation 3.1 of MARPOL Annex VI applies, the distance travelled should be clearly marked in the SEEMP monitoring plan, the ship's logbook should include data entries for the voyage period with date, time and position of the ship, when a scenario specified in regulation 3.1 of MARPOL Annex VI started to apply and ceased to apply, and data should be added to the data reporting format;

.3 if the voyage period is excluded from calculations of the attained CII index value due to sailing in ice conditions, the distance travelled should be clearly marked in the SEEMP monitoring plan, the ship's logbook should include data entries for the voyage period with date, time and position of the ship when the ship encountered ice conditions and left ice conditions, and data should be added to the data reporting format.

4 The summary of monitoring data containing records of measured fuel oil consumption and distance travelled for voyage periods should be available on board. Ice charts related to the voyage periods should also be available if the ship has sailed in ice conditions.

Figure 1: An example of an ice chart of the Baltic Sea area



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ANNEX 18

DRAFT AMENDMENTS TO MARPOL ANNEX V

(Regional reception facilities within Arctic waters and Garbage Record Book)

REGULATIONS FOR THE PREVENTION OF POLLUTION BY GARBAGE FROM SHIPS

Regulation 8 – Reception facilities

1 Paragraph 3 is replaced by the following:

"3 The following States may satisfy the requirements in paragraphs 1 and 2.1 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.*

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

Regulation 10 – Placards, garbage management plans and garbage record-keeping

2 The first sentence of the chapeau of paragraph 3 is replaced by the following:

"3 Every ship of 100 gross tonnage and above and every ship which is certified to carry 15 or more persons engaged in voyages to ports or offshore terminals under the jurisdiction of another Party to the Convention and every fixed or floating platform shall be provided with a Garbage Record Book."

3 Paragraph 3.6 is replaced by the following:

".6 In the event of any discharge or accidental loss referred to in regulation 7 of this Annex an entry shall be made in the Garbage Record Book, or in the case of any ship of less than 100 gross tonnage, an entry shall be made in the ship's official logbook of the date and time of occurrence, port or position of the ship at time of occurrence (latitude, longitude and water depth if

* Refer to the *2012 Guidelines for the development of a Regional Reception Facilities Plan* (resolution MEPC.221(63)), as amended by resolution MEPC.[…](79).

known), the reason for the discharge or loss, details of the items discharged or lost, categories of garbage discharged or lost, estimated amount for each category in cubic metres, reasonable precautions taken to prevent or minimize such discharge or accidental loss and general remarks."

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ANNEX 19

RESOLUTION MEPC.356(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR BRIEF SAMPLING OF ANTI-FOULING SYSTEMS ON SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on the Control of Harmful Anti-fouling Systems for Ships, 2001, held in October 2001, adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (the AFS Convention) together with four Conference resolutions,

NOTING that article 11(1) of the AFS Convention prescribes that ships to which this Convention applies may, in any port, shipyard, or offshore terminal of a Party, be inspected by officers authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention, that such inspection may include brief sampling of the ship's anti-fouling system, and that article 11(1) of the AFS Convention refers to the guidelines to be developed by the Organization,

NOTING ALSO resolution MEPC.104(49) by which the Committee adopted the *Guidelines for brief sampling of anti-fouling systems on ships*,

RECALLING FURTHER that at its seventy-sixth session it adopted amendments to the AFS Convention to introduce controls on cybutryne through resolution MEPC.331(76),

RECOGNIZING the need for a consequential revision of the guidelines associated with the AFS Convention due to the aforementioned amendments,

NOTING FURTHER that through resolutions MEPC.358(78) and MEPC.357(78) the Organization adopted *2022 Guidelines for survey and certification of anti-fouling systems on ships* and *2022 Guidelines for inspection of anti-fouling systems on ships*, respectively,

HAVING CONSIDERED a revised text of the *Guidelines for brief sampling of anti-fouling systems on ships* prepared by the Sub-Committee on Pollution Prevention and Response at its ninth session,

1 ADOPTS the *2022 Guidelines for brief sampling of anti-fouling systems on ships* (2022 Guidelines), the text of which is set out in the annex to this resolution;

2 INVITES Governments to apply the 2022 Guidelines as soon as possible, or when the Convention becomes applicable to them;

3 RECOMMENDS that the Guidelines be reviewed on a regular basis;

4 REVOKES resolution MEPC.104(49).

ANNEX

2022 GUIDELINES FOR BRIEF SAMPLING OF ANTI-FOULING SYSTEMS ON SHIPS

TABLE OF CONTENTS

1 General

Purpose

1.1 Article 11 of the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, hereinafter referred to as "the Convention", and resolution MEPC.358(78) on *2022 Guidelines for survey and certification of anti-fouling systems on ships*, refer to sampling as a method of verification of compliance of a ship's anti-fouling system with the Convention for inspection and survey.

1.2 The *Guidelines for brief sampling of anti-fouling systems on ships*, hereinafter referred to as "the Guidelines", provide procedures for sampling to support the effectiveness of survey and inspection to ensure that a ship's anti-fouling system complies with the Convention and thus assists:

.1 Administrations and recognized organizations (ROs) in the uniform application of the provisions of the Convention;

.2 port State control officers with guidance on methods and handling of brief sampling in accordance with article 11(1)(b) of the Convention; and

.3 companies, shipbuilders, manufacturers of anti-fouling systems, as well as any other interested parties, in understanding the process of sampling as required in terms of the Convention.

1.3 However, inspections or surveys do not necessarily always need to include sampling of the anti-fouling system.

1.4 These Guidelines apply to surveys and inspections of ships subject to the Convention.

1.5 The sole purpose of the sampling activities described in the Guidelines is to verify compliance with the provisions of the Convention. Consequently, such activities do not relate to any aspect not regulated by the Convention (even if such aspects relate to the performance of an anti-fouling system on the hull of a ship, including the quality of workmanship).

Structure of these Guidelines

1.6 These Guidelines contain:

.1 a main body covering aspects of general nature common to "sampling" procedures related to the regulation of anti-fouling systems controlled by the Convention; and

.2 appendices describing the unique procedures associated with the sampling and analysis of anti-fouling systems controlled by the Convention. These appendices only serve as examples of sampling and analytical methods, and other sampling methods not described in an appendix may be used subject to the satisfaction of the Administration or the port State, as appropriate.

1.7 For reasons including the event of further anti-fouling systems becoming controlled under the Convention, or in the light of new experience acquired, these Guidelines may need to be reviewed or amended in the future.

2 Definitions

For the purposes of these Guidelines:

2.1 "Administration" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of a State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the seabed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.

2.2 "Anti-fouling system" means a coating, paint, surface treatment, surface or device that is used on a ship in order to control or prevent attachment of unwanted organisms.

2.3 "Threshold value" means the concentration limit of the chemical under investigation below which compliance with the relevant provisions of the Convention may be assumed.

2.4 "Company" means the owner of the ship or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibilities imposed by the International Safety Management (ISM) Code.

2.5 "Length" means the length as defined in the International Convention on Load Lines, 1966, as modified by the Protocol of 1988 relating thereto, or any successor Convention.

2.6 "Tolerance range" means the numerical range added to the threshold value indicating the range where detected concentrations above the threshold value are acceptable due to recognized analytical inaccuracy and thus do not compromise the assumption of compliance.

3 Personnel safety when sampling

Health

3.1 Persons carrying out sampling should be aware that solvents or other materials used for sampling may be harmful. Wet paint which is sampled may also be harmful. In these cases, the material safety data sheet (MSDS) for the solvent or paint should be read and appropriate precautions should be taken. This will normally include the wearing of long sleeve solvent resistant gloves of suitable impervious material, e.g. nitrile rubber.

3.2 Quantities of dry anti-fouling paint removed during sampling from ships' hulls will normally be too small to cause significant health effects.

Safety

3.3 Access to ships to carry out sampling safely may be difficult. If a ship is moored alongside, persons carrying out sampling must ensure they have safe access to reach the hull from, for example, platforms, crane baskets, cherry pickers or gangways. They must ensure that they are protected by railings or a climbing harness or take other precautions so that they cannot fall into the water between the quay and the ship. If in doubt a lifejacket, and possibly a safety line, should be worn when sampling.

3.4 Access to ships in dry dock should be made by secure means. Scaffolding should be securely constructed and cherry pickers or dock-arms should be properly constructed and maintained if they are to be used to gain access. There should be a system to record the presence of the inspector in the dock area, and he or she should preferably be accompanied. Safety harnesses should be worn in cherry-picker baskets, if used.

4 Sampling and analysis

Sampling methods

4.1 During sampling, care should be taken not to affect the integrity or operation of the anti-fouling system.

4.2 Sampling where the anti-fouling coating is visibly damaged[1] or on block mark areas on the flat bottom of the ship (where the intact anti-fouling system is not applied) should be avoided. Sampling adjacent to or below areas where the anti-fouling system is damaged should also be avoided. When a sample point on the hull has been selected, any fouling present should be removed with water and a soft sponge/cloth before taking a specimen of the anti-fouling system (to avoid contamination of the sample). Where possible, if carried out in dry dock, sampling should be carried out after the hull has been water-washed.

4.3 The materials required for brief sampling methodologies should ideally be inexpensive, widely available and therefore readily accessible, irrespective of sampling conditions and/or location.

4.4 The sampling procedure should ideally be easily and reliably undertaken. Persons conducting sampling should receive appropriate training in sampling methods.

Technical aspects

4.5 The sampling method should take into account the type of anti-fouling system used on the ship (taking into account that different parts of the hull may be treated with different anti-fouling systems).

4.6 Sampling and analysis of the ship's anti-fouling system could be related to only one or to all of the substances listed in Annex 1 of the AFS Convention. The following cases could be considered:

Case A. Analysis of organotin only

Case B. Analysis of cybutryne only

Case C. Simplified approach to detect organotin and cybutryne

4.7 Depending on the case, the number of samples, analysis, and definition of compliance will differ.

[1] During in-service periods, anti-fouling coatings on ships' hulls often become damaged. The extent of damage varies between ships and damaged areas can be visually recognized. Typically, damage can be restricted to localized areas, e.g. anchor chain damage (bow region), fender damage (vertical sides of hull), "rust through areas" (underlying rust causing coating failure), or in some cases can be in smaller areas scattered over larger areas of the hull (usually older ships where over-coating of the original system has taken place many times).

4.8 Specimens of paint for analysis during survey and certification can be taken either as wet paint[2] from product containers, or dry paint film sampled from the hull.

Sampling strategy and number of samples

4.9 The sampling strategy is dependent on the precision of the sampling method, the analytical requirements, costs, and required time and the purpose of the sampling. The number of paint specimens taken of each sample should allow for a retention quantity for back-up/storage in the event of a dispute. For dry samples, triplicate specimens of paint at each sampling point should be taken in close proximity to each other on the hull (e.g. within 10 cm of each other).

4.10 In cases where it is recognized that more than one type of anti-fouling system is present on the hull, where access can be gained, samples should be taken from each type of system:

.1 For survey purposes or for more thorough inspections pursuant to article 11(2) of the Convention, in order to verify the compliance of an anti-fouling system, the number of sample points should reflect representative areas of the ship's hull.

.2 For inspection purposes pursuant to article 11(1) of the Convention sample points on the hull should be selected covering representative areas where the anti-fouling system is intact. Depending on the size of the ship and accessibility to the hull, at least four sample points should be equally spaced down the length of the hull. If sampling is undertaken in dry dock, flat bottom areas of the hull should be sampled in addition to vertical sides as different anti-fouling systems can be present on these different areas.

4.11 The distribution of any remaining anti-fouling paint on the hull surface may not be uniform. Therefore, it is important that the sampling is representative of the hull status; see *Guidelines for survey and certification of anti-fouling systems on ships*, appendix I, paragraph 2).

Analysis

4.12 The analysis of the anti-fouling system should ideally involve minimal analytical effort and economic cost.

4.13 The analysis should be conducted by a recognized laboratory meeting the ISO 17025 standard or another appropriate facility at the discretion of the Administration or the port State.

4.14 The analytical process should be expeditious, such that results are rapidly communicated to the officers authorized to enforce the Convention.

[2] In order to prevent contamination, wet paint samples should be taken from a newly opened container. Paint should be stirred to ensure even consistency before sampling and all equipment used should be cleaned prior to use. Liquid paint samples should be stored in appropriate sealed packaging which will not react with or contaminate the sample. In the case of multi-component coatings (where on-site mixing of several components is required prior to application), samples of each component should be taken and the required mixing ratio recorded. When a sample of wet paint is taken from a container, details of the paint should be recorded, e.g. details required for the IAFS Certificate along with a batch number for the product.

4.15 The analysis should produce unambiguous results expressed in units consistent with the Convention and its associated guidelines. For example, for organotin, results should be expressed as: mg tin (Sn) per kg of dry paint, and, for cybutryne: mg of cybutryne per kg of dry paint.

NOTE: Compound-specific sampling and analytical methodologies are described in the appendices to these Guidelines.

5 Thresholds and tolerance limits

Thresholds

5.1 The analysis should be quantitative to the point of being able to accurately verify the threshold limits within the given tolerance.

5.2 In cases where compliance with acceptable limits, or lack thereof, is unclear, additional sampling or other methodologies for sampling should be considered.

Tolerance range

5.3 Statistical reliability for each (compound-specific) brief sampling procedure should be documented. The analysis should be quantitative to the point of being able to accurately verify the threshold limits within the given tolerance. On the basis of these data a compound-specific tolerance range should be derived and stated in the method description. In general, the tolerance range should not be higher than the standard deviation under typical conditions for testing and should under no circumstances go beyond 30%.

6 Definition of compliance

6.1 Compliance with Annex 1 to the Convention is assumed if the anti-fouling system contains:

.1 organotin at a level which does not provide a biocidal effect. In practice organotin compounds should not be present above 2,500 mg organotin (measured as Sn) per kg of dry paint; and

.2 cybutryne at a level which does not provide a biocidal effect. It should not be present above 1,000 mg of cybutryne per kg of dry paint.

6.2 Compliance is largely dependent on the results of sampling and subsequent analysis. As every method of sampling and analysis has its specific accuracy, a compound-specific tolerance level may be applied in borderline cases with concentrations very close to the threshold level.

6.3 In general, compliance is assumed when the samples yield results below the threshold value.

7 Documentation and recording of information

7.1 The results of the sampling procedure should be fully documented on a method-specific record sheet. Examples are provided in the appendices to these Guidelines.

7.2 Such record sheets should be completed by the sampler and should be submitted to the competent authority of the port State or Administration.

APPENDIX

POSSIBLE METHODS FOR BRIEF SAMPLING AND ANALYSIS OF ANTI-FOULING SYSTEMS ON SHIPS

- ORGANOTIN AND/OR CYBUTRYNE -

METHOD 1

1 Purpose of this method concerning brief sampling and analysis of anti-fouling systems

1.1 This method has been developed in order to describe a rapid methodology appropriate for the identification of anti-fouling systems on ship hulls containing organotin compounds and/or cybutryne acting as biocide. This method has been designed such that sealers should not be affected, and any underlying anti-fouling agent (or primer) is not taken up in the sampling procedure. The method is not recommended for silicon-based anti-fouling systems.

1.2 The method for organotin compounds (Case A under paragraph 4.6 of the Guidelines) is based on a two-step analysis. The first step detects total tin as an indicator for organotin; the second step, detecting specific organotin compounds, is only necessary in the case of the first step proving positive.

1.3 The method for cybutryne (Case B under paragraph 4.6 of the Guidelines) is based on a one-step analysis.

1.4 The simplified approach (Case C under paragraph 4.6 of the Guidelines) to detect organotin compounds and cybutryne is based on a one-step analysis.

2 Sampling device and materials

2.1 The sampling device is constructed in a way that only the upper layer of paint is removed, thereby it should leave any underlying paint (sealer, primer, etc.) intact. This result is achieved through the use of a moving disk (eccentric rotation), which is covered by an abrasive material like quartz or glass fibre fabric. This abrasive material has to be suitable for its use as a supporting material for the removed paint.

2.2 The device fulfils the following requirements:

.1 the device has to work independently from any stationary power supply. The device may be driven by an electrical motor (battery-driven) or may be mechanically driven by a clockwork-like spring, provided it is able to sustain the movement over the required time period;

.2 the applied force has to be constant during the operation, and the area for paint removal has to be defined;

.3 the abrasive material has to be inert against chemical solvents and acids and must not contain more than trace amounts of tin or tin compounds and/or cybutryne; and

.4 the amount of paint removed after a regular operation of the device has to be shown to exceed 20 mg per sample.

2.3 The device as described in the following section has been shown to be suitable for the brief sampling procedure. Any other device may be used however, provided such a device has proven to meet all the above-mentioned requirements.

2.4 The sampling device described here consists of a polyethylene disk, on which fibre glass fabric can be mounted by the use of an O-ring. The disk is moved on an eccentrically rotating axis.

3 Sampling procedure

3.1 The sampling procedure should be performed in the following manner:

.1 control samples should be taken through the entire sampling and analytical process to account for possible contamination;

.2 the mass of the fibreglass pads is weighed with a precision of at least 1 mg. The weight should be documented for each sample;

.3 the fabric should be moistened thoroughly with isopropanol (0.7 mL per sample) immediately before sampling;

.4 when a sample point on the hull has been selected, any fouling present should be removed with water and a soft sponge/cloth before taking a specimen of the anti-fouling system (to avoid contamination of the sample). Where possible, if carried out in dry dock, sampling should be carried out after the hull has been water-washed;

.5 the sampling device is then held against the surface to be sampled for a period of five seconds, prior to the sampling device being switched on;

.6 the sampling device is switched on, thereby removing paint by the circular motion of the fibre glass fabric against the surface of the ship;

.7 the sampling device should be applied to the surface of the hull for a suitable period of time, such that at least 20 mg of paint is taken up by the pad. As a general rule, if the pad colour after sampling matches the colour of the hull coating a sufficient sample has been taken;

.8 the specimens should be taken as close to each other as possible, but without overlap;

.9 upon completion of the sampling, the fibreglass fabric pads should be left to dry and re-weighed;

.10 the number of samples will differ depending on the substances targeted as listed in Annex 1 of the AFS Convention.

Case A. Analysis of organotin only, every sample should be taken in triplicate.

Specimen 'A' – for Step 1
Specimen 'B' – for Step 2
Specimen 'X' – for storage/back-up

Case B. Analysis of cybutryne only, every sample should be taken in duplicate.

Specimen 'C' – for a one-step analysis
Specimen 'X' – for storage/back-up

Case C. Simplified approach to detect organotin and cybutryne, every sample should be taken in duplicate.

Specimen 'C' – for a one-step analysis
Specimen 'X' – for storage/back-up

3.2 Samples should be stored in appropriate sealed packaging which will not react with or contaminate the sample.

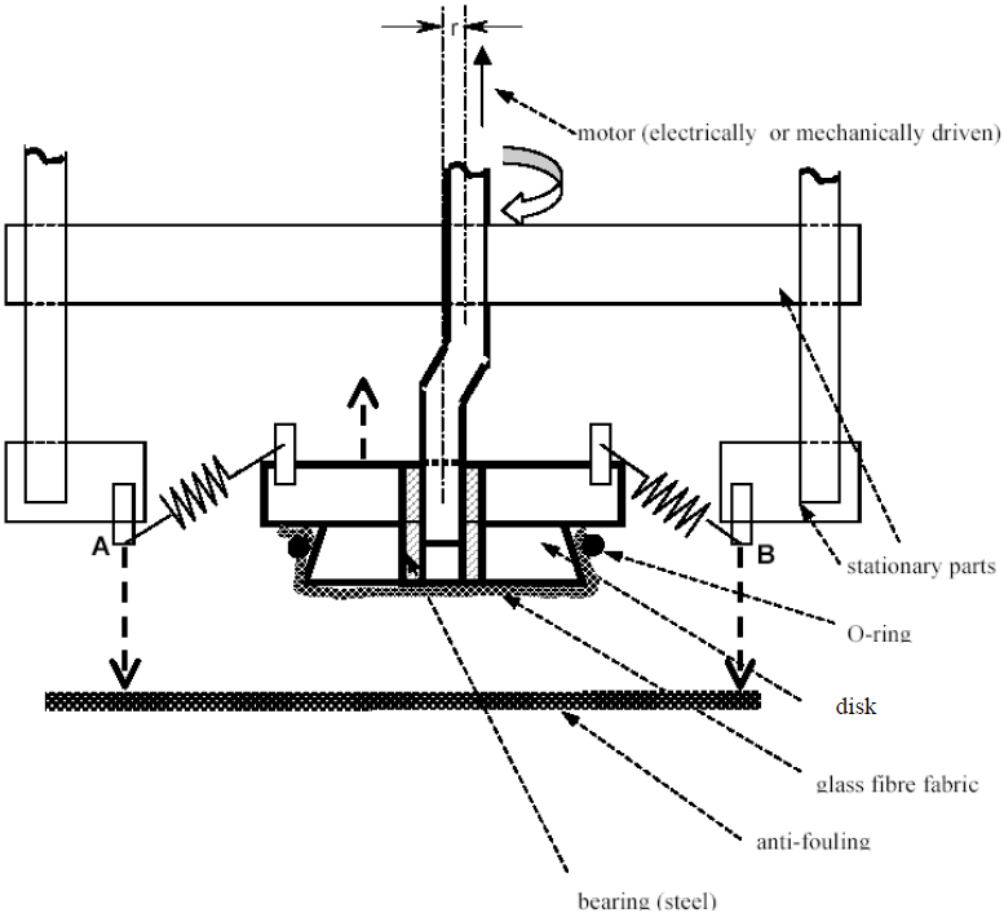


Diagram A: Schematic cross section of the sampling device

The indicated points A and B are to be pressed against the surface. The polyethylene disk, covered with the glass fibre fabric, is moved with an amplitude of 2 r (r = 1.0 cm) on the surface.

Specific data:

Force applied on the paint surface:	25 N (Newton)
Effective diameter of the disk:	5 cm
Frequency of rotation:	6 rotations/s
Solvent used:	isopropanol (0.8 mL per sample).

4 Sampling strategy

4.1 Sampling should be conducted in accordance with paragraph 4 of the Guidelines.

4.2 For inspection purposes in most cases accessibility to all parts of the hull will not be given. A minimum number of eight independent samples should be taken from different accessible parts of the hull.

5 Analytical procedure

5.1 The analytical procedure will differ depending on the substances targeted as listed in Annex 1 of the AFS Convention.

Case A. Analysis of organotin only

5.2 The two components comprising the analytical procedure are illustrated in the flow diagram B. The two components, or steps, are as follows:

.1 (Step 1) – An analysis of Specimen 'A' for the presence of total tin; and

.2 (Step 2) – A more cost- and time-consuming analysis of Specimen 'B', that is applied only when Step 1 produces positive results. This test involves organotin analysis by gas chromatography/mass spectrophotometry (GC/MS) after derivatization and provides specific data on the respective organotin species.

Step 1: Investigation of total tin content in Specimen 'A'

Analysis of Specimen 'A'

5.3 Specimen 'A' is analysed for mass of total tin per kilogram of dry paint (or mass of tin per sample) by applying inductively coupled plasma/mass spectrometry (ICP/MS), once the material had been solubilized by digestion using aqua regia. It should be noted that any other scientifically recognized procedure for tin analysis (such as AAS, XRF and ICP-OES) is acceptable.

Step 2: Characterization of organotin in Specimen 'B'

Analysis of Specimen 'B'

5.4 Should Specimen 'A' produce positive results, organotin compounds should be identified and quantified in Specimen 'B'. Specimen 'B' may be analysed using the following procedure:

.1 solvent extraction of Specimen 'B' as supported by sonication in an ultrasonic bath;

.2 derivatization with ethylmagnesium bromide;

.3 clean-up of the extract;

.4 analysis using high resolution gas chromatography/mass spectrophotometry (GC/MS); and

.5 quantifications using tripropyltin as a standard.

5.5 Any equally reliable method for the chemical identification and quantification of organotin compounds is acceptable.

Case B. Analysis of cybutryne only

5.6 A one-step analysis of 'Specimen C' for determining the amount of cybutryne, using gas chromatography/mass spectrophotometry (GC/MS).

One-step analysis: Characterization of cybutryne in Specimen 'C'

Analysis of Specimen 'C'

5.7 Specimen 'C' should be analysed using the following procedure:

.1 sample extraction using ethyl acetate with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;

.2 ventrifugation of the samples at 600 rcf for 5 minutes;

.3 analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;

.4 quantification using reference cybutryne solutions and an internal standard normalization procedure; and

.5 modified GC/MS methods resulting in an expanded measurement uncertainty (k=2; 95% confidence) of 25% are acceptable.

5.8 Other methods for the chemical identification and quantification of cybutryne, if proven equally reliable, could be accepted by the Administration or the port State.

Case C. simplified approach to detect organotin and cybutryne

5.9 A one-step analysis of Specimen 'C' for determining the amount of organotin and cybutryne using gas chromatography/mass spectrophotometry (GC/MS).

One-step analysis: Characterization of organotin and cybutryne in Specimen 'C'

.1 sample extraction using toluene with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;

.2 derivatization with ethylmagnesium bromide;

.3 clean-up of the extract;

.4 centrifugation of the samples at 600 rcf for 5 minutes;

.5 analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;

.6 cybutryne quantification using reference cybutryne solutions and an internal standard normalization procedure. Organotin quantification using tripropyltin as the internal standard; and

.7 modified GC/MS methods resulting in an expanded measurement uncertainty (k=2; 95% confidence) of 25% are acceptable.

5.10 Other methods for the chemical identification and quantification of organotin and cybutryne, if proven equally reliable, could be accepted by the Administration or the port State.

6 Threshold and tolerance range

6.1 The threshold value for organotin compounds for the brief sampling method as described here is:

"2,500 mg tin (Sn) per kg of dry paint."

6.2 The threshold value for cybutryne for the brief sampling method as described here is:

"1,000 mg of cybutryne per kg of dry paint."

Tolerance range

6.3 The tolerance range is 500 mg Sn / kg of dry paint (20%) in addition to the threshold value.

6.4 The tolerance range is 250 mg cybutryne / kg of dry paint (25%) in addition to the threshold value.

Organotin-containing compounds acting as biocides or catalysts

6.5 As stated in appendix I of resolution MEPC.358(78), for the purposes of defining compliance with Annex 1 to the Convention, it should be noted that small quantities of organotin compounds, acting as chemical catalysts (such as mono- and di-substituted organotin compounds), are allowed, provided they are not acting as a biocide.

6.6 Inorganic impurities in the constituents of the paints should be considered.

6.7 At present neither organotin catalysts nor inorganic impurities are found at concentrations which will be close to the threshold level (2,500 mg Sn/kg of dry paint) or higher. However, organotin-containing compounds, when present in paint in order to act as a biocide, were found in concentrations up to 50,000 mg Sn/kg of dry paint. Thus, the discrimination between anti-fouling systems containing organotin compounds acting as a biocide and anti-fouling systems not containing these compounds or not containing these compounds at concentrations where they act as a biocide is reliably possible.

7 Definition of compliance

7.1 The analytical verification of the compliance will differ depending on the substances targeted as listed in Annex 1 of the AFS Convention.

Case A. Analysis of organotin only
Two-step procedure

7.2 The analytical verification of the compliance with the Convention for organotin compounds is performed in a two-step procedure according to the flow-diagram (diagram B).

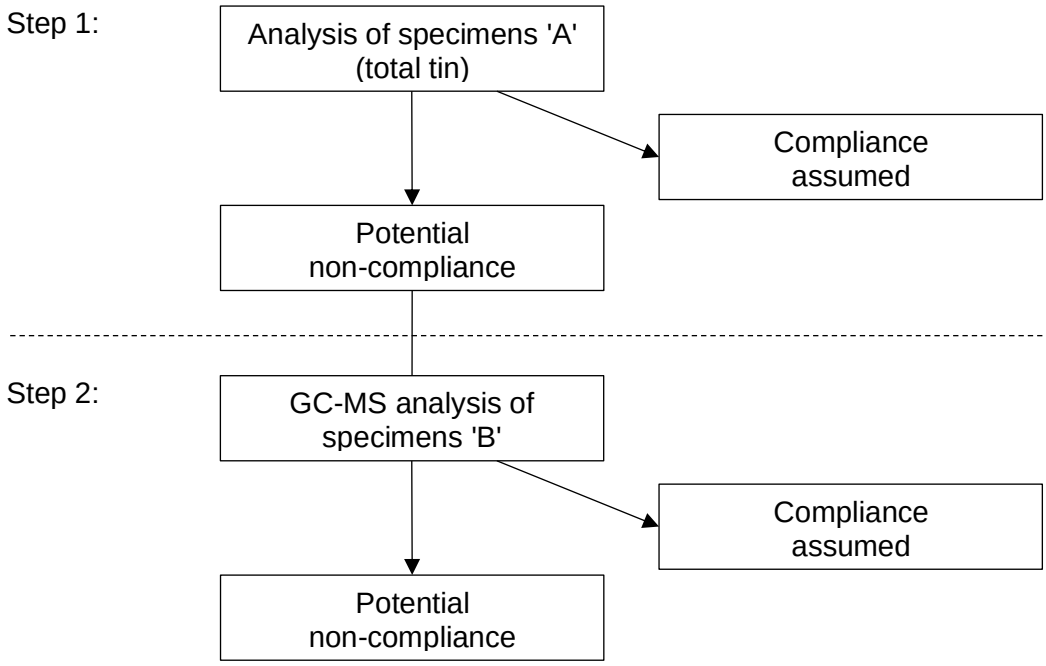


Diagram B: Flow diagram illustrating the two-step analysis procedure for organotin compounds

Compliance with the criteria at the 'Step 1-level'

7.3 Compliance with the Convention is assumed when the results from the specimens 'A', analysed in step 1, meet the following:

.1 no more than 25% of the total number of samples yield results above 2,500 milligrams total tin per kilogram dry paint (2,500 mg Sn/kg of dry paint); and

.2 no sample of the total number of at least eight samples shows a concentration of total tin higher than the sum of threshold value plus the tolerance range, i.e. no sample must exceed the concentration 3,000 mg Sn/kg of dry paint.

7.4 If the results in specimen 'A' indicate that no organotin acting as biocide is present, then performing step 2 is not necessary.

Non-compliance with the criteria at the 'Step 1-level'

7.5 A positive result (non-compliance) is indicated if the provisions of paragraph 7.3 are not met.

7.6 A positive result at step 1 (specimen 'A') would indicate that step 2 should be undertaken, and those samples labelled specimen 'B' should be analysed in order to determine and characterize the organotin present (see diagram B).

Compliance with the criteria at the 'Step 2-level'

7.7 Compliance with the Convention is assumed when the results from the specimens 'B', analysed in step 2, meet the following requirements at the same time:

.1 no more than 25% of the total number of samples yield results above 2,500 milligrams total tin per kilogram dry paint (2,500 mg Sn/kg of dry paint); and

.2 no sample of the total number of at least eight samples shows a concentration of total tin higher than the sum of threshold value plus the tolerance range, i.e. no sample must exceed the concentration 3,000 mg Sn/kg of dry paint.

Non-compliance at 'Step 2-level'

7.8 A positive result in step 2 indicates non-compliance if the provisions of paragraph 7.7 are not met. Such results should be interpreted to mean that organotin compounds are present in the anti-fouling system at a level at which it would act as a biocide.

Case B. Analysis of cybutryne only

7.9 Compliance with the Convention is assumed when the results from specimen 'C', analysed in a one-step analysis for cybutryne, meet the following requirement:

.1 The average value of the total number of specimens shows a concentration below the threshold plus the tolerance range, i.e. 1,250 mg of cybutryne per kg of dry paint.

Non-compliance at the one-step analysis for cybutryne

7.10 An average value of the total number of specimens showing a concentration above the threshold plus the tolerance range, i.e. 1,250 mg of cybutryne per kg of dry paint, indicates non-compliance.

Case C. Simplified approach to detect organotin and cybutryne

7.11 Compliance with the Convention is assumed when the results from specimen 'C', analysed in a one-step analysis for organotin and cybutryne, meet the two conditions below:

.1 for organotin, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range, i.e. 3,000 mg Sn/kg of dry paint; and

.2 for cybutryne, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range, i.e. 1,250 mg of cybutryne per kg of dry paint.

Non-compliance at the one-step analysis for organotin and cybutryne

7.12 If one of the conditions set out in paragraph 7.11 above is not met, this indicates non-compliance. Such results should be interpreted to mean that cybutryne or organotin is present in the anti-fouling system at a level at which it would act as a biocide.

APPENDIX TO METHOD 1

RECORD SHEET FOR THE BRIEF SAMPLING PROCEDURE FOR COMPLIANCE WITH THE CONVENTION IN TERMS OF THE PRESENCE OF ORGANOTIN AND/OR CYBUTRYNE ACTING AS A BIOCIDE IN ANTI-FOULING SYSTEMS ON SHIP HULLS

<table>
<tr><td colspan="2">RECORD SHEET:
GUIDELINES FOR BRIEF SAMPLING OF ANTI-FOULING SYSTEMS ON SHIPS – ORGANOTIN AND CYBUTRYNE</td><td>RECORD NUMBER:</td></tr>
<tr><td colspan="3"><u>SECTION 1: Administration</u></td></tr>
<tr><td>1. Country</td><td>2. Name of port</td><td>3. Date</td></tr>
<tr><td colspan="3">4. Reason for sampling
☐ Port State control ☐ Survey & certification ☐ Other flag State compliance inspection</td></tr>
<tr><td colspan="2">5. Company details:
1. Name of ship:
2. Distinctive number or letters:
3. Port of registry
4. Gross tonnage:
5. IMO number:</td><td>6. Inspecting official's details
1. Name:
2. Comments:</td></tr>
<tr><td colspan="3"><u>SECTION 2: Sampling</u></td></tr>
<tr><td colspan="3">1. Time sampling procedure initiated:</td></tr>
<tr><td colspan="3">2. Description of location from where samples were taken (frame number and distance from boot topping, refer to paragraph 3.2):</td></tr>
<tr><td colspan="3">3. Number of samples taken (three or two specimens per sample):</td></tr>
<tr><td colspan="3">4. Photographs taken of the sample point prior to sampling?
☐ Yes ☐ No</td></tr>
<tr><td colspan="3">5. Time sampling procedure completed:</td></tr>
<tr><td colspan="3">6. Additional comments concerning sampling procedure:</td></tr>
</table>

SECTION 3: Analysis and results

Case A. Analysis of organotin only

1. Step 1 total tin analysis:

Company name:

Analyst responsible: Date:

2. Specimen 'A' results: Total number of specimens 'A' analysed:

No.	mg Sn / kg	No.	mg Sn / kg	No.	mg Sn / kg	No.	mg Sn / kg
1		5		9		13	
2		6		10		14	
3		7		11		15	
4		8		12		16	

Number of specimens exceeding 2,500 mg/kg:

1 or more specimens exceeding 3,000 mg/kg: ☐ Yes ☐ No

Conclusion: Step 2 required ☐

Compliance, further analysis unnecessary ☐

3. Additional comments concerning analysis of results from Specimens 'A':

4. Organotin analysis undertaken by:

Company name:

Analyst responsible: Date:

5. Specimen 'B' results: Total number of specimens 'B' analysed:

No.	mg Sn / kg	No.	mg Sn / kg	No.	mg Sn / kg	No.	mg Sn / kg
1		5		9		13	
2		6		10		14	
3		7		11		15	
4		8		12		16	

Number of specimens exceeding 2,500 mg/kg:

1 or more specimens exceeding 3,000 mg/kg: ☐ Yes ☐ No

Conclusion: Non-compliance ☐

Compliance, further analysis unnecessary: ☐

6. Additional comments concerning analysis of results from Specimens 'B':

Case B. Analysis of cybutryne only		
1. A one-step analysis using gas chromatography/mass spectrophotometry (GC/MS) Company name: Analyst responsible: Date:		
2. Specimen 'C' results:		
Total number of specimens 'C' analysed by GC-MS:		
Average concentration of cybutryne (mg of cybutryne per kg of dry paint):		
3. Conclusions:		
The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint	☐ Yes	☐ No
4. Additional comments concerning analysis of results from Specimens 'C':		

Case C. Simplified approach to detect organotin and cybutryne		
1. A one-step analysis using gas chromatography/mass spectrophotometry (GC/MS) Company name: Analyst responsible: Date:		
2. Specimen 'C' results:		
Total number of specimens 'C' analysed by GC-MS:		
Average concentration of organotin (mg Sn per kg of dry paint):		
Average concentration of cybutryne (mg of cybutryne per kg of dry paint):		
3. Conclusions:		
The average concentration of organotin exceeds the threshold of 3,000 mg Sn/kg of dry paint	☐ Yes	☐ No
The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne/kg of dry paint	☐ Yes	☐ No
4. Additional comments concerning analysis of results from Specimens 'C':		

SECTION 4: Final conclusion	
Summarized conclusion:	
Compliance with AFS Convention assumed	☐
Non-compliance with AFS Convention assumed	☐

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at

(Place of issue of Record)

(Date of issue) (Printed name and signature of authorized official issuing the Record)

(Seal or stamp of the authority/organization)

METHOD 2

1 Purpose of this method

1.1 This method provides sampling and analysis procedures to identify the presence of organotin compounds and/or cybutryne in the anti-fouling systems on ships. The method is designed such that the sampling and the first stage analysis could be carried out by ship surveyors or port State control officers (PSCOs) on the survey/inspection site, e.g. at a dry dock.

1.2 The method for organotin compounds is based on a two-stage analysis (case A under paragraph 4.6 of the Guidelines). The first stage detects total tin as an indicator for the presence of organotin and the second stage is necessary only in the case that the first stage analysis providing a positive result to detect specific organotin compounds.

1.3 The method for cybutryne analysis (case B under paragraph 4.6 of the Guidelines) is based on a one-step analysis based on the gas chromatography/mass spectrophotometry analytical method (GC/MS).

1.4 A simplified approach to detect organotin and cybutryne (case C under paragraph 4.6 of the Guidelines) is based on a one-step analysis using the gas chromatography/mass spectrophotometry analytical method (GC/MS).

2 Sampling

2.1 The sampling is carried out by using abrasive paper rubbing on the surface of the anti-fouling system. This results in collection of paint fragments of the anti-fouling system from a thin area, less than several micrometres in depth from the surface, which do not affect the coatings lying underneath such as sealers.

2.2 Abrasive paper is pasted on a disc of approximately 10 mm in diameter. Rubbing the surface of the anti-fouling system with the disc collects several milligrams of the sample on to the abrasive paper.

2.3 The sampling device consists of an electric motor, two (or three) rotating rods on each of which a disc is attached, and a battery for electric power supply. The discs are pressed on to the surface of the ship's hull by spring coils. The discs rotate counter-clockwise while the rods turn clockwise around the centre of the device. A schematic diagram is given in figure 1.

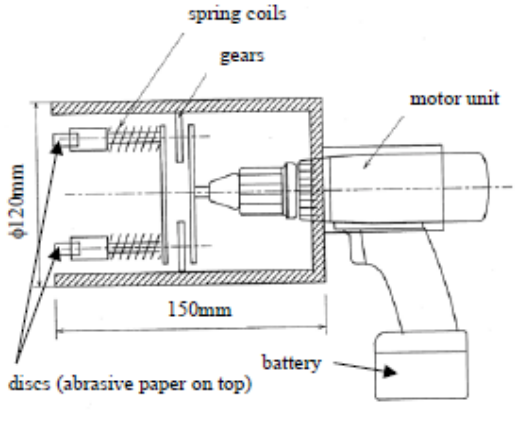


Figure 1. Schematic diagram of sampling device

2.4 A sampling point is selected such that the anti-fouling system is intact over an area of approximately 50 cm x 50 cm or more.

2.5 Depending on the substances targeted as listed in Annex 1 of the AFS Convention:

Case A. For the analysis of organotin only, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.

Case B. For the analysis of cybutryne only, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.

Case C. For the analysis of organotin and cybutryne, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.

2.6 The device is pressed on the ship's hull where it is appropriate to be sampled and held by hand. The electric motor is switched on to slide along the painted surface to lightly scrape off the fragments of the paint onto the abrasive paper. After the sample collection, each disc is removed from the device and stored in an inert container.

2.7 Sampling should normally be carried out with the sampling device. However, in the case that accessibility to the sampling point is poor, it is acceptable to collect samples with the discs by hand if necessary.

3 Analysis

Case A. Analysis of organotin only

3.1 The first-stage analysis

.1 The first-stage analysis is assumed to be carried out on the spot of the survey or inspection, e.g. dry docks and sea ports. In order to accomplish the on-site analysis, X-ray fluorescence analysis (XRF) is used in this method to detect total tin content.

.2 Analytical characteristics, such as detection limit and accuracy, are highly dependent on the type of the instrument, i.e. type of X-ray tube, spectrometer, optical arrangement (filters or collimators), etc. Among several types of the XRF instruments, an energy-dispersive spectrometer with a silicon drift detector (SDD), which is compact in size and able to be operated without liquid nitrogen, is preferable to the present analytical system for a field use, whereas wave-length dispersion system or solid-state detector are also available if the analysis is carried out at laboratories.

.3 Software customized for the tin analysis is prepared to assist the operator, who is assumed to be a ship surveyor or PSCO, to detect total tin in the specimens.

.4 The customized software may in advance need a calibration curve of the characteristic X-ray intensity of tin in relation to the tin content particularly in the range of 0.1 to 0.5%.

.5 After the preparation including the warming-up of the XRF instrument and starting-up of the computer, a specimen (sampling disc) is placed on the sample stage of the instrument. Afterwards, analysis is executed by the customized software. A single batch of analysis for one specimen normally takes five minutes and the result is shown on a display automatically.

6. Since the XRF analysis does not affect any properties of the specimens, all of the collected specimens (six to nine specimens), including those for the second analysis and storage, are able to be used for this analysis.

3.2 Interpretation of the result at the first-stage analysis

.1 Following the procedures above, XRF data of six, or nine, specimens are obtained for each sampling point. Omitting the maximum and minimum values from the data, an average of the tin content is calculated from the intermediate values for the representing value of the sampling point.

.2 Compliance with the Convention is assumed when none of the tin contents (average values) from the samples do not exceed the sum of the threshold (2,500 mg per kg) and a tolerance (500 mg per kg).

.3 When one or more average values of samples from different sampling points do not meet the above criteria, the samples should be sent to a laboratory for the second stage analysis. Regardless of the results, it is also possible to undergo the second stage analysis when the surveyor or PSCO considers that it is necessary to do so.

3.3 Second-stage analysis

.1 Since the second-stage analysis provides the final and definitive results of the samples, the method should be thoroughly reviewed by experts based on scientific evidence. The following is a brief summary of a tentative methodology for the second stage analysis.

.2 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The specimens are hydrolysed with sodium hydroxide aqueous solution, extracted with organic solvent, and then derivatized with propylmagnesium bromide. After cleaning up the extract, analysis using high resolution gas chromatography/mass spectrometry (GC/MS) is carried out. For quantification analysis, tetrabutyl tin d36 is added as the internal standard.

.3 These analyses provide the data of chemical species and their content (mg per kg of the specimens). The content of organotin is obtained in a unit of mg per kg of dry paint.

Case B. For the analysis of cybutryne only

3.4 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The following procedure is proposed for determining the concentration of cybutryne:

.1 sample extraction using ethyl acetate with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;

.2 centrifugation of the samples at 600 rcf for 5 minutes;

.3 analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;

.4 quantification using reference cybutryne solutions and an internal standard normalization procedure; and

.5 modified GC/MS methods resulting in an expanded measurement uncertainty (k=2; 95% confidence) of 25% are acceptable.

Case C. Simplified approach to detect organotin and cybutryne

3.5 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The following procedure is proposed for determining the concentration of organotin and cybutryne:

.1 sample extraction using toluene with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;

.2 addition of sodium hydroxide aqueous solution to hydrolyse the sample and to facilitate the extraction to the toluene;

.3 centrifugation of the samples at 600 rcf for 5 minutes;

.4 collection of the supernatant and derivatization with propylmagnesium bromide;

.5 clean-up of the extract;

.6 analysis of the toluene solution using high resolution capillary GC/MS, with the MS operating in SIM mode;

.7 cybutryne quantification using reference cybutryne solutions and an internal standard normalization procedure; organotin quantification using tetrabutyl tin d36 is added as the internal standard; and

.8 modified GC/MS methods resulting in an expanded measurement uncertainty (k=2; 95% confidence) of 25% are acceptable.

4 Compliance with the Convention

Case A. Analysis of organotin only

4.1 Compliance with the Convention for organotin compounds is assumed when the results from the second-stage analysis meet the following requirements at the same time:

.1 no more than 25% of the total number of samples yield results above 2,500 milligrams tin as organic form per kilogram dry paint (2,500 mg Sn/kg of dry paint); and

.2 no sample of the total number of specimens shows a concentration of tin as organic form higher than the sum of the threshold value plus the tolerance range, i.e. no sample must exceed the concentration 3,000 mg Sn/kg dry paint.

4.2 When the result does not meet the above criteria, it is interpreted to mean that organotin compounds are present in the anti-fouling system at a level where they would act as a biocide.

Case B. Analysis of cybutryne only

4.3 Compliance with the Convention for cybutryne is assumed when the results from the cybutryne analysis meet the following criterion:

.1 the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range, i.e. 1,250 mg of cybutryne per kg of dry paint.

4.4 When the result does not meet the above criterion, it is interpreted to mean that cybutryne is present in the anti-fouling system at a level where it would act as a biocide.

Case C. Simplified approach to detect organotin and cybutryne

4.5 Compliance with the Convention for organotin compounds and cybutryne is assumed when the results from the cybutryne and organotin analysis meet the two conditions below:

.1 for organotin, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e. 3,000 mg Sn/kg of dry paint; and

.2 for cybutryne, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range, i.e. 1,250 mg of cybutryne per kg of dry paint.

4.6 When the results do not meet one of the conditions above, it is interpreted to mean that organotin compounds or cybutryne are present in the anti-fouling system at a level where they would act as a biocide.

APPENDIX TO METHOD 2

RECORD SHEET FOR THE SAMPLING AND ANALYSIS OF ANTI-FOULING SYSTEMS ON SHIP HULLS – ORGANOTIN COMPOUNDS AND/OR CYBUTRYNE

		Record number:
Section 1: Administration		
1. Country		2. Location
3. Date		
4. Reason for survey/inspection		
5. Details of the ship		
	5.1 Name of ship	
	5.2 Distinctive number or letters	
	5.3 Gross tonnage	5.4. Year of build
	5.5 Owner or operator of ship	
	5.6 Flag State	5.7 Class of ship
	5.8 Authority of AFS certificate	
	5.9 Date of issue	
	5.10 Date of last endorsement	
	5.11 IMO number	
	5.12 Name of shipmaster	
	5.13 Product name of anti-fouling system	
	5.14 Name of manufacturer	
	5.15 Name of shipyard where applied	
	5.16 Comments	
6. Inspecting official's details		
	6.1 Name	
	6.2 Comments	

Section 2: Sampling and analysis

Case A. Analysis of organotin only

	Record number
Sampling and Stage 1 analysis (X-ray fluorescence analysis)	
Date:	**Instrument I.D.**

Sample location	Specimen I.D.	Sample disc	Content of tin (mg/ kg)	max	min	Average
A	A1	☐ abrasive				
	A2	☐ metal				
	A3	☐ others				Average
	A4	☐ abrasive				
	A5	☐ metal				mg/kg
	A6	☐ others				☐>2,500 mg/kg
	A7	☐ abrasive				☐>3,000 mg/kg
	A8	☐ metal				
	A9	☐ others				
B	B1	☐ abrasive				
	B2	☐ metal				
	B3	☐ others				Average
	B4	☐ abrasive				
	B5	☐ metal				mg/kg
	B6	☐ others				☐>2,500 mg/kg
	B7	☐ abrasive				☐>3,000 mg/kg
	B8	☐ metal				
	B9	☐ others				
C	C1	☐ abrasive				
	C2	☐ metal				
	C3	☐ others				Average
	C4	☐ abrasive				
	C5	☐ metal				mg/kg
	C6	☐ others				☐>2,500 mg/kg
	C7	☐ abrasive				☐>3,000 mg/kg
	C8	☐ metal				
	C9	☐ others				
D	D1	☐ abrasive				
	D2	☐ metal				
	D3	☐ others				Average
	D4	☐ abrasive				
	D5	☐ metal				mg/kg
	D6	☐ others				☐>2,500 mg/kg
	D7	☐ abrasive				☐>3,000 mg/kg
	D8	☐ metal				
	D9	☐ others				

☐ Stage 2 required	☐ ___samples out of___ are above 2,500 mg/kg ☐sample(s)___is (are) above 3,000 mg/kg	☐Compliant
Sampled by	Analysed by	
Signature	Signature	

	Record number:

Stage 2 analysis (Gas chromatography/mass spectrometry)				
Date				
Instrument I.D.				
Comments on the method				
Sample I.D.	Specimen used	Content of tin (XFR analysis) (mg/kg)	Content of tin (as organotin) (mg/kg)	Compliance
A				☐>2,500 mg/kg ☐>3,000 mg/kg
B				☐>2,500 mg/kg ☐>3,000 mg/kg
C				☐>2,500 mg/kg ☐>3,000 mg/kg
D				☐>2,500 mg/kg ☐>3,000 mg/kg
4. Conclusion ☐ Not compliant _____ samples out of _____are above 2,500 mg/kg sample(s)_____is (are) above 3,000 mg/kg ☐Compliant				
5. Additional comments				
6. Laboratory name				
7. Analysed by		8. Signature		

Case B. Analysis of cybutryne only

	Record number
Sampling and gas chromatography/mass spectrometry analysis	
Date:	**Instrument I.D.**

Sample location	Specimen I.D.	Sample disc	Comments on the samples and sampling procedure	Comments on the sample location
A	A1	☐ abrasive		
	A2	☐ metal		
	A3	☐ others		
	A4	☐ abrasive		
	A5	☐ metal		
	A6	☐ others		
	A7	☐ abrasive		
	A8	☐ metal		
	A9	☐ others		
B	B1	☐ abrasive		
	B2	☐ metal		
	B3	☐ others		
	B4	☐ abrasive		
	B5	☐ metal		
	B6	☐ others		
	B7	☐ abrasive		
	B8	☐ metal		
	B9	☐ others		
C	C1	☐ abrasive		
	C2	☐ metal		
	C3	☐ others		
	C4	☐ abrasive		
	C5	☐ metal		
	C6	☐ others		
	C7	☐ abrasive		
	C8	☐ metal		
	C9	☐ others		
D	D1	☐ abrasive		
	D2	☐ metal		
	D3	☐ others		
	D4	☐ abrasive		
	D5	☐ metal		
	D6	☐ others		
	D7	☐ abrasive		
	D8	☐ metal		
	D9	☐ others		

Average concentration of cybutryne (mg of cybutryne per kg of dry paint)	
Sampled by	Analysed by
Signature	Signature

Case C. Simplified approach to detect organotin and cybutryne

	Record number
Sampling and gas chromatography/mass spectrometry analysis	
Date:	**Instrument I.D.**

Sample location	Specimen I.D.	Sample disc	Comments on the samples and sampling procedure	Comments on the sample location
A	A1	☐ abrasive		
	A2	☐ metal		
	A3	☐ others		
	A4	☐ abrasive		
	A5	☐ metal		
	A6	☐ others		
	A7	☐ abrasive		
	A8	☐ metal		
	A9	☐ others		
B	B1	☐ abrasive		
	B2	☐ metal		
	B3	☐ others		
	B4	☐ abrasive		
	B5	☐ metal		
	B6	☐ others		
	B7	☐ abrasive		
	B8	☐ metal		
	B9	☐ others		
C	C1	☐ abrasive		
	C2	☐ metal		
	C3	☐ others		
	C4	☐ abrasive		
	C5	☐ metal		
	C6	☐ others		
	C7	☐ abrasive		
	C8	☐ metal		
	C9	☐ others		
D	D1	☐ abrasive		
	D2	☐ metal		
	D3	☐ others		
	D4	☐ abrasive		
	D5	☐ metal		
	D6	☐ others		
	D7	☐ abrasive		
	D8	☐ metal		
	D9	☐ others		

Average content of organotin (mg of organotin per kg of dry paint)	

Average concentration of cybutryne (mg of cybutryne per kg of dry paint)	
Sampled by	Analysed by
Signature	Signature

Section 3: Final conclusion
1. Conclusion ☐ Anti-fouling system is compliant with the AFS Convention 2001. ☐ Anti-fouling system is NOT compliant with the AFS Convention 2001.
2. Comments
3. Processed official 3.1 Name 3.2 Date 3.3 Signature
4. Authorized administrator 4.1 Name 4.2 Date 4.3 Signature

***

ANNEX 20

RESOLUTION MEPC.357(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR INSPECTION OF ANTI-FOULING SYSTEMS ON SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on the Control of Harmful Anti- fouling Systems for Ships, 2001, held in October 2001, adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (the AFS Convention) together with four Conference resolutions,

RECALLING FURTHER that article 11(1) of the AFS Convention prescribes that ships to which this Convention applies may, in any port, shipyard, or offshore terminal of a Party, be inspected by officers authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention,

NOTING that article 3(3) of the AFS Convention prescribes that Parties to this Convention shall apply the requirements of this Convention as may be necessary to ensure that no more favourable treatment is given to ships of non-Parties to this Convention,

NOTING ALSO resolution MEPC.208(62) by which the Committee adopted the 2011 Guidelines for Inspection of Anti-fouling Systems on Ships,

RECALLING FURTHER that at its seventy-sixth session it adopted amendments to the AFS Convention to introduce controls on cybutryne through resolution MEPC.331(76),

RECOGNIZING the need for a consequential revision of the guidelines associated with the AFS Convention due to the aforementioned amendments,

NOTING FURTHER that through resolutions MEPC.358(78) and MEPC.356(78) the Organization adopted *2022 Guidelines for survey and certification of anti-fouling systems on ships* and *2022 Guidelines for brief sampling of anti-fouling systems on ships*, respectively, and

HAVING CONSIDERED a revised text of the *Guidelines for inspection of anti-fouling systems on ships* prepared by the Sub-Committee on Pollution Prevention and Response at its ninth session,

1 ADOPTS the *2022 Guidelines for inspection of anti-fouling systems on ships* (2022 Guidelines), the text of which is set out in the annex to this resolution;

2 INVITES Governments to apply the 2022 Guidelines when exercising port State control inspections;

3 RECOMMENDS that the 2022 Guidelines incorporated in the future revision of resolution A.1155(32) on *Procedures for port State control, 2021*;

4 RECOMMENDS that the Guidelines be reviewed on a regular basis;

5 REVOKES resolution MEPC.208(62).

ANNEX

2022 GUIDELINES FOR INSPECTION OF ANTI-FOULING SYSTEMS ON SHIPS

1 INTRODUCTION

1.1 The right of the port State to conduct inspections of anti-fouling systems on ships is laid down in article 11 of the AFS Convention. The guidelines for conducting these inspections are described below.

1.2 Ships of 400 gross tonnage and above engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will be required to undergo an initial survey before the ship is put into service or before the International Anti-fouling System Certificate (IAFS) is issued for the first time; and a survey should be carried out when the anti-fouling systems are changed or replaced.

1.3 Ships of 24 metres in length or more but less than 400 gross tonnage engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will have to carry a Declaration on Anti-fouling Systems signed by the owner or authorized agent. Such declaration shall be accompanied by appropriate documentation (such as a paint receipt or a contractor invoice) or contain appropriate endorsement.

2 INITIAL INSPECTION

2.1 Ships required to carry an IAFS Certificate or Declaration on Anti-Fouling Systems (Parties of the AFS Convention)

2.1.1 The PSCO should check the validity of the IAFS Certificate or Declaration on Anti-Fouling Systems, and the attached Record of Anti-Fouling Systems, if appropriate.

2.1.2 The only practical way to apply paint to the ship's bottom (underwater part) is in a dry dock. This means that the date of application of paint on the IAFS Certificate should be checked by comparing the period of dry-docking with the date on the certificate.

2.1.3 If the paint has been applied during a scheduled dry-dock period, it has to be registered in the ship's logbook. Furthermore, this scheduled dry-docking can be verified by the endorsement date on the (statutory) Cargo Ship Safety Construction Certificate or the Cargo Ship Safety Certificate (SOLAS, regulation I/12(a)(v)) and Passenger Ship Safety Certificate (SOLAS, regulation I/7).

2.1.4 In case of an unscheduled dry-dock period, it could be verified by the registration in the ship's logbook.

2.1.5 It can be additionally verified by the endorsement date on the (Class) Hull Certificate, the dates on the Manufacturer's Declaration or by confirmation of the shipyard.

2.1.6 The IAFS Certificate includes a series of tick boxes indicating for each of the anti-fouling systems, describing the following situations:

.1 if an anti-fouling system controlled under Annex 1 to the AFS Convention has not been applied during or after construction of this ship;

.2 if an anti-fouling system controlled under Annex 1 to the AFS Convention has been applied on this ship previously, but has been removed;

.3 if an anti-fouling system controlled under Annex 1 to the AFS Convention has been applied on this ship previously, but has been covered with a sealer coat;

.4 if an anti-fouling system controlled under Annex 1 of the AFS Convention has been applied on this ship previously, but is not in the external coating layer of the hull or external parts or surfaces on 1 January 2023 (not applicable for organotin); and

.5 if an anti-fouling system controlled under Annex 1 of the AFS Convention was applied on this ship prior to 1 January 2023, but must be removed or covered with a sealer coat no later than 60 months following the last application to the ship of an anti-fouling systems containing cybutryne (not applicable for organotin).

2.1.7 Particular attention should be given to verifying that the survey for issuance of the current IAFS Certificate matches the dry-dock period listed in the ship's log(s)[1] and that only one tick box is marked for each of the substances controlled under Annex 1.

2.1.8 The Record of Anti-Fouling Systems should be attached to the IAFS Certificate and be up to date. The most recent record should agree with the tick box on the front of the IAFS Certificate. The issuing of the IAFS Certificate should be in accordance with regulation 2(3) of Annex 4 of the AFS Convention.

2.2 Ships of non-Parties to the AFS Convention

2.2.1 Ships of non-Parties to the AFS Convention are not entitled to be issued with an IAFS Certificate. Therefore, the PSCO should ask for documentation that contains the same information as in an IAFS Certificate and take this into account in determining compliance with the requirements.

2.2.2 If the existing anti-fouling system is declared not to be controlled under Annex 1 to the Convention, without being documented by an International Anti-Fouling System Certificate, verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary, based on experience gained and the existing circumstances. Documentation for verification could be, for example, MSDS (Material Safety Data Sheets), or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer.

2.2.3 Ships of non-Parties may have Statements of Compliance issued in order to comply with regional requirements, for example, Regulation (EC) 782/2003 as amended by Regulation (EC) 536/2008, which could be considered as providing sufficient evidence of compliance for organotin compounds.

2.2.4 In all other aspects the PSCO should be guided by the procedures for ships required to carry an IAFS Certificate.

[1] This provision, regarding the matching of the survey with the dry-dock period, is not applicable for the survey referred to in operative paragraph 4 of resolution MEPC.331(76).

2.2.5 The PSCO should ensure that no more favourable treatment is applied to ships of non-Parties to the AFS Convention.

3 MORE DETAILED INSPECTION

3.1 Clear grounds

3.1.1 A more detailed inspection may be carried out when there have been clear grounds to believe that the ship does not substantially meet the requirements of the AFS Convention. Clear grounds for a more detailed inspection may be when:

.1 the ship is from a flag of a non-Party to the Convention and there is no AFS documentation;

.2 the ship is from a flag of a Party to the Convention but there is no valid IAFS Certificate;

.3 the painting date shown on the IAFS Certificate does not match the dry-dock period of the ship;

.4 the ship's hull shows excessive patches of different paints; and

.5 the IAFS Certificate is not properly completed.

3.1.2 If the IAFS Certificate is not properly completed, the following questions may be pertinent:

.1 "When was the ship's anti-fouling system last applied?";

.2 "If the anti-fouling system is controlled under Annex 1 to the AFS Convention and was removed, what was the name of the facility and date of the work performed?";

.3 "If the anti-fouling system is controlled under Annex 1 to the AFS Convention and has been covered by a sealer coat, what was the name of the facility and date applied?";

.4 "What is the name of the anti-fouling/sealer products and the manufacturer or distributor for the existing anti-fouling system?"; and

.5 "If the current anti-fouling system was changed from the previous system, what was the type of anti-fouling system and name of the previous manufacturer or distributor?".

3.2 Sampling

3.2.1 A more detailed inspection may include sampling and analysis of the ship's anti-fouling system, if necessary, to establish whether or not the ship complies with the AFS Convention. Such sampling and analysis may involve the use of laboratories and detailed scientific testing procedures.

3.2.2 If sampling is carried out, the time to process the samples cannot be used as a reason to delay the ship.

3.2.3 Any decision to carry out sampling should be subject to practical feasibility or to constraints relating to the safety of persons, the ship or the port (see appendix 1 for sampling procedures; an AFS Inspection Report template for sampling and analysis is attached to the Guidelines).

3.3 Action taken under the AFS Convention

Detention

3.3.1 The port State could decide to detain the ship following detection of deficiencies during an inspection on board.

3.3.2 Detention could be appropriate in any of the following cases:

.1 certification is invalid or missing;

.2 the ship admits it does not comply (thereby removing the need to prove by sampling); and

.3 sampling proves it is non-compliant within the port's jurisdiction.

3.3.3 Further action would depend on whether the problem is with the certification or the anti-fouling system itself.

3.3.4 If there are no facilities in the port of detention to bring the ship into compliance, the port State could allow the ship to sail to another port to bring the anti-fouling system into compliance. This would require an agreement of that port.

Dismissal

3.3.5 The port State could dismiss the ship, meaning that the port State demands that the ship leave port – for example if the ship chooses not to bring the AFS into compliance but the port State is concerned that the ship is leaching tributyltin (TBTs) or cybutryne into its waters.

3.3.6 Dismissal could be appropriate if the ship admits it does not comply or sampling proves it is non-compliant while the ship is still in port. Since this would also be a detainable deficiency the PSCO can detain first and require rectification before release. However, there may not be available facilities for rectification in the port of detention. In this case the port State could allow the ship to sail to another port to bring the anti-fouling system into compliance. This could require the agreement of that port.

3.3.7 Dismissal could be appropriate in any of the following cases:

.1 certification is invalid or missing;

.2 the ship admits it does not comply (thereby removing the need to collect proof by sampling); and

.3 sampling proves that the ship is non-compliant within the port's jurisdiction.

3.3.8 In these cases the ship will probably already have been detained. However, detention does not force the ship to bring the AFS into compliance (only if it wants to depart). In such a situation the port State may be concerned that the ship is leaching TBTs or cybutryne while it remains in its waters.

Exclusion

3.3.9 The port State could decide to exclude the ship to prevent it entering its waters. Exclusion could be appropriate if sampling proves that the ship is non-compliant but the results have been obtained after it has sailed or after it has been dismissed.

3.3.10 Exclusion could be appropriate if sampling proves that the ship is non-compliant but the results have been obtained after it has sailed or after it has been dismissed. Article 11(3) of the AFS Convention only mentions that the "party carrying out the inspection" may take such steps. This means that, if a port State excludes a ship, the exclusion cannot be automatically applied by other port States.

3.3.11 In accordance with the Procedures for Port State Control (resolution A.1155(32), as amended), where deficiencies cannot be remedied at the port of inspection, the PSCO may allow the ship to proceed to another port, subject to any appropriate conditions determined. In such circumstances, the PSCO should ensure that the competent authority of the next port of call and the flag State are notified.

Reporting to the flag State

3.3.12 Article 11(3) of the AFS Convention requires that, when a ship is detained, dismissed or excluded from a port for violation of the Convention, the Party taking such action shall immediately inform the flag Administration of the ship and any recognized organization which has issued a relevant certificate.

4 AFS REPORT TO FLAG STATE IN RESPONSE TO ALLEGED CONTRAVENTIONS

4.1 Article 11(4) of the AFS Convention allows Parties to inspect ships at the request of another Party, if sufficient evidence that the ship is operating or has operated in violation of the Convention is provided. Article 12(2) permits port States conducting the inspection to send the Administration (flag State) of the ship concerned any information and evidence it has that a violation has occurred. Information sent to the flag State is often inadequate for a prosecution. The following paragraphs detail the sort of information needed.

4.2 The report to the authorities of the port or coastal State should include as much as possible the information listed in section 3. The information in the report should be supported by facts which, when considered as a whole, would lead the port or coastal State to believe a contravention had occurred.

4.3 The report should be supplemented by documents such as:

.1 the port State report on deficiencies;

.2 a statement by the PSCO, including their rank and organization, about the suspected non-conforming anti-fouling system. In addition to the information required in section 3, the statement should include the grounds the PSCO had for carrying out a more detailed inspection;

.3 a statement about any sampling of the anti-fouling system including:

.1 the ship's location;

.2 where the sample was taken from the hull, including the vertical distance from the boot topping;

.3 the time of sampling;

.4 person(s) taking the samples; and

.5 receipts identifying the persons having custody and receiving transfer of the samples;

.4 reports of the analyses of any samples including:

.1 the results of the analyses;

.2 the method employed;

.3 reference to or copies of scientific documentation attesting the accuracy and validity of the method employed;

.4 the names of persons performing the analyses and their experience; and

.5 a description of the quality assurance measures of the analyses;

.5 statements of persons questioned;

.6 statements of witnesses;

.7 photographs of the hull and sample areas; and

.8 a copy of the IAFS Certificate, including copies of relevant pages of the Record of Anti-fouling Systems, logbooks, MSDS or similar, declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and other dry dock records pertaining to the anti-fouling system.

4.4 All observations, photographs and documentation should be supported by a signed verification of their authenticity. All certifications, authentications or verifications should be in accordance with the laws of the State preparing them. All statements should be signed and dated by the person making them, with their name printed clearly above or below the signature.

4.5 The reports referred to under paragraphs 2 and 3 of this section should be sent to the flag State. If the coastal State observing the contravention and the port State carrying out the investigation on board are not the same, the port State carrying out the investigation should also send a copy of its findings to the coastal State.

APPENDIX 1

SAMPLING

Considerations related to brief sampling may be found in section 2.1 of the *Guidelines for brief sampling of anti-fouling systems on ships* (resolution MEPC.356(78)).

Any obligation to take a sample should be subject to practical feasibility or to constraints relating to the safety of persons, the ship or the port.

The PSCO should consider the following:

- liaise with the ship on the location and time needed to take samples; the PSCO should verify that the time required will not unduly prevent the loading/unloading, movement or departure of the ship;

- do not expect the ship to arrange safe access but liaise with the ship over the arrangements that the port State competent authority has made, for example boat, cherry picker, staging;

- select sampling points covering representative areas;

- take photographs of the hull, sample areas and sampling process;

- avoid making judgements on the quality of the paint (e.g. surface, condition, thickness, application);

- the need of inviting the ship representative's presence during brief sampling to ensure that the evidence is legally obtained;

- complete and sign the inspection report form together with the included sampling record sheets (to be filled in by the sampler), as far as possible, and leave a copy with the ship as a proof of inspection/sampling;

- inform the next port State where the inspected ship is to call;

- agree with or advise the ship on to whom the ship's copy of the finalized inspection report will be sent in cases when it cannot be completed in the course of the inspection; and

- ensure that receipts identifying the persons having custody and receiving transfer of the samples accompany the samples are filled in to reflect the transfer chain of the samples. PSCOs are reminded that the procedures set in national legislation regarding custody of evidence are not affected by the regulation. These guidelines therefore do not address this issue in detail.

1 Sampling methodologies

It is at the discretion of the port State to choose the sampling methodology. The *Guidelines for brief sampling of anti-fouling systems on ships* adopted by resolution MEPC.356(78) allow that any other scientifically recognized method of sampling and analysis of AFS controlled under the Convention than those described in the appendix to the Guidelines may be used (subject to the satisfaction of the Administration or the port State). The sampling methodology will depend, inter alia, on the surface hardness of the paint, which may vary considerably. The amount of paint mass removed may vary correspondingly.

Based on the onboard International Anti-fouling System Certificate or a Declaration on Anti-fouling System, the port State competent authority would decide if the brief sampling analysis should focus on only organotin, cybutryne or both and apply the appropriate methodology including the number of samples, analysis, and definition of compliance.

Sampling procedures, based on the removal of paint material from the hull, require the determination of paint mass. It is important that procedures used are validated, produce unambiguous results and contain an adequate control.

The competent port State authority can decide to contract specialist companies to carry out sampling. In this case the PSCO should attend the ship during the sampling procedure to ensure the liaison and arrangements mentioned above are in place.

If a specialist company is not used, the port State competent authority should provide appropriate training to the PSCO in the available sampling methods and procedures and ensure that agreed procedures are followed.

The following general terms should be observed:

- the PSCO should choose a number of sample points preferably covering all the representative areas of the hull, but it is desirable to have at least eight (8) sample points equally spaced down and over the length of the hull, if possible divided over PS and SB (keeping in mind that different parts of the hull may be treated with different anti-fouling systems);

- triplicate specimens of paint at each sampling point should be taken in close proximity to each other on the hull (e.g. within 10 cm of each other);

- contamination of the samples should be avoided, which normally includes the wearing of non-sterilized non-powdered disposable gloves of suitable impervious material – e.g. nitrile rubber;

- the samples should be collected and stored in an inert container (e.g. containers should not consist of materials containing organotins and cybutryne or have the capacity to absorb organotins and cybutryne);

- samples should be taken from an area where the surface of the anti-fouling system is intact, clean and free of fouling;

- loose paint chips coming from detached, peeled or blistered hull areas should not be used for sampling;

- samples should not be taken from a heated or area where the paint is otherwise softened (e.g. heavy fuel tanks);

- the underlying layers (primers, sealers, TBT containing AFS) should not be sampled if there is no clear evidence of exposure of extended areas; and

- ships bearing an anti-fouling system that does not contain cybutryne in the external coating layer are not required to be controlled under Annex 1 of the Convention. Such ships carrying an IAFS Certificate indicating the situation described in paragraph 2.1.6.4 of these Guidelines should be deemed compliant with the Convention except if there is a doubt on the validity of the IAFS Certificate.

2 Validity of the sampling

In order to safeguard the validity of the sampling as evidence of non-compliance, the following should be considered:

- only samples taken directly from the hull and free of possible contamination should be used;

- all samples should be stored in containers, marked and annotated on the record sheet. This record sheet should be submitted to the Administration;

- the receipts identifying the persons having custody and receiving transfer of the samples should be filled in and accompany the samples to reflect the transfer chain of the samples;

- the PSCO should verify the validity of the instrument's calibration validity date (according to the manufacturer instruction);

- in cases when a contracted specialist company is used for carrying out sampling, the PSCO should accompany its representative to verify sampling; and

- photographs of the hull, sample areas and sampling process could serve as additional proof.

It is also the case that sampling companies and/or procedures can be certified.

3 Health and safety when sampling

Any obligation to take a sample should be subject to practical feasibility or any constraints relating to the safety of persons, the ship or the port.

The PSCO is advised to ensure their safety taking the following points into account:

- general requirements enforced by the terminal or port authority and national health, safety and environmental policy;

- condition of the ship (ballast condition, ship's operations, mooring, anchorage, etc.);

- surroundings (position of ship, traffic, ships movement, quay operations, barges or other floating vessels alongside);

- safety measures for the use of access equipment (platforms, cherry picker, staging, ladders, railings, climbing harness, etc.), e.g. ISO 18001;

- weather (sea state, wind, rain, temperature, etc.); and

- precautions to avoid falling into the water between the quay and the ship. If in doubt, a lifejacket and if possible a safety line should be worn when sampling.

Any adverse situation encountered during sampling that could endanger the safety of personnel shall be reported to the safety coordinator.

Care should be taken to avoid contact of the removed paint with the skin and the eyes, and no particles should be swallowed or come into contact with foodstuffs. Eating or drinking during sampling is prohibited and hands should be cleaned afterwards. Persons carrying out sampling should be aware that the AFS and solvents or other materials used for sampling may be harmful and appropriate precautions should be taken. Personal protection should be considered by using long sleeve solvent-resistant gloves, dust mask, safety glasses, etc.

Standard (and specific, if applicable) laboratory safety procedures should be followed at all times when undertaking the sampling procedures and subsequent analysis.

4 Conducting analyses

The *Guidelines for brief sampling of anti-fouling systems on ships* envisage a two-stage analysis for organotin analysis for both methods presented in the appendix to the Guidelines. The first stage is a basic test, which can be carried out on site as in the case of Method 2. The second stage is carried out when the first stage results are positive. It is noted that in the IMO Guidelines these stages are referred to as Steps 1 and 2 as in the case of Method 1. It is at the discretion of the port State competent authorities to choose which analysis methods are used.

The method for cybutryne determination is based on a one-step analysis.

The following points are presented for port State consideration:

- approval procedure for the recognition of laboratories meeting ISO 17025 standards or other appropriate facilities should be set up by the port State competent authorities. These procedures should define the recognition criteria. Exchange of information between port States on these procedures, criteria and laboratories/facilities would be beneficial, i.e. for the purposes of exchange of best practices and possible cross-border recognition and provision of services;

- the company that undertakes the analysis and/or samples should comply with national regulations and be independent from paint manufacturers;

- the PSCO carrying out the AFS inspection of a ship should verify the validity of the ISO 17025 certificate and/or the recognition of the laboratory;

- if more time is needed for analysis than available considering the ship's scheduled time of departure, the PSCO shall inform the ship and report the situation to the port State competent authority. However, the time needed for analysis does not warrant undue delay of the ship; and

- PSCOs should ensure completion of the record sheets for the sampling procedure as proof of analysis. In cases when the laboratory procedures prescribe presentation of the analyses' results in a different format, this technical report could be added to the record sheets.

5 The first-stage analysis for organotin

The first-stage analysis serves to detect the total amount of tin in the AFS applied.

It is at the discretion of the port State competent authority to choose the first-stage analysis methodology. However, the use of a portable X-ray fluorescence analyser (mentioned under

Method 2) or any other scientifically justified method allowing the conduction of first-stage analyses on site could be considered best practice.

The port State competent authority has to decide whether the first-stage analysis should be carried out by PSCOs or by contracted companies.

The port State competent authority could provide PSCOs with this equipment (e.g. portable X-ray fluorescence analyser) and provide the appropriate training.

6 The second-stage analysis for organotin

The second-stage (final) analysis is used to verify whether or not the AFS system complies with the Convention requirements, i.e. whether organotin compounds are present in the AFS at a level which would act as a biocide.

The port State could consider implementing only a second-stage analysis.

It is at the discretion of the Authority to choose the second-stage analysis methodology. In this respect it is hereby noted that the second-stage analysis methodology for sampling Method 2 provided in the Guidelines is only tentative and "should be thoroughly reviewed by experts based on scientific evidence" (section 5.1 of Method 2).

7 One-stage analysis for cybutryne

For cybutryne a one-stage analysis is described in both Method 1 and Method 2 of the brief sampling guidelines. The specimens are to be analysed in a GC-MS analysis. The procedure is the same for both methods.

8 One-stage analysis for cybutryne and organotin

For cybutryne and organotin a one-stage analysis is described in both Method 1 and Method 2 of the brief sampling guidelines. The specimens are to be analysed in a GC-MS analysis.

9 Conclusions on compliance

The Authority should only make conclusions on compliance based on the second-stage analysis of the sample (organotin). In case the results indicate non-compliance at that stage, there are clear grounds to take further steps.

For cybutryne the authority could make conclusions on compliance based on the one-stage analysis.

If considered necessary, more thorough sampling can be also carried out in addition or instead of brief sampling.

Sampling results should be communicated as soon as possible to the ship (as part of the inspection report) and in the case of non-compliance also to the flag State and recognized organization acting on behalf of the flag State if relevant.

Authorities should, in accordance with section 5.2 of the *Guidelines for brief sampling of anti-fouling systems on ships*, develop and adopt procedures to be followed for those cases where compliance with acceptable limits or lack thereof is unclear, considering additional sampling or other methodologies for sampling.

FORM S/1

REPORT OF INSPECTION OF A SHIP'S ANTI-FOULING SYSTEM (AFS)

SHIP PARTICULARS

1. Name of ship: **2. IMO number:**

3. Type of ship: **4. Call sign:**

5. Flag of ship: **6. Gross tonnage:**

7. Date keel laid / major conversion commenced:

INSPECTION PARTICULARS

8. Date & time:

9. Name of facility:
(dry dock, quay, location)

Place & country:

10. Areas inspected ☐Ship's logbook ☐Certificates ☐Ship's hull

11. Relevant certificate(s)

	(a) title	(b) issuing authority	(c) dates of issue
1.	*IAFS Certificate*		
2.	*Record of AFS*		
3.	*Declaration of AFS*		
4.			

12. Dry-dock period AFS applied:

13. Name of facility AFS applied:

14. Place & country AFS applied:

15. AFS samples taken ☐No ☐Yes Nature of sampling: ☐Brief ☐Extent

16. Reason for sampling of AFS:

17. Record sheet attached :
(country-code / IMO number / dd-mm-yy)

18. Copy to: ☐ PSCO ☐ Flag State ☐ Recognized organization
☐ Head office ☐ Master ☐ Other:

PORT STATE PARTICULARS

Reporting authority: _____ District office _____

Address: _____

_____

Telephone/Fax/Mobile: _____

E-mail: _____

Name:
(duly authorized inspector of reporting authority) _____

Date: _____ Signature: _____

FORM S/2

RECORD SHEET FOR THE SAMPLING PROCEDURE FOR COMPLIANCE WITH THE CONVENTION IN TERMS OF THE PRESENCE OF ORGANOTIN AND/OR CYBUTRYNE ACTING AS A BIOCIDE IN ANTI-FOULING SYSTEMS ON SHIP HULLS

RECORD NUMBER		(country-code / IMO number / dd-mm-yy)

Name of ship _____ IMO number: _____

SAMPLING PARTICULARS

1.	**Date & time initiated:**		**2.**	**Date & time completed**
3.	**Name of paint manufacturer:**			
4.	**AFS product name & colour:**			
5.	**Reason for sampling:**	☐ **Port State control**	☐ **Survey & certification**	☐ **Other flag State compliance inspection**
6.	**Sampling method**			
7.	**Hull areas sampled:**	☐ Port side	☐ Starboard side	☐ Bottom
	Number of sampling points:			
8.	**Back-up samples' storage location:** *(e.g. port State inspection office)*			
9.	☐ **Photos taken of the sample points**		Comments:	
10.	☐ **Paint samples (wet)**		Comments:	
11.	**Case A - Analysis of organotin only**			
	☐ First-stage analysis for organotin		Comments:	
	☐ Second-stage analysis for organotin		Comments:	
12.	**Case B - Analysis of cybutryne only**		Comments:	
	One-stage analysis for cybutryne			
13.	**Case C - Simplified approach to detect organotin and cybutryne**			
	One-stage analysis for organotin and cybutryne			
14.	**Comments concerning sampling procedure**			
15.	**Sampling company**		**Name**	
			Date	
			Signature	

PORT STATE PARTICULARS

Reporting authority: _____ **District office:** _____

Address: _____

_____

Telephone/Fax/ Mobile: _____

E-mail: _____

Name:
(duly authorized inspector of reporting authority) _____

Date: **Signature:**

FORM S/3

RECORD NUMBER	

Name of ship _____ IMO number: _____

METHOD 1 ANALYSIS

Case A - Analysis of organotin only

1.	**Instrument I.D.:**			**Calibration expire date:**		
2.	**Specimens 'A'** results			Total number of specimens 'A' analysed:		
3.	**No.**	**Sample location** *(frame & distance from boot topping)*	**mg Sn/kg**	**No.**	**Sample location** *(frame & distance from boot topping)*	**mg Sn/kg**
	1			**9**		
	2			**10**		
	3			**11**		
	4			**12**		
	5			**13**		
	6			**14**		
	7			**15**		
	8			**16**		
4.	**Results**					
	Number of specimens exceeding 2,500 mg/kg:				☐Step 2 required	
	1 or more specimens exceeding 3,000 mg/kg ☐ Yes ☐ No				☐Compliance, no further analysis	
5.	**Additional comments concerning analysis of results from Specimens 'A'**					
6.	**Company**			**Name:** **Date:** **Signature:**		

7.	**Instrument I.D.:**				**Calibration expire date:**			
8.	**Specimens 'B'** results				Total number of specimens "B" analysed:			
9.	**No.**	**organotin** (mg Sn/kg) as Sn	**No.**	**organotin** (mg Sn/kg) as Sn	**No.**	**organotin** (mg Sn/kg) as Sn	**No.**	**organotin** (mg Sn/kg) as Sn
	1		**5**		**9**		**13**	
	2		**6**		**10**		**14**	
	3		**7**		**11**		**15**	
	4		**8**		**12**		**16**	

10.	**Results** Number of specimens exceeding 2,500 mg/kg: 1 or more specimens exceeding 3,000 mg/kg ☐ Yes ☐ No	☐Non-compliance assumed ☐Compliance assumed
11.	**Additional comments concerning analysis of results from Specimens 'B'**	
12.	**Company**	**Name:** **Date:** **Signature:**

Case B - Analysis of cybutryne only

Gas chromatography/mass spectrophotometry (GC/MS) analysis

1.	**Instrument I.D.:**		**Calibration expire date:**	
2.	**Specimens 'C'** results			
	Total number of specimens 'C' analysed by GC-MS:			
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint):			
3.	**Conclusions** The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint			☐ Yes ☐ No. Compliance assumed.
4.	**Additional comments concerning analysis of results from Specimens 'C'**			
5.	**Company**		**Name:** **Date:** **Signature:**	

Case C - Simplified approach to detect organotin and cybutryne

Gas chromatography/mass spectrophotometry (GC/MS) analysis

1.	**Instrument I.D.:**		**Calibration expire date:**	
2.	**Specimens 'C'** results			
	Total number of specimens 'C' analysed by GC-MS:			
	Average concentration of organotin (mg Sn/kg of dry paint)			
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint):			
3.	**Conclusions**			
	The average concentration of organotin exceeds the threshold of 3,000 mg Sn per kg of dry paint		☐ Yes ☐ No. Compliance assumed.	
	The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint		☐ Yes ☐ No. Compliance assumed.	
4.	**Additional comments concerning analysis of results from Specimens 'C'**			
5.	**Company**		**Name:** **Date:** **Signature:**	

FORM S/4

RECORD NUMBER	

Name of ship _____ IMO number: _____

METHOD 2 ANALYSIS

Case A - Analysis of organotin only

First stage

1.	**Instrument I.D.:**	**Calibration expire date:**

2.	**Sample location** (frame & distance from boot topping)	**Specimen I.D.**	**Sample disc**	**Content of tin (mg/ kg)**	**max**	**min**	**Average**
A		A1	☐ abrasive				
		A2	☐ metal				
		A3	☐ others				Average
		A4	☐ abrasive				
		A5	☐ metal				mg/kg
		A6	☐ others				☐>2,500 mg/kg
		A7	☐ abrasive				☐>3,000 mg/kg
		A8	☐ metal				
		A9	☐ others				
B		B1	☐ abrasive				
		B2	☐ metal				
		B3	☐ others				Average
		B4	☐ abrasive				
		B5	☐ metal				mg/kg
		B6	☐ others				☐>2,500 mg/kg
		B7	☐ abrasive				☐>3,000 mg/kg
		B8	☐ metal				
		B9	☐ others				
C		C1	☐ abrasive				
		C2	☐ metal				
		C3	☐ others				Average
		C4	☐ abrasive				
		C5	☐ metal				mg/kg
		C6	☐ others				☐>2,500 mg/kg
		C7	☐ abrasive				☐>3,000 mg/kg
		C8	☐ metal				
		C9	☐ others				
D		D1	☐ abrasive				
		D2	☐ metal				
		D3	☐ others				Average
		D4	☐ abrasive				
		D5	☐ metal				mg/kg

		D6	☐ others				☐>2,500 mg/kg
		D7	☐ abrasive				☐>3,000 mg/kg
		D8	☐ metal				
		D9	☐ others				
3.	**Results first-stage analysis** ☐ ____ samples out of ____ are above 2,500 mg/kg ☐ sample(s) ____ is (are) above 3,000 mg/kg					☐Compliant ☐Second stage required	
4.	**Comments**						
5.	**Company**		Name Date Signature				

Second stage

1.	**Instrument I.D.:**	**Calibration expire date:**

2.	**Specimen used** *(Specimen I.D.)*	**Content of tin first stage** *(XRF analysis) (mg Sn/kg)*	**Content of tin second stage** *(as organotin) (mg Sn/kg)*	**Compliance**
A				
				☐>2,500 mg/kg
				☐>3,000 mg/kg
B				
				☐>2,500 mg/kg
				☐>3,000 mg/kg
C				
				☐>2,500 mg/kg
				☐>3,000 mg/kg
D				
				☐>2,500 mg/kg
				☐>3,000 mg/kg
3.	**Results second stage analysis** ☐ ____ samples out of ____ are above 2,500 mg/kg (dry paint) ☐sample(s) ____ is (are) above 3,000 mg/kg (dry paint)		☐ Compliant ☐ Not compliant	
4.	**Comments**			
5.	**Company**	Name Date Signature		

Case B – Analysis of cybutryne only

Gas chromatography/mass spectrophotometry (GC/MS) analysis for cybutryne determination

1.	**Instrument I.D.:**	**Calibration expire date:**

2.	**Results of GC-MS analysis**		
	Average concentration (mg of cybutryne per kg of dry paint)		☐ Compliant ☐ Not compliant
3.	**Comments**		
4.	**Company**	Name Date	

Case C – Simplified approach to detect organotin and cybutryne

Gas chromatography/mass spectrophotometry (GC/MS) analysis for cybutryne and organotin determination

1.	**Instrument I.D.:**	**Calibration expire date:**

2.	**Results of GC-MS analysis**		
	Average concentration of organotin (mg Sn/kg)		☐ Compliant ☐ Not compliant
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint)		☐ Compliant ☐ Not compliant
3.	**Comments**		
4.	**Company**	Name Date	

PORT STATE PARTICULARS

Reporting authority: District office:

Address: _____

_____

Telephone/Fax/Mobile: _____

E-mail: _____

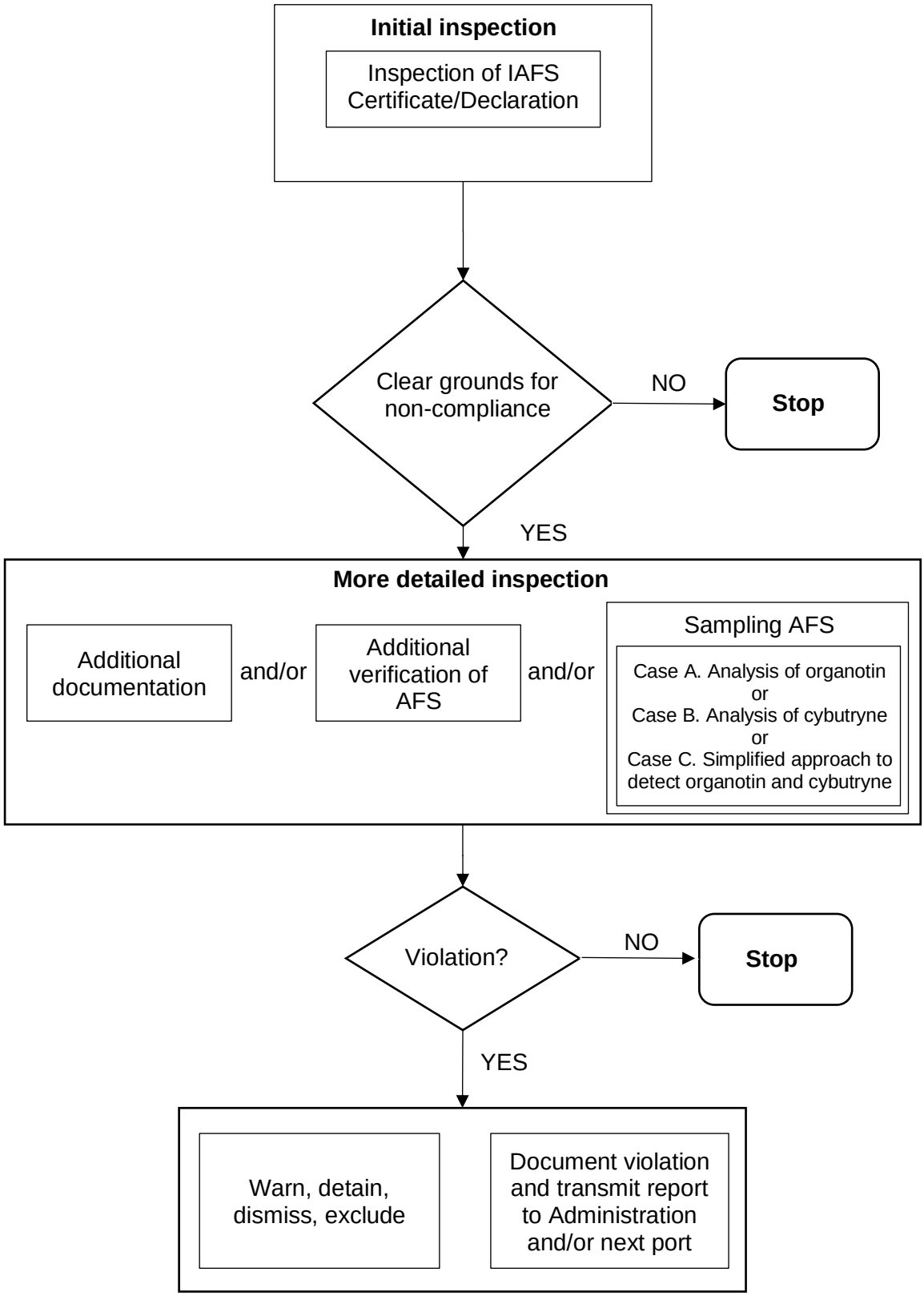
Name: _____

(duly authorized inspector of reporting authority) _____

Date: _____ Signature: _____

APPENDIX 2

AFS INSPECTION PROCESS



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ANNEX 21

RESOLUTION MEPC.358(78)
(adopted on 10 June 2022)

2022 GUIDELINES FOR SURVEY AND CERTIFICATION OF ANTI-FOULING SYSTEMS ON SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by the international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on the Control of Harmful Anti-fouling Systems for Ships, 2001, held in October 2001, adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (the AFS Convention) together with four Conference resolutions,

NOTING that article 10 of the AFS Convention prescribes that ships shall be surveyed and certified in accordance with the regulations of annex 4 of the Convention,

NOTING ALSO that regulation 1(4)(a) of annex 4 of the AFS Convention refers to the guidelines to be developed by the Organization,

NOTING FURTHER resolution MEPC.195(61) by which the Committee adopted the *2010 Guidelines for survey and certification of anti-fouling systems on ships*,

RECALLING FURTHER that at its seventy-sixth session it adopted amendments to the AFS Convention to introduce controls on cybutryne through resolution MEPC.331(76),

RECOGNIZING the need for a consequential revision of the guidelines associated with the AFS Convention due to the aforementioned amendments,

NOTING FURTHER that through resolutions MEPC.356(78) and MEPC.357(78) the Organization adopted *2022 Guidelines for brief sampling of anti-fouling systems on ships* and *2022 Guidelines for inspection of anti-fouling systems on ships*, respectively, and

HAVING CONSIDERED a revised text of the *Guidelines for survey and certification of anti-fouling systems on ships* prepared by the Sub-Committee on Pollution Prevention and Response at its ninth session,

1 ADOPTS the *2022 Guidelines for survey and certification of anti-fouling systems on ships* (2022 Guidelines), the text of which is set out in the annex to this resolution;

2 INVITES Governments to apply the 2022 Guidelines as soon as possible, or when the Convention becomes applicable to them;

3 RECOMMENDS that the Guidelines be reviewed on a regular basis;

4 REVOKES resolution MEPC.195(61).

ANNEX

2022 GUIDELINES FOR SURVEY AND CERTIFICATION OF ANTI-FOULING SYSTEMS ON SHIPS

1 General

1.1 Article 10 of the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, hereinafter referred to as "the Convention", prescribes that ships shall be surveyed and certified in accordance with the regulations of annex 4 to the Convention. The purpose of this document is to provide the *Guidelines for surveys and certification of anti-fouling systems on ships* referred to in regulation 1(4)(a) of annex 4, hereinafter referred to as the "Guidelines", that will assist the Administrations and recognized organizations in the uniform application of the provisions of the Convention and assist companies, shipbuilders, manufacturers of anti-fouling systems, as well as other interested parties to understand the process of the surveys and issuance and endorsement of the certificates.

1.2 These Guidelines provide the procedures for survey to ensure that a ship's anti-fouling system complies with the Convention, and those necessary for issuance and endorsement of an International Anti-fouling System Certificate. A guidance for compliant anti-fouling systems is given in appendix I to this annex.

1.3 These Guidelines apply to surveys of ships of 400 gross tonnage and above engaged in international voyages, excluding fixed or floating platforms, floating storage units (FSUs), and floating production storage and off-loading units (FPSOs), as specified in regulation 1(1) of annex 4 to the Convention.

1.4 The sole purpose of the survey activities described in these Guidelines is to verify compliance with the provisions of the Convention. Consequently, such surveys do not relate to any aspect not regulated by the Convention even if such aspects relate to the performance of an anti-fouling system on the hull of a ship, including the quality of workmanship during the application process.

1.5 In the event that a new survey method is developed, or in the event that the use of a certain anti-fouling system is prohibited and/or restricted, or in the light of experience gained, these Guidelines may need to be revised in the future.

2 Definitions

For the purposes of these guidelines:

2.1 "Administration" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of a State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the seabed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.

2.2 "Anti-fouling system" means a coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms.

2.3 "Company" means the owner of the ship or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibilities imposed by the International Safety Management (ISM) Code.

2.4 "Gross tonnage" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in annex 1 to the International Convention on Tonnage Measurement of Ships, 1969, or any successor Convention.

2.5 "International voyage" means a voyage by a ship entitled to fly the flag of one State to or from a port, shipyard, or offshore terminal under the jurisdiction of another State.

2.6 "Length" means the length as defined in the International Convention on Load Lines, 1966, as modified by the Protocol of 1988 relating thereto, or any successor Convention.

2.7 "Ship" means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs).

3 General requirements for surveys

3.1 An initial survey covering at least the scope as in paragraph 1 of appendix II to these Guidelines should be held before the ship is put into service and the International Anti-fouling System Certificate required under regulation 2 or 3 of annex 4 to the Convention is issued for the first time.

3.2 A survey should be carried out whenever an anti-fouling system is changed or replaced. Such surveys should cover the scope as in paragraph 2 of appendix II to these Guidelines.

3.3 A major conversion affecting the anti-fouling system of a ship may be considered as a newbuilding as determined by the Administration.

3.4 Repairs generally do not require a survey. However, repairs affecting approximately twenty-five (25) per cent or more of the anti-fouling system should be considered as a change or replacement of the anti-fouling system.

3.5 A non-compliant anti-fouling system controlled under annex 1 to the Convention that undergoes repair must be repaired or replaced with a compliant anti-fouling system.

4 Request for survey

4.1 Prior to any survey, a request for survey should be submitted by the Company to the Administration, or to a recognized organization, along with the ship's data required in the International Anti-fouling System Certificate as listed:

.1 Name of ship

.2 Distinctive number or letters

.3 Port of registry

.4 Gross tonnage

.5 IMO number.

4.2 A request for survey should be supplemented by a declaration and supporting information from the anti-fouling system manufacturer, confirming that the anti-fouling system

applied, or intended to be applied to the ship is in compliance with the requirements of the Convention (with an identification of the version of the Convention referred to). Such declaration should provide the following information contained in the Record of Anti-fouling System, as can be found in appendix I to annex 4 to the Convention:

.1 Type of anti-fouling system*.

.2 Name of anti-fouling system manufacturer.

.3 Name and colour of anti-fouling system.

.4 Active ingredient(s) and their Chemical Abstract Service Registry Number(s) (CAS number(s)).

4.3 Information required by the surveyor regarding compliance of the product with the Convention should be found in a declaration from the anti-fouling system manufacturer which may be provided on the anti-fouling system container and/or on supportive documentation (such as Material Safety Data Sheets (MSDS), or similar). A link between the supportive documentation and the relevant container should exist.

5 Conduct of surveys

5.1 **Initial surveys** (Surveys in accordance with regulation 1(1)(a) of annex 4 to the Convention)

.1 The initial survey should verify that all applicable requirements of the Convention are complied with.

.2 As part of the survey, it should be verified that the anti-fouling system specified by the documentation submitted with the request for survey complies with the Convention. The survey should include verification that the anti-fouling system applied is identical to the system specified in the request for survey.

.3 Taking into account experience gained and the prevailing circumstances, the initial survey should include the tasks as listed in paragraph 1 of appendix II to these Guidelines.

.4 The verification tasks set out in paragraph 5.1.2 should be conducted at any time, either before, during, or after the anti-fouling system has been applied to the ship, as deemed necessary to verify compliance. No checks or tests must affect the integrity, structure or operation of the anti-fouling system.

5.2 **Surveys when the anti-fouling systems are changed or replaced** (Surveys in accordance with regulation 1(1)(b) of Annex 4 to the Convention)

.1 If the existing anti-fouling system is confirmed by an International Anti-fouling System Certificate not to be controlled under annex 1 to the Convention, the provisions described in paragraphs 5.1 and 5.2 apply.

* Examples of suitable wording could be: Organotin-free self- polishing type, Organotin-free ablative type, Organotin-free conventional, Biocide-free silicon type paint, others. In the case of an anti-fouling system containing no active ingredients, the words "biocide-free" should be used.

.2 If the existing anti-fouling system is declared not to be controlled under annex 1 of the Convention, without being documented by an International Anti-fouling System Certificate, a verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary based on experience gained and the existing circumstances. Documentation for verification could, for example, be MSDS, or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer. To verify the new anti-fouling system, the provisions described in paragraph 5.1 apply.

.3 If the existing anti-fouling system has been removed, the removal should be verified in addition to the provisions described in paragraph 5.1.

.4 If a sealer coat has been applied, a verification should be carried out to confirm that the name, type and colour of the sealer coat applied to the ship match those specified in the request for survey, and that the existing anti-fouling system has been covered with that sealer coat. Additionally the provisions described in paragraph 5.1 apply.

.5 An existing anti-fouling system controlled under annex 1 of the Convention, containing organotin:

.1 applied on/after 1 January 2003 or a later date if specified by the Administration, should be removed in accordance with paragraph 5.2.3;

.2 applied before 1 January 2003 or a later date if specified by the Administration, must have been removed or covered by a sealer coat in accordance with paragraph 5.2.4, not later than 60 months after its application and latest on 1 January 2008.

.6 An existing anti-fouling system controlled under annex 1 of the Convention, containing cybutryne in the external coating layer:

.1 applied before 1 January 2023, should be removed or covered by a sealer coat in accordance with paragraph 5.2.4.

.7 The survey should include the tasks as listed in paragraph 2 of appendix II to these Guidelines.

5.3 **Surveys of existing ships requesting only an International Anti-fouling System Certificate**

.1 If the existing anti-fouling system is declared not to be controlled under Annex 1 to the Convention, a verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary based on experience gained and the existing circumstances. Such documentation could be MSDS or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer. If this information raises no reasonable doubt that the system applied is compliant with annex 1 of the Convention, the International Anti-fouling System Certificate may be issued on this basis.

6 Issuing or endorsing the International Anti-fouling System Certificate

6.1 The International Anti-fouling System Certificate along with the Record of Anti-fouling Systems should be:

.1 issued upon satisfactory completion of the initial survey;

.2 issued upon acceptance of another Party's International Anti-fouling System Certificate; or

.3 endorsed upon satisfactory completion of a survey for change or replacement of an anti-fouling system.

APPENDIX I

Guidance for compliant anti-fouling systems

1 For the purpose of compliance with annex 1 to the Convention in respect to organotin compounds

Small quantities of organotin compounds acting as a chemical catalyst (such as mono- and di-substituted organotin compounds) are allowed, provided that they are present at a level which does not provide a biocidal effect to the coating. On a practical level, when used as a catalyst, an organotin compound should not be present above 2,500 mg total tin per kilogram of dry paint.

2 For the purpose of compliance with annex 1 to the Convention in respect to cybutryne

2.1 When samples are directly taken from the hull

It could be expected that the distribution of the remaining anti-fouling paint on the hull surface is not uniform. Due to hull design and consequent action of the sea water during the service life of the paint, the paint may not have uniformly eroded, some parts in the hull may still have some paint, other parts may not have any paint left. Therefore, the brief samples taken from the hull surface should be representative of the anti-fouling system applied. Average values of cybutryne should not be present above 1,000 mg of cybutryne per kilogram of dry paint. Below this level any remaining cybutryne is expected not to create a negative impact to the marine environment.

2.2 When samples are taken from wet paint containers

Cybutryne should not be present at a level which does provide a biocidal effect (i.e. average values of cybutryne should not be present above 200 mg of cybutryne per kilogram of dry paint).

APPENDIX II

Guidance for surveys under the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS 2001)

(FI) 1 Initial survey (AFS 2001, annex 4, regulation 1(1)(a))

(FI) 1.1 confirming that a Declaration and supporting information from the anti-fouling system manufacturer, specifying that the anti-fouling system and, where applicable, the sealer coat intended to be applied to the ship are in compliance with the requirements of the Convention, is provided (AFS 2001);

(FI) 1.2 verifying that the relevant containers of the anti-fouling system show same data as the supporting information (AFS 2001);

(FI) 1.3 confirming that the existing anti-fouling system, if controlled under annex 1 of the Convention, has been removed or that a sealer coat has been applied (AFS 2001);

(FI) 1.4 verifying, where applicable, that the relevant containers of the sealer coat applied show same data as the supporting information (AFS 2001);

(FI) 1.5 where supporting information from the anti-fouling system manufacturer is not available or does not provide sufficient information, sampling or testing or other checks conducted on site, of the anti-fouling system;

(FI) 1.6 for ships of 24 m or more in length but less than 400 GT and engaged in international voyages, confirming that the owner or owner's authorized agent has completed a Declaration on Anti-fouling System (AFS 2001);

(FR) 2 Surveys when anti-fouling systems are changed or replaced (AFS 2001, annex 4, regulation 1(1)(b));

(FR) 2.1 confirming that a Declaration and supporting information from the anti-fouling system manufacturer, specifying that the anti-fouling system and, where applicable, the sealer coat intended to be applied to the ship are in compliance with the requirements of the Convention, is provided (AFS 2001);

(FR) 2.2 verifying that the relevant containers of the anti-fouling system show same data as the supporting information (AFS 2001);

(FR) 2.3 confirming that the existing anti-fouling system, if controlled under annex 1 of the Convention, has been removed or that a sealer coat has been applied (AFS 2001);

(FR) 2.4 verifying, where applicable, that the relevant containers of the sealer coat applied show same data as the supporting information (AFS 2001);

(FR) 2.5 for ships of 24 m or more in length but less than 400 GT, confirming that the owner or owner's authorized agent has completed a Declaration on Anti-fouling System (AFS 2001);

(FR) 2.6 endorsement of the Record of Anti-fouling Systems.

***

ANNEX 22

DRAFT AMENDMENTS TO MARPOL ANNEXES I, II AND IV

(Regional reception facilities within Arctic waters)

MARPOL ANNEX I

REGULATIONS FOR THE PREVENTION OF POLLUTION BY OIL

Regulation 38 – Reception facilities

1 Paragraph 4 is replaced by the following:

"4 The following States may satisfy the requirements in paragraphs 1 to 3 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.*

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

2 Paragraph 6 is replaced by the following:

"6 The following States may satisfy the requirements in paragraph 5 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

* Refer to the *2012 Guidelines for the development of a Regional Reception Facilities Plan* (resolution MEPC.221(63)), as amended by resolution MEPC.[…](79).

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.*

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

Appendix II

Form of IOPP Certificate and Supplements

Form B of the Supplement to the International Oil Pollution Prevention Certificate

RECORD OF CONSTRUCTION AND EQUIPMENT FOR OIL TANKERS

3 The title of section 5 is replaced by the following:

"**Section 5 – Construction (regulations 18, 19, 20, 21, 22, 23, 26, 27, 28 and 33)**"

MARPOL ANNEX II

REGULATIONS FOR THE CONTROL OF POLLUTION BY NOXIOUS LIQUID SUBSTANCES IN BULK

Regulation 18 – Reception facilities and cargo unloading terminal arrangements

4 Paragraph 3 is replaced by the following:

"3 The following States may satisfy the requirements in paragraphs 1, 2 and 6 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.*

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

MARPOL ANNEX IV

REGULATIONS FOR THE PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS

Regulation 12 – Reception facilities

5 Paragraph 2 is replaced by the following:

"2 The following States may satisfy the requirements in paragraphs 1 to 3 of this regulation through regional arrangements when, because of those States' unique circumstances, such arrangements are the only practical means to satisfy these requirements:

.1 small island developing States; and

.2 States the coastline of which borders on Arctic waters, provided that regional arrangements shall cover only ports within Arctic waters of those States.

Parties participating in a regional arrangement shall develop a Regional Reception Facilities Plan, taking into account the guidelines developed by the Organization.*

The Government of each Party participating in the arrangement shall consult with the Organization, for circulation to the Parties of the present Convention:

.1 how the Regional Reception Facilities Plan takes into account the guidelines;

.2 particulars of the identified Regional Ships Waste Reception Centres; and

.3 particulars of those ports with only limited facilities."

***

* Refer to the *2012 Guidelines for the development of a Regional Reception Facilities Plan* (resolution MEPC.221(63)), as amended by resolution MEPC.[…](79).

* Refer to the *2012 Guidelines for the development of a Regional Reception Facilities Plan* (resolution MEPC.221(63)), as amended by resolution MEPC.[…](79).

ANNEX 23

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(Mediterranean Sea SO_x Emission Control Area)

Regulation 14
Sulphur oxides (SO_x) and particulate matter

Requirements within emission control areas

1 At the end of sub-paragraph 3.3, the word "and" is deleted. At the end of sub-paragraph 3.4, "." is replaced by ";" and the word "and" is added after ";". A new sub-paragraph 3.5 is added as follows:

".5 the Mediterranean Sea Emission Control Area, which means the area described by the coordinates provided in appendix VII to this Annex."

Appendix VII
Emission control areas (regulations 13.6 and 14.3)

2 A new paragraph 4 is inserted, as follows:

"4 In respect of the application of regulation 14.4, the Mediterranean Sea SO_x Emission Control Area includes all waters bounded by the coasts of Europe, Africa and Asia, and is described by the following coordinates:

.1 the western entrance to the Straits of Gibraltar, defined as a line joining the extremities of Cape Trafalgar, Spain (36°11'N, 6°02'W) and Cape Spartel, Morocco (35°48'N, 5°55'W);

.2 the Strait of Canakkale, defined as a line joining Mehmetcik Burnu (40°03'N, 26°11'E) and Kumkale Burnu (40°01'N, 26°12'E); and

.3 the northern entrance to the Suez Canal excluding the area enclosed by geodesic lines connecting points 1-4 with the following coordinates:

Point	Latitude	Longitude
1	31˚29'N	32°16'E
2	31˚29'N	32°28'25"E
3	31˚14'N	32°32'37"E
4	31˚14'N	32°16'E

"

***

ANNEX 24

BIENNIAL STATUS REPORT OF THE PPR SUB-COMMITTEE FOR THE 2022-2023 BIENNIUM

Sub-Committee on Pollution Prevention and Response (PPR)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.11	Measures to harmonize port State control (PSC) activities and procedures worldwide	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Ongoing		MEPC 77/16, paras. 10.1 to 10.6
1. Improve implementation	1.15	Revised guidance on methodologies that may be used for enumerating viable organisms	2022	MEPC	PPR		Completed		PPR 7/22, section 5; PPR 9/21, section 5; MEPC 78/17 para. 4.8
1.Improve implementation	1.21	Review of the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (resolution MEPC.207(62))	2023	MEPC	PPR		In progress		PPR 8/13, section 4; PPR 9/21, section 7
1. Improve implementation	1.23	Evaluation and harmonization of rules and guidance on the discharge of discharge water from EGCS into the aquatic environment, including conditions and areas	~~2022~~ 2025	MEPC	PPR		Extended		PPR 9/21, section 10; MEPC 78/17, paras. 5.9 to 5.18 and 14.14
Note: MEPC 78 agreed to: extend the target completion year to 2025; not include the output in the provisional agenda for PPR 10; and to consider reinstating the output in the provisional agenda of a future session of the Sub-Committee (after PPR 10) subject to further proposals to the Committee on part 3 (regulatory matters) and part 4 (database of substances) of the scope of work of the output by interested Member States and international organizations.									

Sub-Committee on Pollution Prevention and Response (PPR)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.26	Revision of MARPOL Annex IV and associated guidelines ~~to introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants~~	2023	MEPC	III/HTW	PPR	In progress		PPR 9/21, section 14; MEPC 78/17, paras. 14.7 to 14.11
Note: MEPC 78 agreed to amend the title of the existing output 1.26 to "Revision of MARPOL Annex IV and associated guidelines", and that specific work to be carried out be captured in the scope of work, i.e. (1) introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants; (2) consider amending the definition of "person" as provided in regulation 1 of MARPOL Annex IV, taking into account persons other than crew and passengers; and (3) prohibit fitting comminuting and disinfecting systems (CDS) on new ships.									
2. Integrate new and advancing technologies in the regulatory framework	2.3	Amendments to the IGF Code and development of guidelines for low-flashpoint fuels	Continuous	MSC	HTW / PPR / SDC / SSE	CCC	No work requested		MSC 104/18, paragraph 15.16
2. Integrate new and advancing technologies in the regulatory framework	2.13	Review of the IBTS Guidelines and amendments to the IOPP Certificate and Oil Record Book	2023	MEPC	PPR		No work requested		MEPC 77/16, paragraphs 9.1 and 9.2; MEPC 78/17, paras. 9.11 to 9.19
2. Integrate new and advancing technologies in the regulatory framework	2.15	Development of amendments to MARPOL Annex VI and the NO_X Technical Code on the use of multiple engine operational profiles for a marine diesel engine	2023	MEPC	PPR		In progress		PPR 9/21, section 11; MEPC 78/17, paras. 5.5 to 5.8

Sub-Committee on Pollution Prevention and Response (PPR)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
2. Integrate new and advancing technologies in the regulatory framework	2.18	Standards for shipboard gasification of waste systems and associated amendments to regulation 16 of MARPOL Annex VI	2023	MEPC	PPR		In progress		PPR 9/21, section 9
2. Integrate new and advancing technologies in the regulatory framework	2.19	Revision of guidelines associated with the AFS Convention as a consequence of the introduction of controls on cybutryne	2022	MEPC	PPR		Completed		PPR 9/21, section 6; MEPC 78/17, paras. 9.7 and 9.8
3. Respond to climate change	3.3	Reduction of the impact on the Arctic of emissions of black carbon from international shipping	2023	MEPC	PPR		In progress		PPR 9/21, section 8
4. Engage in ocean governance	4.3	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships	2023	MEPC	PPR/III/HTW		In progress		PPR 9/21, section 15; MEPC 78/17, section 8
6. Address the human elements	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	PPR	Ongoing		MEPC 78/17, paras. 10.4 and 13.1
6. Address the human elements	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	PPR	Ongoing		MSC 100/20, paragraphs 10.3 to 10.6 and 17.25; PPR 9/21, section 12
6. Address the human elements	6.16	Development of an operational guide on the response to spills of hazardous and noxious substances (HNS)	~~2022~~ 2023	MEPC	PPR		Extended		PPR 9/21, section 4

Sub-Committee on Pollution Prevention and Response (PPR)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
Note: MEPC 78 agreed to extend the TCY to 2023.									
7. Ensure regulatory effectiveness	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		PPR 9/21, section 16; MEPC 78/17, section 4, and paras. 5.6 and 5.7
7. Ensure regulatory effectiveness	7.3	Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code	Continuous	MEPC	PPR		Ongoing		PPR 9/21, section 3; MEPC 78/17, para. 9.3
7. Ensure regulatory effectiveness	7.11	Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters	~~2022~~ 2023	MEPC	PPR		Extended		PPR 9/21, section 12; MEPC 78/17, paras. 14.3 to 14.6
Note: MEPC 78 agreed to extend the TCY to 2023.									
7. Ensure regulatory effectiveness	7.16	Development of necessary amendments to MARPOL Annexes I, II, IV, V and VI to allow States with ports in the Arctic region to enter into regional arrangements for port reception facilities (PRFs)	2023	MEPC	PPR		Completed		PPR 9/21, section 13; MEPC 78/17, paras.9.9 and 9.10

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ANNEX 25

PROVISIONAL AGENDA FOR PPR 10

Opening of the session

1 Adoption of the agenda

2 Decisions of other IMO bodies

3 Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code (7.3)

4 Development of an operational guide on the response to spills of hazardous and noxious substances (HNS) (6.16)

5 Review of the *2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species* (resolution MEPC.207(62)) (1.21)

6 Reduction of the impact on the Arctic of Black Carbon emissions from international shipping (3.3)

7 Standards for shipboard gasification of waste systems and associated amendments to regulation 16 of MARPOL Annex VI (2.18)

8 Development of amendments to MARPOL Annex VI and the NO_X Technical Code on the use of multiple engine operational profiles for a marine diesel engine (2.15)

9 Revision of regulation 13.2.2 of MARPOL Annex VI to clarify that a marine diesel engine replacing a boiler shall be considered a replacement engine (7.43)

10 Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters (7.11)

11 Review of the IBTS Guidelines and amendments to the IOPP Certificate and Oil Record Book (2.13)

12 Revision of MARPOL Annex IV and associated guidelines (1.26)

13 Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships (4.3)

14 Unified interpretation of provisions of IMO environment-related conventions (7.1)

15 Biennial agenda and provisional agenda for PPR 11

16 Election of Chair and Vice-Chair for 2024

17 Any other business

18 Report to the Marine Environment Protection Committee

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ANNEX 26

STATUS REPORT OF THE OUTPUTS OF MEPC FOR THE 2022-2023 BIENNIUM

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.2	Input on identifying emerging needs of developing countries, in particular SIDS and LDCs to be included in the ITCP	Continuous	TCC	MSC / MEPC / FAL / LEG		Ongoing		MEPC 78/17, section 12
1. Improve implementation	1.4	Analysis of consolidated audit summary reports	Annual	Assembly	MSC / MEPC / LEG / TCC / III	Council	In progress		MEPC 78/17, paras. 10.7 to 10.11
1. Improve implementation	1.5	Non-exhaustive list of obligations under instruments relevant to the IMO Instruments Implementation Code (III Code)	Annual	MSC / MEPC	III		In progress		MEPC 77/16, paras. 10.8 and 10.9
1. Improve implementation	1.7	Identify thematic priorities within the area of maritime safety and security, marine environmental protection, facilitation of maritime traffic and maritime legislation	Annual	TCC	MSC / MEPC / FAL / LEG		In progress		MEPC 78/17, section 12
1. Improve implementation	1.9	Report on activities within the ITCP related to the OPRC Convention and the OPRC-HNS Protocol	Annual	TCC	MEPC		In progress		MEPC 78/17, section 12
1. Improve implementation	1.11	Measures to harmonize port State control (PSC)	Continuous	MSC / MEPC	HTW / PPR / NCSR	III	Ongoing		MEPC 78/17, paras. 7.73 and 9.8

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
		activities and procedures worldwide							
1. Improve implementation	1.13	Review of mandatory requirements in the SOLAS, MARPOL and Load Line Conventions and the IBC and IGC Codes regarding watertight doors on cargo ships	2022	MSC / MEPC	CCC	SDC	Completed		MSC 104/18, paras. 3.19-3.21; MEPC 78/17, section 3
1. Improve implementation	1.14	Development of guidance in relation to Mandatory IMO Member State Audit Scheme (IMSAS) to assist in the implementation of the III Code by Member States	2023	MSC / MEPC	III		In progress		MEPC 76/15, paragraphs 10.2 and 12.5
1. Improve implementation	1.15	Revised guidance on methodologies that may be used for enumerating viable organisms	2022	MEPC	PPR		Completed		MEPC 78/17 para. 4.8
1. Improve implementation	1.16	Review of the 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ.833) (2014 Guidelines) and identification of next steps	2023	MEPC	SDC		In progress		MEPC 78/17 para. 10.3

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
1. Improve implementation	1.18	Development of guidance on assessments and applications of remote surveys, ISM Code audits and ISPS Code verifications	2024	MSC/ MEPC	III		In progress		MSC 105/20, para. 18.52
1. Improve implementation	1.21	Review of the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (resolution MEPC.207(62))	2023	MEPC	PPR		In progress		PPR 9/21, section 7
1. Improve implementation	1.23	Evaluation and harmonization of rules and guidance on the discharge of discharge water from EGCS into the aquatic environment, including conditions and areas	~~2022~~ 2025	MEPC	PPR		Extended		PPR 9/21, section 10; MEPC 78/17, paras. 5.9 to 5.18 and 14.14
Note: MEPC 78 agreed to: extend the target completion year to 2025; not include the output in the provisional agenda for PPR 10; and consider reinstating the output in the provisional agenda of a future session of the Sub-Committee (after PPR 10) subject to further proposals to the Committee on part 3 (regulatory matters) and part 4 (database of substances) of the scope of work of the output by interested Member States and international organizations.									
1. Improve implementation	1.24	Review of the BWM Convention based on data gathered in the experience-building phase	2023	MEPC			In progress		MEPC 78/17, section 4
1. Improve implementation	1.25	Urgent measures emanating from issues identified during the	2023	MEPC			In progress		MEPC 78/17, section 4

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
		experience-building phase of the BWM Convention							
1. Improve implementation	1.26	Revision of MARPOL Annex IV and associated guidelines—~~to introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants~~	2023	MEPC	III / HTW	PPR	In progress		PPR 9/21, section 14; MEPC 78/17, paras. 14.7 to 14.11
Note: MEPC 78 agreed to amend the title of the existing output 1.26 to "Revision of MARPOL Annex IV and associated guidelines", and that specific work to be carried out be captured in the scope of work, i.e. (1) introduce provisions for record-keeping and measures to confirm the lifetime performance of sewage treatment plants; (2) consider amending the definition of "person" as provided in regulation 1 of MARPOL Annex IV, taking into account persons other than crew and passengers; and (3) prohibit fitting comminuting and disinfecting systems (CDS) on new ships.									
1. Improve implementation	1.30	Review of the 2014 Standard specification for shipboard incinerators (resolution MEPC.244(66)) regarding fire protection requirements for incinerators and waste stowage spaces	2022	MEPC	SSE		In progress		SSE 8/22, section 19
Note: SSE agreed to a draft MEPC resolution on amendments to the 2014 Standard specification for shipboard incinerators (resolution MEPC.244(66)), as set out in annex 17, for submission to MEPC 79 with a view to adoption.									

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
2. Integrate new and advancing technologies in the regulatory framework	2.2	Approved ballast water management systems which make use of Active Substances, taking into account recommendations of the GESAMP-BWWG	Annual	MEPC			In progress		MEPC 78/17, para. 4.7
2. Integrate new and advancing technologies in the regulatory framework	2.13	Review of the IBTS Guidelines and amendments to the IOPP Certificate and Oil Record Book	2023	MEPC	PPR		In progress		MEPC 78/17, paras. 9.11 to 9.19
2. Integrate new and advancing technologies in the regulatory framework	2.15	Development of amendments to MARPOL Annex VI and the NOx Technical Code on the use of multiple engine operational profiles for a marine diesel engine	2023	MEPC	PPR		In progress		PPR 9/21, section 11; MEPC 78/17, paras. 5.5 to 5.8
2. Integrate new and advancing technologies in the regulatory framework	2.17	Consideration of development of goal-based ship construction standards for all ship types	2023	MSC / MEPC			No work requested by MSC		
2. Integrate new and advancing technologies in the regulatory framework	2.18	Standards for shipboard gasification of waste systems and associated amendments to regulation 16 of MARPOL Annex VI	2023	MEPC	PPR		In progress		PPR 9/21, section 9
2. Integrate new and advancing	2.19	Revision of guidelines associated with the AFS	2022	MEPC	PPR		Completed		PPR 9/21, section 6;

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
technologies in the regulatory framework		Convention as a consequence of the introduction of controls on cybutryne							MEPC 78/17, paras. 9.7 and 9.8
3. Respond to climate change	3.1	Treatment of ozone-depleting substances used by ships	Annual	MEPC			In progress		MEPC 74/18, paras. 5.75 and 5.76
3. Respond to climate change	3.2	Further development of mechanisms needed to achieve the reduction of GHG emissions from international shipping	Annual	MEPC			In progress		MEPC 78/17, sections 6 and 7
3. Respond to climate change	3.3	Reduction of the impact on the Arctic of emissions of Black Carbon from international shipping	2023	MEPC	PPR		In progress		PPR 9/21, section 8
3. Respond to climate change	3.4	Promotion of technical cooperation and transfer of technology relating to the reduction of GHG emissions from ships	2023	MEPC			In progress		MEPC 78/17, sections 7 and 12
3. Respond to climate change	3.5	Revision of guidelines concerning Chapter 4 of MARPOL Annex VI	2023	MEPC			In progress		MEPC 78/17, section 6
3. Respond to climate change	3.6	EEDI reviews required under regulation 21.6 of MARPOL Annex VI	2023	MEPC			In progress		MEPC 78/17, section 6
3. Respond to climate change	3.7	Further technical and operational measures for	2023	MEPC			In progress		MEPC 78/17, section 6

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
		enhancing the energy efficiency of international shipping							
4. Engage in ocean governance	4.1	Identification and protection of Special Areas, ECAs and PSSAs	Continuous	MEPC	NCSR		Ongoing		MEPC 78/17, section 11
4. Engage in ocean governance	4.2	Input to the ITCP on emerging issues relating to sustainable development and achievement of the SDGs	Continuous	TCC	MSC / MEPC /FAL / LEG		Ongoing		MEPC 78/17, section 12
4. Engage in ocean governance	4.3	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter From Ships	2023	MEPC	PPR / III / HTW		In progress		MEPC 78/17, section 8
6. Address the human element	6.1	Role of the human element	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		MEPC 78/17, paras. 10.4 and 13.1
6. Address the human element	6.2	Validated model training courses	Continuous	MSC / MEPC	III / PPR / CCC / SDC / SSE / NCSR	HTW	Ongoing		PPR 9/21, section 12
Note: MSC 105 approved the holding of virtual meetings of three drafting groups, to take place during 2022, to consider draft model courses for validation at HTW 9, and invited the Council to endorse this decision									
6. Address the human element	6.10	Development of an entrant training manual for PSC personnel	2023	MSC / MEPC	III		In progress		MEPC 76/15, paras. 10.1, 10.2 and 12.5

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
6. Address the human element	6.11	Development of training provisions for seafarers related to the BWM Convention	2022	MEPC	HTW		In progress		MEPC 78/17, para.10.6
6. Address the human element	6.16	Development of an operational guide on the response to spills of hazardous and noxious substances (HNS)	~~2022~~ 2023	MEPC	PPR		Extended		PPR 9/21, section 4
Note: MEPC 78 agreed to extend the TCY to 2023.									
7. Ensure regulatory effectiveness	7.1	Unified interpretation of provisions of IMO safety, security, environment, facilitation, liability and compensation-related conventions	Continuous	MSC / MEPC / FAL / LEG	III / PPR / CCC / SDC / SSE / NCSR		Ongoing		MEPC 78/17, section 4, and paras. 5.6 and 5.7
7. Ensure regulatory effectiveness	7.3	Safety and pollution hazards of chemicals and preparation of consequential amendments to the IBC Code	Continuous	MEPC	PPR		Ongoing		PPR 9/21, section 3; MEPC 78/17, para. 9.3
7. Ensure regulatory effectiveness	7.4	Lessons learned and safety issues identified from the analysis of marine safety investigation reports	Annual	MSC / MEPC	III		In progress		III 7/17, section 4
7. Ensure regulatory effectiveness	7.5	Identified issues relating to the implementation of IMO instruments from the analysis of PSC data	Annual	MSC / MEPC	III		In progress		III 7/17, section 6

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
7. Ensure regulatory effectiveness	7.7	Consideration and analysis of reports on alleged inadequacy of port reception facilities	Annual	MEPC	III		In progress		III 7/17, section 3
7. Ensure regulatory effectiveness	7.8	Monitoring the worldwide average sulphur content of fuel oils supplied for use on board ships	Annual	MEPC			Completed		MEPC 78/17, paras. 5.3 and 5.4
7. Ensure regulatory effectiveness	7.11	Development of measures to reduce risks of use and carriage of heavy fuel oil as fuel by ships in Arctic waters	~~2022~~ 2023	MEPC	PPR		Extended		PPR 9/21, section 12; MEPC 78/17, paras. 14.3 to 14.6
Note: MEPC 78 agreed to extend the TCY to 2023.									
7. Ensure regulatory effectiveness	7.16	Development of necessary amendments to MARPOL Annexes I, II, IV, V and VI to allow States with ports in the Arctic region to enter into regional arrangements for port reception facilities (PRFs)	2023	MEPC	PPR		In progress		PPR 9/21, section 13; MEPC 78/17, paras.9.9 and 9.10
7. Ensure regulatory effectiveness	7.27	Updated Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)	Annual	MSC / MEPC	III		In progress		III 7/17, section 8; MEPC 77/16, para.10.7
7. Ensure regulatory effectiveness	7.28	Consideration of reports of incidents involving dangerous goods or marine pollutants in packaged form	Annual	MSC / MEPC	III	CCC	No work requested		CCC 7/15, section 9

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
		on board ships or in port areas							
7. Ensure regulatory effectiveness	7.43	Revision of regulation 13.2.2 of MARPOL Annex VI to clarify that a marine diesel engine replacing a boiler shall be considered a replacement engine.	2023	MEPC		PPR	No work requested		MEPC 78/17, paragraph 14.13
Note: The output was approved by MEPC 77 and included in the Committee's post-biennial agenda (1 session required for its completion). MEPC 78 approved the provisional agenda for PPR 10, which includes this output. Therefore, the target completion year is set to 2023.									
8. Ensure organizational effectiveness	8.1	Endorsed proposals for the development, maintenance and enhancement of information systems and related guidance (GISIS, websites, etc.)	Continuous	Council	MSC / MEPC / FAL / LEG / TCC		Ongoing		MEPC 78/17, para. 4.45
8. Ensure organizational effectiveness	8.3	Analysis and consideration of reports on partnership arrangements for, and implementation of, environmental programmes	Annual	TCC	MEPC		In progress		MEPC 78/17, section 12
8. Ensure organizational effectiveness	8.9	Revised documents on organization and method of work, as appropriate	2023	Council	MSC / FAL / LEG / TCC / MEPC		In progress		MEPC 78/17, section 13
OW. Other work	OW.3	Endorsed proposals for new outputs for the 2022-2023 biennium as accepted by the Committees	Annual	Council	MSC / MEPC / FAL / LEG / TCC		In progress		MEPC 78/17, section 14

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)									
Reference to SD, if applicable	Output number	Description	Target completion year	Parent organ(s)	Associated organ(s)	Coordinating organ	Status of output for Year 1	Status of output for Year 2	References
OW. Other work	OW.8	Cooperate with the United Nations on matters of mutual interest, as well as provide relevant input/guidance	2023	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	In progress		MEPC 78/17, para. 7.6 and section 8
OW. Other work	OW.9	Cooperate with other international bodies on matters of mutual interest, as well as provide relevant input/guidance	2023	Assembly	MSC / MEPC / FAL / LEG / TCC	Council	In progress		MEPC 78/17, sections 7 and 8

POST-BIENNIAL AGENDA OF THE MARINE ENVIRONMENT PROTECTION COMMITTEE

MARINE ENVIRONMENT PROTECTION COMMITTEE (MEPC)								
ACCEPTED POST-BIENNIAL OUTPUTS				Parent organ(s)	Associated organ(s)	Coordinating organ	Timescale	Reference
No.	Biennium*	Reference to strategic direction, if applicable	Description					
1	2022-2023	7. Address the human element (New)	Development of a guide compiling best practices to develop local-level marine spill contingency plans to aid States, particularly local governments and key institutions, in implementing the OPRC Convention and OPRC-HNS Protocol	MEPC	PPR		2 sessions	MEPC 78/17, para.14.2
2	2016-2017	7. Ensure regulatory effectiveness	Development of amendments to regulation 19 of MARPOL Annex VI and development of an associated Exemption Certificate for the exemption of ships not normally engaged on international voyages	MEPC	III		2 sessions	MEPC 71/17, para.14.15

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* Biennium when the output was placed on the post-biennial agenda.

ANNEX 27

ITEMS TO BE INCLUDED IN THE AGENDA OF MEPC 79

No.	Item
1	Adoption of the agenda
2	Decisions of other bodies
3	Consideration and adoption of amendments to mandatory instruments
4	Harmful aquatic organisms in ballast water
5	Air pollution prevention
6	Energy efficiency of ships
7	Reduction of GHG emissions from ships
8	Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships
9	Reports of other sub-committees
10	Identification and protection of Special Areas, ECAs and PSSAs
11	Application of the Committees' method of work
12	Work programme of the Committee and subsidiary bodies
13	Election of the Chair and Vice-Chair
14	Any other business
15	Consideration of the report of the Committee

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ANNEX 28

STATEMENTS BY DELEGATIONS AND OBSERVERS*

ITEM 2

Statement by the delegation of Australia

"Thank you Chair

Australia aligns itself with the interventions of those who have spoken and condemns in the strongest possible terms Russia's unprovoked, unjustified and unlawful invasion of Ukraine. It is a gross violation of international law, including the Charter of the United Nations.

The Russian Federation's actions present an immediate and ongoing threat to the marine environment in the Black Sea and the Sea of Azov. Australia reminds the Russian Federation of its obligations to protect the marine environment and urges it to stop attacks directed at commercial ships and port infrastructure immediately.

This delegation thanks Ukraine for points raised in their intervention and supports representing all of these important items in the report of this Committee.

Thank you"

Statement by the delegation of Canada

"Thank you Chair.

Canada condemns in the strongest possible terms Russia's egregious attack on Ukraine. This invasion is not just an attack on Ukraine. It is an attack on international law, democracy, freedom, and human rights. We stand in solidarity with Ukraine and call on Russia to immediately cease its aggression and withdraw from Ukraine's sovereign territory.

The invasion severely threatens the safety of and security of merchant shipping, the protection of the marine environment, the lives of seafarers and the integrity of global supply lines.

At this Committee Canada is particularly concerned about the potential environmental impacts of Russia's actions as noted by our colleague from Ukraine.

In order to implement the direction from the Council mentioned by you Chair, Canada fully supports the declaration of Ukraine and aligns itself with France, the UK and Australia and requests that our Committee make a clear statement condemning Russia's actions and stressing the critical importance of protecting merchant shipping and the marine environment for the duration of this war"

* Statements have been included in this annex as provided by delegations/observers, in the order in which they were given, sorted by agenda item, and in the language of submission (including translation into any other language if such translation was provided). Statements are accessible in all official languages on audio file at: http://docs.imo.org/Meetings/Media.aspx

Statement by the delegation of France

"M. le Président,

D'emblée, au nom des États membres de l'Union européenne qui sont tous membres de l'OMI, la France souhaite exprimer sa pleine solidarité avec l'Ukraine et le peuple ukrainien, dont la vie a été affectée par la guerre d'agression de la Russie contre l'Ukraine, que nous condamnons avec la plus grande fermeté possible. L'Union européenne est aux côtés de l'Ukraine et de son peuple. La guerre d'agression injustifiable, non provoquée et illégale de la Russie contre l'Ukraine constitue une violation flagrante du droit international et de la Charte des Nations unies. Elle porte atteinte à la sécurité et à la stabilité européenne et mondiale et cause des pertes massives en vies humaines et des blessures aux civils.

Nous exigeons de la Fédération de Russie qu'elle cesse immédiatement ses actions militaires, qu'elle retire sans condition toutes ses forces et équipements militaires de l'ensemble du territoire ukrainien, qu'elle respecte pleinement l'intégrité territoriale, la souveraineté et l'indépendance de l'Ukraine à l'intérieur de ses frontières internationalement reconnues. Nous exigeons également que la Fédération de Russie se conforme à la résolution 68/262 de l'Assemblée générale des Nations Unies sur "l'intégrité territoriale de l'Ukraine" et aux résolutions de l'Assemblée générale des Nations Unies adoptées le 2 mars et le 24 mars respectivement, sur "l'agression contre l'Ukraine" (A/RES/ES-11/1) et sur "les conséquences humanitaires de l'agression contre l'Ukraine" (A/RES/ES-11/2). Face à une situation de plus en plus préoccupante, les Etats membres de l'Union européenne ont adopté et mis en place un ensemble de sanctions contre la Russie, et en particulier décidé d'interdire leurs ports aux navires russes.

M. le Président,

À l'OMI, la 35e session extraordinaire du Conseil a adopté en mars par consensus une déclaration condamnant fermement la violation par la Fédération de Russie de l'intégrité territoriale et de la souveraineté de l'Ukraine, y compris de ses eaux territoriales, qui représente un grave danger pour la vie et un risque sérieux pour la sécurité de la navigation et l'environnement marin. Cette déclaration a souligné les conséquences désastreuses de cette situation sur la sécurité et le bien-être des marins et sur la sécurité du transport maritime international, ainsi que la nécessité de préserver les chaînes d'approvisionnement qui font vivre les autres nations et le peuple ukrainien. En conséquence, les comités de l'OMI ont été invités à examiner les implications de cette invasion pour la mise en œuvre des instruments de l'Organisation, et à prendre les mesures appropriées.

C'est pourquoi la France souhaite que cette question soit étudiée de manière approfondie par la 78ème session du comité de la protection du milieu marin. La France apporte donc son entier soutien à la déclaration de la Délégation de l'Ukraine. Nous souhaitons en particulier que ses demandes en relation avec les conséquences sur l'environnement marin des actions militaires conduites par la Fédération de Russie dans la mer Noire et la mer d'Azov figure au rapport comme une décision de notre comité.
Merci M. le Président."

Statement by the delegation of Finland

"Thank you Chair, Greetings to all,

Finland condemns in the strongest possible terms Russia's military aggression against Ukraine, which grossly violates international law and the UN Charter, and undermines international security and stability.

Finland wants to express its full solidarity with Ukraine and the Ukrainian people and fully supports the statement by Ukraine.

Finland wants to associate with the intervention made by France on behalf of the EU Member States and this statement to be reflected in the report of the Committee.

Thank you Chair."

Statement by the delegation of Georgia

"Thank you Chair,

Russian Federation's unprovoked and unjustified military aggression against Ukraine poses an unprecedented threat to maritime security, navigational safety, seafarers' safety, and marine environmental protection in the Black Sea and Sea of Azov.

We demand that the Russian Federation ceases its unlawful activities, including attacks on commercial vessels, ensures the safety and welfare of seafarers and the security of international shipping in all affected areas, as well as respects its obligations under relevant international treaties and conventions. Georgia once again reiterates its unwavering support for the independence, sovereignty and territorial integrity of Ukraine within its internationally recognized borders.

Georgia supports the inclusion of the points raised by Ukraine in the final report of this Committee.

Thank you "

Statement by the delegation of Italy

"Thank you Mr Chair and a good day to all.

This delegation expresses its solidarity to the people of Ukraine and we wish to support the concepts stated by the distinguished delegation of France and others, and in particular, we fully support the outcome of the 35th extraordinary session of the Council as set out in document MEPC 78/2/4 provided by the secretariat

Also, we would like to highlight, how the consequences of this armed conflict are putting the safety of seafarers and at the same time, the safety of international maritime transport at serious risk on a daily basis. Furthermore, looking ahead to the very near future, we consider it a high priority to try to preserve the supply chains which sustain the economies and social peace of many countries and firstly the food supply."

Statement by the delegation of Spain

"España apoya en su totalidad la intervención de la delegación de Francia en la que se condena la agresión militar no provocada e injustificada de la Federación de Rusia contra Ucrania.

Nos gustaría aprovechar esta oportunidad para volver a expresar nuestro compromiso y solidaridad con el pueblo ucraniano ante la agresión de la que está siendo objeto por parte de la Federación de Rusia.

En línea con las decisiones adoptadas por el CE 35, y tal y como ha destacado Francia en su intervención, España desea que esta cuestión se estudie en profundidad en la 78ª sesión del Comité de Protección del Medio Marino.

Por lo tanto, apoyamos plenamente la declaración realizada por la delegación de Ucrania. En particular, deseamos que sus peticiones en relación con las consecuencias sobre el medio marino de las acciones militares llevadas a cabo por la Federación Rusa en el Mar Negro y el Mar de Azov se incluyan en el informe como decisión de nuestro Comité. "

Statement by the delegation of Ukraine

"Mr. Chair,

Following the temporary occupation of Ukraine's Crimea in 2014 Ukraine has drawn the attention of the Member States the illegal actions of the Russian federation conducive to the massive pollution of the marine areas in the Black Sea and the Sea of Azov. This, inter alia, related to:

Firstly, the exploitation of waters adjacent to the temporarily occupied Crimea for the ship to ship transportation of gas / oil and other natural resources illegally imported / exported to / from Crimea. The vessels engaged in these activities were spotted to turn off onboard AIS stations. The mentioned water areas were also used for bunkering at sea for tankers, which apparently receive diesel fuel from other vessels, which were arriving from Russian ports as well as from other Black Sea states. Given the technical condition of the monitored vessels, there are grounds to believe more maritime incidents can occur endangering the safety and security of navigation and the environmental situation in this area;

Secondly, the construction of a bridge across the Kerch Strait, which impermissibly interferes with navigation and excludes Ukraine from exercising its sovereign rights in the Kerch Strait and the Sea of Azov. The bridge impedes the ability of large vessels to navigate through the strait and access Ukraine's Sea of Azov ports, and threatens to harm the marine environment.

Mr. Chair,

From 24 February 2022 onwards, the situation with marine environment pollution has aggravated because of the full-scale invasion of Ukraine by the Russian Federation.

Massive shellings of ships, port and other critical infrastructure, located ashore. You may recall the bombardment of Moldova-flagged chemical tanker **Millennial Spirit** on 25 February, which remain on fire for over a month, the shelling and subsequent sinking of **M/V Helt** on 3 March, the missile strikes heavily hitting the **M/V Azburg**, which had been berthed in Mariupol, not to mention the "operational sinking" of the russian missile cruiser Moskva, which presumably carried nuclear weapons on board.

Moreover, the regular shellings of port of Mapiupol itself and the strategic metallurgical plant "Azovstal", the technical facility of which tens of thousands of tons of hydrogen sulphide solution, having spilled into the Sea of Azov after the mass bombardment.

As a result of Russian aggression and an increase in the number of warships in the Black and Azov Seas, as a result of explosions, shelling, flooding and oil spills, the situation in some parts of them is even critical.

One of the pieces of evidence of such developments is the several thousands of wounded and dead dolphins found on the coasts of Bulgaria, Romania, Turkey and Ukraine. Relevant numbers greatly exceeds those usually recorded in the region. Sea fauna is very sensitive to noise pollution from war ships and active hostilities in the area are completely unfavourable to the marine environment.

In addition, the chemical composition of water is deteriorating because of oil and other harmful substances spills. In particular, a chemical leak caused by the shelling of the "Azovstal" could cause a complete extinction of flora and fauna of the Sea of Azov. Apart from that, dangerous substances could also get into the Mediterranean Sea.

Mr. Chair,

Given these developments, the delegation of Ukraine proposes that the Committee considers adopting a strong decision addressing the impact of the Russian invasion of Ukraine. We kindly request the Member States to support the inclusion of following elements in the Committee's final report:

'The Committee took the following decision:

.1 noted the recent decision of the thirty-fifth extraordinary session of the IMO Council and the adoption of resolution MSC.495(105) by MSC 105, which strongly condemned the russian federation's invasion of Ukraine that started on 24 February 2022, and expressed grave concern regarding its impact on global shipping, safety and security of navigation in the Black Sea and the Sea of Azov and the maritime community;

.2 further noted the discussions held at PPR 9, which highlighted the impacts of the russian federation's armed aggression against Ukraine in the Black Sea and the Sea of Azov on the marine environment;

.3 reaffirmed in this regard its strong commitment to the full implementation of the Sustainable Development Goal (SDGs) to ensure the sustainable use the oceans and seas and protection of marine and coastal ecosystems;

.4 expressed concern about the consequences of the russian federation's attacks directed at the peaceful commercial vessels, inter alia m/v "Millennial Spirit", "Helt", "Azburg" and other ships that sustained damage, which ended in spillage of substances harmful to the offshore ecosystem;

.5 stressed in this regard the critical importance of protecting the environment in times of war, including in compliance with the relevant international obligations under international humanitarian law;

.6 urged the russian federation to refrain from attacks aimed at commercial ships and critical port infrastructure, which may result in the pollution of marine areas from oil, chemicals and other harmful substances;

.7 resolved to keep this matter under review and invited Member States concerned to provide relevant reports to the Committee.'

I thank you, Mr. Chair."

Statement by the delegation of the United Kingdom

"Thank you, Chair

The United Kingdom, along with our international partners, stand united in condemning the Russian government. Russia's assault on Ukraine is an unprovoked, premeditated attack against a sovereign democratic state which constitutes a flagrant violation of international law and the international rules-based order. The UK remains fully committed to upholding the sovereignty and territorial integrity of Ukraine within its internationally recognised borders.

As a Permanent Member of the UN Security Council, Russia has a particular responsibility to uphold international peace and security. Instead, it is violating the borders of another country and its actions are causing widespread suffering.

The Russian Government has shown that it was never serious about engaging in diplomacy – it has deliberately worked to mislead the world, in order to mask its carefully planned aggression.

The UK condemns these actions and we call for the Russian Government to cease its military actions in Ukraine and immediately de-escalate the situation.

As has already been stated by others, the Council has tasked all Committees with examining the implications of this invasion, and we welcome the recently adopted resolution from MSC, MSC.495(105) on *Actions to facilitate the urgent evacuation of seafarers from the war zone area in and around the Black Sea and the Sea of Azov as a result of the Russian Federation invasion of Ukraine.* We agree that MEPC should look at this issue in depth and fully support the inclusions in the report suggested by Ukraine.

Finally the UK continues to stand with the people of Ukraine, we will work with them – for however long it takes – to ensure that the sovereignty and independence of Ukraine is restored.

Thank you, Chair."

Statement by the delegation of the United States

"Thank you Chair.

The United States recalls the decisions of the IMO Council's thirty-fifth extraordinary session, strongly condemning the Russian Federation's violation of the territorial integrity and the sovereignty of Ukraine, extending to its territorial waters, which is in contravention of the Charter of the United Nations and the purposes of the IMO as set forth in Article 1 of the Convention. We also recall the resolution adopted by the Maritime Safety Committee on April 28 calling on the Russian Federation to immediately and unconditionally cease its aggression against Ukraine and withdraw its troops from the region, including Ukraine's territorial waters. We also recall the discussions at PPR 9, which highlighted the impacts of the Russian Federation's aggression on the marine environment.

The United States condemns Russia's war of choice against Ukraine with its horrific consequences and the killing of Ukrainian civilians in areas held by Russian forces. Russia's continued war not only is damaging to the marine environment but is severely disrupting agricultural production in and shipments from Ukraine, threatening global food security. We remain concerned about the consequences of the Russian Federation's attacks that have hit peaceful commercial vessels, and the resulting harmful impacts to the marine environment.

In this regard, we strongly support calls for the Russian Federation to refrain from any attacks on commercial vessels and to avoid damage to port infrastructure and may also result in damage to the marine environment.

The United States also strongly condemns Russia's devastating assault on Mariupol. We call on Russia to immediately withdraw its forces from Mariupol and from all of Ukraine, including its territorial waters. Despite Russia's claims of establishing a so-called humanitarian corridor for ocean-going vessels, and although some seafarers have been repatriated since the conflict began, we note with grave concern that ships currently laden with grain for over two months, along with some remaining seafarers, remain stranded at Ukrainian ports, unable to leave the area. Russia's premeditated, unprovoked, and unjustified war in Ukraine, extending to the maritime areas in the Black Sea and Sea of Azov, is the only reason there is even a need to establish a safe passage corridor. That said, we strongly encourage member states to facilitate the and the establishment of a viable safe passage corridor so critical cargoes, especially agricultural cargoes, can safely get to those import-reliant countries most in need.

We again strongly condemn Russia's unlawful efforts to impede access to the Kerch Strait and Sea of Azov, and its suspension of the right of innocent passage in territorial sea areas in the Black Sea. We demand that Russia respect Ukraine's sovereignty and territorial integrity within its internationally recognized borders, extending to its territorial waters.

Chair, the United States supports Ukraine's proposal for inclusion of the points they made in the report of the Committee and to ensure the Committee's report reflect the statements made by delegations.

Thank you."

Statement by the delegation of the Russian Federation

"Российская делегация решительно отвергает все безосновательные обвинения, сделанные в адрес России делегацией Украины и другими, в особенности касательно атак на гражданские суда. Эти обвинения не подтверждены никакими фактами украинской стороной. Более того у российской стороны имеются обратные доказательства того, что суда, которые были названы украинским коллегой, как якобы подвергшимся российским бомбардировкам, были повреждены из-за действий украинской стороны. Каждый случай атаки на гражданские суда требует тщательного расследования. Российская Федерация будет проводить такие расследования, при этом в компетенцию данного Комитета это не входит, поэтому он не вправе принимать какие-либо решения или выносить суждения в этой связи. Мы категорически не согласны с теми действиями Комитета, которые были предложены делегацией Украины. Более того, эти предложения были сделаны устно, без представления какого-то письменного документа для рассмотрения и обсуждения возможных решений Комитета. Насколько можно судить, во всех сделанных заявлениях присутствует явная однобокость, когда вина возлагается только на одну сторону, в то время как действия другой стороны (других сторон) просто опускаются.

Российская Федерация также хотела бы поблагодарить Генерального Секретаря и его специального советника за предоставление обновленной информации от Секретариата ИМО касательно текущей ситуации в Азовском и Черном морях и украинских черноморских портах. Со своей стороны еще раз подтверждаем, что наша делегация находится в постоянном контакте по этому вопросу как с Генеральным Секретарем, так и со специальным советником и предоставляет Секретариату свежие данные, основанные на имеющихся фактах.

Подтверждаем также то обстоятельство, которое было отмечено Генеральным Секретарем, - Российская Федерация, в полном соответствии с итогами 35-й внеочередной сессии Совета, создала гуманитарный безопасный коридор в Чёрном море для выхода иностранных судов из украинских портов в открытое море. Недавно этот коридор в интересах безопасности был изменён российской стороной. Соответствующая информация была доведена посредством циркулярного письма до всех государств-членов. Это подтверждает, что Российская Федерация уделяет большое внимание вопросу безопасности мореплавания в регионе. К сожалению, в настоящее время использование этого гуманитарного коридора не представляется возможным из-за действий украинской стороны, которая оказалась неспособной обеспечить безопасный выход торговых судов из своих черноморских портов из-за морских мин, установленных украинскими вооруженными силами в этих портах и вокруг них, а также по причине блокирования выходов из портов затопленными кранами и баржами, на что указал Генеральный Секретарь в своем выступлении. В этой связи отмечаем, что существует угроза загрязнения морской среды, связанная с риском подрыва гражданских судов на минах, выставленных Украиной в своем территориальном море, часть из которых была сорвана с якорей из-за штормовой погоды и бесконтрольно дрейфует в западной части Черного моря.

Кроме того хотели бы отметить, что разминирование фарватеров портов в регионе Азовского моря было завершено Российской Федерацией. Эти порты возвращаются к нормальной работе. Российской стороной был создан безопасный морской коридор в Азовском море для навигации судов. Данная информация была также доведена до сведения всех государств-членов Организации.

В отношении влияния текущей ситуации в данном районе на глобальные цепочки поставок товаров, что было отмечено некоторыми делегациями, еще раз сообщаем, что это является прямым следствием введения незаконных односторонних ограничительных мер против Российской Федерации.

Наша делегация еще раз заверяет всех присутствующих в том, что Россия открыта к сотрудничеству и будет продолжать отслеживать ситуацию с выводом торговых судов из данного района и своевременно информировать Секретариат ИМО о ее развитии."

"The delegation of the Russian Federation strongly rejects all groundless allegations made against Russia by the Ukrainian delegation and others, in particular regarding attacks on civilian ships. These accusations are not supported by any facts from the Ukrainian side. Moreover, the Russian side has evidence to the contrary that the ships, which were named by the Ukrainian counterpart as allegedly subjected to Russian bombing, were damaged due to the actions of the Ukrainian side. Every attack on civilian ships requires a thorough investigation. The Russian Federation will conduct such investigations, while this is not within the competence of this Committee, therefore it is not entitled to make any decisions or make judgments in this regard. We categorically disagree with the actions of the Committee that were proposed by the delegation of Ukraine. Moreover, these proposals were made orally, without the submission of any written document for consideration and discussion of possible decisions of the Committee. As far as one can judge, there is a clear lopsidedness in all the statements made, when the blame is placed on only one side, while the actions of the other side (s) are simply omitted.

The Russian Federation would also like to thank the Secretary-General and his Special Adviser for providing an update from the IMO Secretariat regarding the current situation in the Sea of Azov and the Black Sea as well as in the Ukrainian ports in the Black Sea. For our part, we reaffirm that our delegation is in constant contact on this issue with both the Secretary-General

and the Special Adviser and provides the Secretariat with up-to-date data based on the available facts.

We also reaffirm the fact mentioned by the Secretary-General that the Russian Federation, in full accordance with the outcomes of the 35th Extraordinary Session of the Council, has created a humanitarian safe corridor in the Black Sea for the exit of foreign ships from Ukrainian ports to the open sea. Recently, this corridor was altered by the Russian side in the interests of safety of navigation. The relevant information was communicated through the Circular Letter to all Member States. This confirms that the Russian Federation pays great attention to the issue of the safety of navigation in the region. Unfortunately, at present the use of this humanitarian corridor is not possible due to the actions of the Ukrainian side, which proved unable to ensure the safe exit of merchant ships from its Black Sea ports due to sea mines laid by the Ukrainian armed forces in and around these ports, and also because of the blocking of exits from ports by flooded cranes and barges, as was indicated by the Secretary-General in his statement. In this regard, we have to note that there is a threat of pollution of the marine environment due the risk of explosion of civilian ships on mines laid by Ukraine in its territorial sea, some of which were torn from anchors due to stormy weather and are drifting uncontrollably in the western part of the Black Sea.

In addition, we would like to note that the demining of the fairways of the ports in the Sea of Azov region was completed by the Russian Federation. These ports return to normal operation. The Russian side has created a safe maritime corridor in the Sea of Azov for the navigation. This information was also brought to the attention of all Member States of the Organization.

With regard to the impact of the current situation in the region on the global supply chains of goods, as was noted by some delegations, we reiterate that this is a direct consequence of the introduction of illegal unilateral restrictive measures against the Russian Federation.

Our delegation once again assures all those present that Russia is open to cooperation and we will continue to monitor the situation with the evacuation of merchant ships from the area and promptly inform the IMO Secretariat about its development."

ITEM 5

Statement by the delegation of Brazil

"Chair, Brazil is ok with your proposal, but we would be most thankful if you allowed us to make some comments on this crucial topic. Chair, this week and during so many other meetings we have been intensely discussing the upcoming review of the Initial Strategy, particularly regarding what the ambition levels should be.

Yet at least as important as discussing the finishing line is to agree on the way that will take us there. Brazil believes that one thing is clear: there won't be one single silver bullet that will allow us to reach our emission goals. We should be open to combining different strategies and alternatives. Therefore, we will propose that the Committee bring the documents listed in document MEPC 78/J/7 to discussion under agenda item 7.

Chair, Brazil considers biofuels to be one of the most promising alternatives to the decarbonization of maritime transport in the short term. Provided that their carbon footprint is calculated based on a well-to-wake methodology, biofuels can offer significant benefits to the maritime sector, since their production results in a net reduction of CO_2 levels in the atmosphere. In that sense, we congratulate Canada for the submission of document MEPC 78/7/28, which presents very positive results of extensive trials on the use of biofuels blended with marine diesel oil at different concentrations from 50 to 100%.

One of the main benefits of biofuels for the maritime transport is that they can be used on standard vessels without any modification to their engines since they are chemically rather like petroleum diesel.

Some other fuels which could also potentially be used as low, or zero emission alternatives face a much greater challenge. Hydrogen, ammonia, and methanol, for example, can theoretically be effective in reducing GHG emissions but still have a long way to go before becoming commercially viable, either due to their lack of technological maturity or to a need of heavy investments for the implementation of the necessary infrastructure.

Additionally, the sulphur content in biofuels is very low, which means that, on that front, they already meet the 2020 requirements and potentially eliminate the need for any exhaust gas cleaning systems.

As we know, Mr. Chair, the viability of many new fuels depends on overcoming several challenges in the next 20 years. Since there will be no short- and mid- term solutions that will be able to meet the demand, we must assume that the substitution of current marine fuels for others with a lower carbon footprint will have to occur in a progressive and phased manner.

For those reasons, Brazil strongly supports the finalization of the LCA guidelines, which should consider the lifecycle analysis of the different types of biofuels, and we call upon Member States to, as proposed by India in document MEPC 78/5, start working on developing interim guidelines for the testing and for the use of biofuels in maritime transport.

Thank you, Mr. Chair."

ITEM 7

REVISION OF THE INITIAL IMO GHG STRATEGY

Statement by the delegation of Argentina

"Argentina reiterates its commitment to the reduction of greenhouse gases, and to the review of the IMO's Initial Strategy on GHG.

Regarding the level of ambition, Argentina has committed to "net zero" by 2050, but, as is the case with many countries, this does not include maritime transport (because it is not part of the UNFCCC negotiations).

We believe a net zero will be an effort to sharply strengthen current levels, and a "full zero" by 2050 will not only heavily impact international trade, but may also be unfeasible by requiring the scale development of alternative fuels and adaptation of port infrastructure on a global scale in 28 years.

We believe that the proposal in document MEPC 78/7/24, which proposes reinforcing the level of ambition for 2030 and a new intermediate level for 2040, is also premature, without having concrete and reliable data, such as those from the IMO DCS, that measure the short-term impact of the measure on GHG reduction.

Argentina is open to negotiating goals that are viable, given that not taking these aspects into account could restrict international trade in 2050 to a handful of countries that manage to make the transition of infrastructure and ships by themselves in such a short time.

On how to ensure the just transition, the revised Initial Strategy will apply in the future, and will cover the entire economic transition.

The Initial Strategy contains a package made up of the levels of ambition and the negative impacts on the States. We cannot at all agree to reviewing only the levels of ambition. We are talking about the economic transformation of many sectors, not only the maritime sector, and therefore all aspects of Initial Strategy must be included.

Medium and long-term measures entail ceasing to use fossil fuels by a date to be determined, which is proposed in 2050. However, it will not be possible to reach 2050 or another close date without the necessary scale production of new non-fossil fuels, and that this entails not only investment in research and development that includes developing countries, but also access to inventions, allowing them to participate in the production that will be needed to meet high demand.

Some delegations prefer "just transition" to CBDR (common but differentiated responsibilities and respective capabilities). In terms of climate change, just transition or equitable transition are not equivalent to CBDR. The review of the Initial Strategy must incorporate operationalizing the CBDR principle in an appropriate manner, in particular in a way that avoids negative impact on States.

Here I would like to be clear: we do not support differential implementation on the basis of the flag, but we do support that the needs of developing countries be duly taken into account and that the historical responsibility of developed countries be recognized. Our goals refer to global climate change, and developing countries are not the biggest emitters. It is not fair to propose that the goals of the UNFCCC be imported without its principles, because our mandate in the IMO derives from the UNFCCC. So if one part of UNFCCC is to be imported in the IMO, all must be imported. It is not acceptable to pick and choose, as some delegation has suggested that CBDR is "not applicable" at the IMO. There is no basis for such an assertion. Therefore, we are ready to work with delegations that are open to considering that it is not fair to disregard strong impacts measures will have on developing countries, who are not responsible for climate change. Therefore, the reasonable and effective incorporation of CBDR should be possible in a dialogue between developed and developing countries, because we do not believe that, in general, developed countries seek that developing countries suffer economic impacts from a phenomenon for which we are not responsible and let aside our development priorities.

To ensure that we arrive at the review for MEPC 80, Argentina believes that there should be a general consensus among Members for a comprehensive review, avoiding a partial approach. To do this, Argentina can support the package proposed by Peru (and to leaving the labels aside for now):

1. Vision and ambition levels,
2. How to operationalize the guiding principles of the Initial Strategy,
3. Impact assessment (revised procedure based on the procedure for the assessment of impacts of short-term measures),
4. Monitoring of measures and monitoring of impacts + review of measures as necessary,
5. Mechanism to address negative impacts on developing countries,
6. Adaptation/just transition measures (i.e. financing for fuel supply and bunkering/port infrastructure, technology transfer, access to new fuels)."

Statement by the delegation of the Bahamas

"Referring to document MEPC 78/7/14, we agree that a dedicated session of the ISWG is held between MEPC 78 and 79 to develop a revised strategy.

Importantly, we should also arrive at an agreement on terms presently in circulation, zero emissions by 2050, net zero by 2050 and carbon or climate neutrality by 2050. These are leading to confusion.

While developing the revision, we would align ourselves with the specific comment in document MEPC 78/7/2 by ICS, which suggests that rather than producing an entirely new document, we should consider minimum and logical number of changes to the text of the current initial strategy.

And finally Chair, whichever route we follow, we must be united in our goals and ensure that all member states are not only aligned, but are also capable of performing and meeting the objectives, with special emphasis on vulnerable nations, developing countries and SIDS."

Statement by the delegation of Belgium

"As agreed at MEPC appen77 the levels of ambition from the initial strategy need to be strengthened and we continue to support the phasing out of all GHGs from shipping, on a well-to-wake basis, by no later than 2050. Considering the lifetime of ships as well as the necessary investments and steps to be undertaken ashore, a decision on the final goal needs to be taken rather sooner than later. The industry needs clarity on the 2050 target and clear target setting is needed as well to maintain the level playing field. Therefore we believe that the levels of ambition should be clearly set and not as "efforts to be pursued". This would not give any certainty to the sector and would not give enough certainty that the goals from the strategy, or the Paris Agreement, would be achieved. We do concur to limit the revision to a number of identified and specific parts of the strategy. The strategy needs to be updated in line with more recent data, both in terms of climate science as in terms of fuel transition feasibility and we believe this data to be available already as France and others have rightly recalled in their interventions. Any additional input is welcomed as long as it is made available in due time so that the planned decision on the revised Strategy is taken by MEPC 80.

With regard to the pathway and how to reach the 2050 target, we support the inclusion of additional progress checkpoints, especially for 2040. As mentioned before, many steps need to be taken and the transition will be gradual. Additional checkpoints will allow the whole sector to monitor the transition on a global scale. In the meantime many initiatives are already ongoing, for example to establish green corridors. We fully support these initiatives. At the same time, the global approach remains to be our first priority and a prerequisite to achieve full decarbonization as well as the Paris Agreement temperature goals.

For the same reason we support the transition to take place in a fair and equitable way so that no one is left behind. As was stated at COP 26 all countries should benefit from the opportunities offered by an equitable transition, such as the introduction of modern technologies and capacity building. Further consideration should be given to in-sector as well as relevant out-of-sector support to developing countries, in particular SIDS and LDCs, and this is part of the discussions on the MLTMs.

Considering all these elements on the table chair, we believe further constructive discussions are needed in a dedicated working group at MEPC79 or in a dedicated ISWG on the strategy, which might in any case be needed if for some reason MEPC79 would not take place in a live setting. This will allow us to properly discuss concrete proposals and make progress on the

revision of the strategy which needs to be finalized and decided at MEPC80, which is only two sessions away from now."

Statement by the delegation of Brazil

First statement

"Brazil remains committed to the decarbonization of shipping as one of the contributing sectors for the global efforts to curb GHG emissions under the auspices of this organization and of the UNFCCC. However, we must align ourselves with statements by Members States who have questioned the feasibility of the goals that have been proposed for the revision of the Initial Strategy. In particular, we must confess that we are intrigued by some statements which have openly rejected the notion that there is a need for further studies and analysis before embarking on an emission reduction goal that the IPCC itself doesn't seem to deem as feasible.

Mr. Chair, when analysing scenarios compatible with a limit of 1.5 C in global temperature, IPCC's recent AR6 report admitted that global transport will not be able to reach a reduction greater than 59% of emissions until 2050. At the moment, there simply isn't a cost-effective alternative to fossil fuels and we believe that this Committee should be guided by sound science rather than by wishful thinking. We simply can't be sure of what the consequences of approving such a level of ambition will be and we especially don't know which unintended consequences it might bring about.

We don't think this is the best way of green-lighting any public policy, especially when dealing with an international regime that aims to shape the maritime sector for decades to come.

Chair, some countries have recently had to backpedal and soften some environmental measures in light of the recent energy crisis. The regime we're aiming to implement here will not be as flexible. If we get the review of the strategy wrong, we might compromise not only the economic development of dozens of countries but also harm the environment, given that more isolated countries won't have access to the most efficient and greenest goods and technologies.

Chair, we have to arrive at credible and feasible solutions, which shall be anchored in solid technical and scientific knowledge and not, as I said, in wishful thinking or domestic electoral moods. Moreover, maritime transport's decarbonization efforts should be consistent with UNFCCC's regimes rather than used as compensation for the shortcomings of domestic measures. They must also recognize and reflect the principle of common but differentiated responsibilities, which the current debate on the review of ambition levels doesn't seem to properly take into consideration. On that point, we cannot understand how some countries can argue that we should take measures now to avoid a climate disaster decade from now while at the same time failing to own up to the fact that they're responsible for an incommensurately larger share of the emissions that are warming up the Earth as we speak and that were equally emitted decades ago. This doesn't come from the history books; this is literally in the air we breathe.

Chair, we came up with the levels of ambition of IMO's initial strategy by taking into consideration the proportion of emissions that shipping is responsible for and comparing it with commitments made by the Contracting Parties to the Paris Agreement. Before discussing any change to IMO emission goals, we'd have to inquire whether the same level of increase in ambition has already been adopted for the reduction of emissions on land, always bearing in mind that the maritime sector is responsible for less than 3% of global emissions while being essential for the transport of 90% of global trade.

For all of those reasons, Brazil supports that document MEPC 78/7/26, of which we are a co-sponsor, shall constitute the basis for the discussion on the adjustment of the ambition levels. We do not support document MEPC 78/7/14, by Australia et al, as we are against raising the levels of ambition without the necessary supporting evidence and without a serious feasibility assessment. We are against increasing the already heavy workload of meetings, as we think it risks silencing countries which lack the manpower or the resources to keep up with it. And we support the further development of mechanisms for comprehensively assessing the impacts of the measures, especially those disproportionately affecting some countries, and the further evaluation of the lifecycle of fuels.

We also view the package of principles proposed by Argentina as a realistic framework for further negotiations and a promising way forward."

Second statement

"Chair, Brazil is ok with your proposal, but we would be most thankful if you allowed us to make some comments on this crucial topic. Chair, this week and during so many other meetings we have been intensely discussing the upcoming review of the Initial Strategy, particularly regarding what the ambition levels should be.

Yet at least as important as discussing the finishing line is to agree on the way that will take us there. Brazil believes that one thing is clear: there won't be one single silver bullet that will allow us to reach our emission goals. We should be open to combining different strategies and alternatives. Therefore, we will propose that the Committee bring the documents listed in document MEPC 78/J/7 to discussion under agenda item 7.

Chair, Brazil considers biofuels to be one of the most promising alternatives to the decarbonization of maritime transport in the short term. Provided that their carbon footprint is calculated based on a well-to-wake methodology, biofuels can offer significant benefits to the maritime sector, since their production results in a net reduction of CO_2 levels in the atmosphere. In that sense, we congratulate Canada for the submission of document MEPC 78/7/28, which presents very positive results of extensive trials on the use of biofuels blended with marine diesel oil at different concentrations from 50 to 100%.

One of the main benefits of biofuels for the maritime transport is that they can be used on standard vessels without any modification to their engines since they are chemically rather like petroleum diesel.

Some other fuels which could also potentially be used as low, or zero emission alternatives face a much greater challenge. Hydrogen, ammonia, and methanol, for example, can theoretically be effective in reducing GHG emissions but still have a long way to go before becoming commercially viable, either due to their lack of technological maturity or to a need of heavy investments for the implementation of the necessary infrastructure.

Additionally, the sulphur content in biofuels is very low, which means that, on that front, they already meet the 2020 requirements and potentially eliminate the need for any exhaust gas cleaning systems.

As we know, Mr. Chair, the viability of many new fuels depends on overcoming several challenges in the next 20 years. Since there will be no short- and mid- term solutions that will be able to meet the demand, we must assume that the substitution of current marine fuels for others with a lower carbon footprint will have to occur in a progressive and phased manner.

For those reasons, Brazil strongly supports the finalization of the LCA guidelines, which should consider the lifecycle analysis of the different types of biofuels, and we call upon Member States to, as proposed by India in document MEPC 78/5, start working on developing interim guidelines for the testing and for the use of biofuels in maritime transport."

Statement by the delegation of Canada

"Colleagues, the science is increasingly clear on the staggering economic, environmental, and human costs of allowing global average temperatures to increase by more than 1.5 degrees, and it is also clear that each additional fraction of a degree of warming entails non-linear increases to these costs.

As the global carbon budget to stay within that limit rapidly depletes, the science is equally clear that emissions need to peak as soon as possible, decline rapidly, and approach zero by 2050.

Therefore, Canada sees that our principal task in this session is to frame our work to revise the Initial Strategy around an ambitious vision and targets consistent with the Paris Agreement's 1.5-degree temperature goal, and importantly, to ensure we dedicate the required time for detailed discussions to take place in order to agree the Revised Strategy by MEPC 80.

Submissions to this session demonstrate a substantial convergence around zero GHG emissions by 2050, and we think it would be reasonable to use this as a frame coming out of this meeting to focus our work going forward, as well as provide an important signal that moves governments, markets, and producers toward common objectives.

We should be including GHGs broadly, because even though current fuels emit mostly CO_2 on a global warming potential 100 basis, that could change with the adoption of alternative fuels, some of which have the potential to generate substantial non-carbon GHG emissions under certain circumstances.

To ensure we're on the right track, we support the inclusion of stringent absolute, well-to-wake GHG emissions reductions targets for 2030 and a checkpoint in 2040 that would be in line with zero GHG emissions by 2050:

Targets to reduce GHG emissions intensity or increase the percentage of the fleet that should be zero- GHG emission by given years, could play a supportive role, as long as they reflect well-to-wake emissions and remain technology- neutral.

The science is clear: the cost of inaction far outweighs the cost of addressing the sector's emissions, and this cost will unfortunately be disproportionately borne by developing countries, especially SIDS and LDCs.

We hear the calls of these countries to help them with this needed maritime transition, and we are confident that we can find effective ways to design measures to help the most vulnerable countries to participate in getting the sector to zero emissions as part of a fair and inclusive transition, which should be an objective of our efforts.

At the same time, while we see potential improvements to the principles section of the Initial Strategy, and in particular could see a number of new principles that could be added, we don't support dedicating precious plenary time to discuss it at this MEPC session.

Colleagues, we agreed a few years ago to finalize the revision of the Strategy by MEPC 80, and we must organize ourselves this week to deliver.

Given the heavy workload in the Terms of Reference already recommended to this committee by ISWG 12, we would support tasking an additional, dedicated working group to undertake this work and provide an interim report to MEPC 79 to deliver at least some concrete elements of the Strategy in line with a full revision by MEPC 80."

Statement by the delegation of China

"Thank you Chair, China would like to thank all submitters for presenting proposals under this issue of revision of strategy. As we highlighted in our proposal, document MEPC 78/7/26, the revision of the Initial Strategy should follow a comprehensive review rather than merely focusing on the vision and ambition levels. The revision of the Strategy should make decisions on a package of elements including vision, levels of ambition, guiding principles, measures and actions, supportive measures, capacity-building and technical cooperation, impact assessment, and other elements. Among these, the focused attentions should be given to impact assessments, including revised procedure based on procedure for assessment of impacts of short-term measure, follow up of measures and follow up of impacts identified, mechanism for addressing impacts on States, and measures for just transition of developing countries.

The modification of the vision and levels of ambition, and the introduction of other forms of targets and the setting of intermediate checkpoints, as suggested by some delegations, should be supported by feasibility study and impact assessment. China cannot agree with the candidate proposal of reaching zero emission for international shipping by 2050, as it is not in line with Glasgow Climate Pact, and not supported by feasibility study and impact assessment. The IPCC reports and other similar information on climate science have just underscored the urgency of tackling climate change, but they didn't provide any assessment on the shipping industry. The GHG 4 study only assessed shipping industry data up to 2018, without covering that of 2019 and beyond. The revision of the Strategy should take into account the special nature of the shipping industry, which is very important to the world economy and the livelihood of people in developing countries. We agree with what India just said, setting goals must be pragmatic and achievable.

The review of the Strategy should be aligned with the Paris Agreement and Glasgow Climate Pact, which reiterated the principle of CBDR, emphasizing that developed countries provide more support to developing countries. The CBDR principle is a basic principle of the UNFCCC, and is the basis for IMO ship GHG negotiations. It is confirmed in the Initial strategy, and must be written in the revised Strategy.

In order to ensure fair and just transition, or more correctly, to ensure the embodiment of CBDR, due consideration should be given to:

1) negative impacts on developing countries should always be taken into account in the development of measures;
2) development of a mechanism to address the negative impacts identified; and
3) developing countries should have access to and have the capability to produce low carbon or zero carbon fuels or equipment.

As for how to ensure the revision is finalized before MEPC 80, China believes the that given the highly political nature of this issue, it should be kept on the agenda of MEPC. Also as it is a major and sensitive issue, it would be unfair to have it discussed in working group's meeting without interpretation. Therefore it is not appropriate to have a dedicated ISWG-GHG meeting to solely focus on the revision of the Strategy before MEPC 79."

Statement by the delegation of the Cook Islands

"It may be helpful if we take the opportunity of reminding the Committee who we are and of our concerns as to the likely impact of the measures under discussion as collectively we seek a fair and just transition.

The Cook Islands comprises 15 small islands spread over an Exclusive Economic Zone (EEZ) of 1.97 million square kilometres in the South Pacific Ocean a region that collectively, emits less than 0.03% of the World's total greenhouse gas emissions... It is made up of two main groups; the Northern Group consisting 6 low lying coral atolls and the Southern Group of 9 islands.

The Cook Islands contributes an insignificant 0.00014% of global greenhouse gas emissions. Despite this, the Island faces the brunt of climate change impacts, caused by others represented here today, and alarmingly of the impact of measures taken here in relation to shipping. To deal with this unprecedented challenge, Cook Islands has carved a pathway of low carbon development to strengthen climate resilience and further reduce its already insignificant carbon footprint to achieve its national vision 'to enjoy the highest quality of life consistent with the UN SDG's and aspirations of our people, and in harmony with our culture and environment'.

This can only be achieved by the continuation of safe, cost effective and timely shipping services upon which we rely for 90% of our foodstuffs, medicines, building materials and other goods upon which we depend. Our reliance for our fuel needs are 100% dependent reliant on shipping a reliance that will remain in the era of alternative fuels that we all seek.

For these reasons, we repeat the questions as yet unanswered by the proponents of the proposals at ISWG GHG 12, who all commit to a just and equitable transition without having reached a common understanding of precisely what that means. That is, to explain to us and the Committee, how the measure they propose will ensure that there will in the absence of a waiver based on our already completed stakeholder assessment:

.1 be no disruption to timely shipping services to our islands; and
.2 that these services will remain affordable and not add to the already high costs and inflation that our small and highly vulnerable economy is already facing. As the members already know, without these vital shipping services, our social structure cannot be maintained and our island life could not be sustained.

On the question of levies, we have a number of concerns which of course relate back to the questions we have posed to which we would suggest the Committee require clarity, specifically:

Can it be confirmed that the prime objective of such a scheme would be to help finance in sector R&D into alternative fuels, more efficient hull and engine designs and other technical measures in order to ensure that the sector can meet our 2030 and 2050 targets with our shipping needs continuing to be met.

Alternatively, for those who are proposing that such funds would be disbursed out of sector by way of some compensatory mechanism, we would ask them to indicate what proportion of such funds would be allocated to SIDS/ LDCs and better clarity for what purpose. This should be determined before the progressing of such measures.

We have concerns that international shipping, upon which we depend for 90% of our essential goods and services is being seen by some as a vehicle through which IMO is to potentially make up shortfalls in monetary commitments, including those made at the UNFCCC to finance the GCF. This unfortunately comes at a time when there are global shortages in supply and shipping backlogs caused by the global pandemic and more recently, hostilities that will impact on us all.

Chair, I think we also need to be very cognizant of the fact that all of us here have signed the Paris Agreement and, like it or not, those provisions, not just some of them, apply to states affected, irrespective of what sector we're talking about or not. After all, we are talking more about climate change in this context than we are about shipping more generally. Of course, the concept of equitable transition is enshrined in the Paris agreement as are the special circumstances of SIDS in that the Agreement as determined in Article 13, shall be implemented in a non- intrusive, non-punitive be respectful of national sovereignty and crucially avoid placing undue burden on parties.

Chair, we really do need to respect the provisions of other Agreements and ensure we are not undermining those or going against the spirit contained in them, as we would surely be doing if under the IMO Treaty, or through MARPOL Amendments we would seek to raise funds to disburse out of sector in a manner not respecting the articles of the UNFCCC Paris Agreement. Chair, the Committee should reflect that, as we know to our cost, very plausible schemes, with very pleasing commencements, often have lamentable conclusions.

We share the views of the many who have spoken before us that the parties again commit that: 'No one be left behind'."

Statement by the delegation of India

"We may first respond to document MEPC 78/7 from WSC and document MEPC 78/7/2 from ICS and thank them for raising many critical regulatory and economic elements for this Committee to bear in mind while revising the GHG reduction strategy. We align with them on most, except for deciding on any definitive time bound ambitions.

While we echo the observation of WSC on the immense R&D effort required to raise the TRL of shipboard and shore-side systems, India stresses on the equal need to raise their Commercial Readiness Index score to make feasible business cases for low and zero emission ships.

On the market-based measures such as Global Carbon Pricing being proposed by many, we would alert the member states that such over ambitious economic measures, much higher than even those proposed for shore-based industries, may blunt the competitive edge of the shipping industry pushing cargo to other modes of transport where carbon levy does not exist and is cheaper. On the other hand, we are afraid that a variable, volatile and speculative pricing of carbon allowances under proposals like emission trading scheme would make future investment decisions in new zero-carbon technologies uncertain, making it far more difficult and unattractive.

Regarding various proposals demanding 2050 target date for full decarbonization of shipping, India feels that any such time bound target or declared ambitions from a credible organization like IMO, should be achievable, pragmatic, inclusive and more importantly should reflect solutions and roadmap to achieve the goal. Failing which, it will be seen by the world as a hollow political statement, damaging the confidence in this Organization as the global leader for control of emissions from maritime sector.

Unfortunately, document MEPC 78/7/14 and few other supporting documents with similar contentions from some of our esteemed delegations do not identify a pathway or any sort of evidence-based justification for enhancing the ambition and 2050 targets, except that there is a universal call for zero emissions. With no clear pathway on how shipping is going to achieve these enhanced targets, especially with alternate fuels and associated equipment far from maturity, the need for an exclusive session is not justifiable and India expresses its dissent to it.

Mr. Chair, it is against this background that India submitted documents MEPC 78/7/4 and MEPC 78/7/26 to which we are one of the cosponsors, appealing to this Committee that the Initial Strategy should follow a comprehensive review rather than merely focusing on the vision and ambition levels.

Through its document MEPC 78/7/4 this delegation suggests that Committee needs to distinguish and decide whether the objective of the Strategy should be to achieve "Net-zero emission" or "Absolute-zero emission" in the maritime sector, because both these concepts demand varying sets strategies to achieve the desired objectives.

Reminding the member states that CO_2 remains the dominant source of shipping's climate impact accounting for 98% of total international GHG emissions, India suggests that the Committee may deliberate upon with an open mind whether it would be more realistic and pragmatic, to aim for carbon neutrality or net-zero CO_2 emissions, rather than losing our focus on concentrating on various minor contributory constituents of emissions.

Further, going by the "polluter pays" principle this delegation proposes that those ship types which emit more must reach net-zero earlier than others. It may be useful to decarbonize first the bigger polluters based on ship type and size, as done in the EEDI regulatory regime.

We also have specific comment on the document MEPC 78/7/6 endorsing extra-territorial regional measures from few member states on the pretext of provisions of UNCLOS'82. We would respectfully request the sponsors of the document to kindly go through various other Articles of the Convention, inter-alia, Article 211.4, which clarifies that Coastal states may exercise their sovereignty only in their territorial waters; Article 211.5 which clarifies that any legislation beyond territorial seas shall be in-line with international laws established through competent international organizations; and more importantly, Article 211.6, which clarifies that in case of any measure beyond the territorial waters over and above the international laws, it shall be in consultation with competent Organization, corroborated by scientifically proven supporting evidence, specifically affecting that region. It is only an established scientific fact that climate change is a global issue to be addressed through global measures and hence this Organization, particularly this Committee is the most appropriate and competent forum for this.

This delegation would also like to extend full support to the document MEPC 78/7/26 to which India is one of the cosponsors, with a strong alert to this forum that any number of resolutions with any amount of ambitious targets on global emission control without addressing the genuine concerns of the developing nations who are going to hold the key for emission control of the future world order is neither going to generate the desired effects nor do any regulatory framework or resolutions, without recognizing the genuine rights of the developing nations to strive for better standard of living for their people will stand the challenges of time."

Statement by the delegation of the Marshall Islands

"Chair, every day that we delay taking real, concrete action to reduce GHG emissions from international shipping, is a day wasted. And we have no more of those days left. The science is clear. Our experiences as atoll nations is clear. Let us not waste today. Instead, let us agree to launch a process for revising our collective Strategy that will transform this industry with the

ambition and speed we know is necessary, while also protecting the most vulnerable and leaving none behind. It is up to us, and we must meet this moment.

Chair, you have asked us to identify the targets we think we should be setting in the Revised Strategy. For us, there can be no other answer except that we must be guided by the need to limit warming to 1.5 degrees. This objective must be enshrined in the Revised Strategy, together with a reference to the latest IPCC AR6 Reports. The science makes it clear we must completely eliminate emissions from international shipping by 2050 at the very latest – not "in this century", as the current Strategy states. We are very glad that 30 other IMO Member States have joined us in signing onto the Declaration on Zero Emission Shipping by 2050,[*] including a diverse range of developed and developing countries, and that momentum for this goal continues to grow among industry as well.

Chair, to reach this goal we will also need to set 1.5-degree aligned targets for 2030 and 2040. These should include both absolute GHG emission reduction targets and GHG intensity targets. To avoid shifting emissions from sea to land, the Revised Strategy must make clear that these targets are to be applied on a well-to-wake basis. We are also interested to discuss further the suggestion made by Germany to have five-yearly checkpoints starting in 2025, to ensure we are moving with the required urgency.

Chair, I wish to thank our colleagues from India for directing our attention to the difference between a zero and a net-zero target. There are no carbon sinks on ships, and the possibility of offsetting shipping emissions is unacceptable, as it will fundamentally undermine the market signal necessary for the transition. Zero emissions from international shipping, therefore, means just that: zero emissions from international shipping. We do not agree, however, with the suggestion in India's document MEPC 78/7/4 that we should differentiate targets by ship type.

In order to achieve our goals, Chair, it is clear that we must introduce a price on shipping emissions. We have listened closely to the concerns that this idea raises for some countries. As a small island developing state in the middle of the mighty Pacific Ocean, Chair, the Republic of the Marshall Islands is well aware of the risks that such a change could create for our own people. We would not and could not propose such a course of action, therefore, unless we were totally confident that we could protect the interests of the most vulnerable, particularly SIDS and LDCs, through the process of this transition. For this reason, enshrining an equitable transition at the heart of the Revised Strategy is a moral imperative. The 1.5 goal and the importance of an equitable transition should be woven throughout the Revised Strategy, but both of these concepts must be clearly anchored in the Vision and Guiding Principles of the Strategy. It will also be essential for the Revised Strategy to recognize the crucial principles of environmental integrity and polluter pays.

Finally, Chair, you have asked us to consider how we can ensure that we finalize this work before MEPC 80. Respectfully, Chair, the question of how we complete the strategy revision by MEPC 80 is not one that is up for debate. We have already agreed that MEPC 80 is when this work will be completed. There can be no question, therefore, that we will meet as many times as we need to, in order to ensure we meet that deadline. You already have a clear mandate in that respect, Chair. We thank the co-sponsors of document MEPC 78/7/14 for their submission, and concur with them that a dedicated ISWG-GHG to consider proposals on the revision of the Strategy before MEPC 79 is a useful and appropriate first step. We would suggest that this meeting happen well in advance of MEPC 79, and that it be held in person, with due regard for the need for safety and inclusivity."

[*] https://em.dk/media/14312/declaration-on-zero-emission-shipping-by-2050-cop26-glasgow-1-november-2021.pdf

Statement by the delegation of Palau

"In general terms this delegation believes appropriate, at this point of the work carried out for months, establish a dedicated session of the intersession working group on the reduction of greenhouse gas emissions from ships before next MEPC meetings to develop a shared, compatible, adjusted, but acceptable, strategy.

With regard to the actions relating to medium and long-term measures, also for these we think, like others before me, that there is a need to establish a dedicated session to achieved, a shared and acceptable strategy that takes into account the protection of the environmental and economic impact of distant region that are totally dependent on maritime commerce.

About the general strategy in brief we are of the opinion that the strategy must be ambitious to achieve the phasing out of greenhouse gas emissions from international shipping as soon as possible.

That is our duty as a Maritime Organization.

Like others in the Region we are a group of small islands and our contribution to the global GHG is very very low close to nothing more or less. Nevertheless we are under impact of the clime exchange.

We are convinced that a just and equitable transition remains fundamental and this, should be taken into huge consideration, for the natural vulnerability of some Nations and geographic areas of the world and more specifically SIDS and LDC but also for all developing countries. The measures need to take into consideration that shipping services, vital to the island's life, need to have acceptable cost for our fragile economy and no disruption.

As other before me I have to recall the general content of the Paris agreement and what the agreement has leaved to us in terms of spirit of collaboration and mutual support.

Finally we share some consideration made by other member states especially for ensure an equal general condition.

A just transition must ensure that no one is left behind."

Statement by the delegation of Tuvalu

"In relation to the revision of the strategy, Tuvalu would like to align itself with the statements of the Republic of the Marshal Islands, the Solomon Islands Tonga and Vanuatu. As an atoll nation most exposed to climate change, Tuvalu cannot stress enough the importance of revising the initial strategy with increased levels of ambition and targets fully aligned to avoiding warming in excess of 1.5 degrees, and adopted in the shortest possible timeframe.

In addition to the agreement on having a price on carbon as per the polluter pays principle, international shipping has to commit to a zero emissions level on a well-to-wake basis before 2050 and not net zero.

Without dedicated meeting capacity, we risk failing to align the IMO strategy fully with the latest scientific data to produce a strategy that is in line with the obligations of this institution and its member states. We therefore support the demand for a dedicated additional intersessional meeting well in advance of MEPC 79, to allow us to reflect on its outcomes in time to prepare for MEPC 79 and to ensure that the revision is finalised before MEPC 80.

In relation to Equitable Transition, Tuvalu would like to remind this assembly that the starting point for consideration has to be the scientific consensus of the latest IPCC report in relation to Impacts, Adaptation and Vulnerability. Let me quote from the report for Policymakers, I believe this includes the IMO, the first key takeaway point:

'Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. Some development and adaptation efforts have reduced vulnerability. Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected.'

Chair let me also quote a more distressing passage of this report. '*Between 2010-2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability (high confidence). Vulnerability at different spatial levels is exacerbated by inequity and marginalization linked to gender, ethnicity, low income or combinations thereof (high confidence), especially for many Indigenous Peoples and local communities (high confidence).'*

In this context, it does not seem either pertinent or reasonable for the IMO to define what has already been universally identified and demonstrated through scientific consensus. I am referring to the states and regions disproportionately affected by climate change in need of adaptation and mitigation. Instead of engaging in a new definition of what is disproportionate and what would be equitable, it would be better to refer to the appropriate IPCC reports in the Revised Strategy.

The mandate of this committee has always been to reduce GHG emission from ships and to provide mitigation and adaptation solutions for those that have already been identified as disproportionately affected by climate change. There cannot be disproportionately affected people in an IMO sense and in an IPCC sense, hence we should make sure there is clear alignment to the IPCC science on the basis of the science-based approach adopted at the IMO.

As alluded to by the delegation of the Cook Islands, the IMO does not operate in a vacuum and is constrained in its operation by existing higher norms of public international law.

The equitable transition that the IMO is implicitly tasked with by an already large and fast growing body of International Environmental law, can solely be based on what is universality accepted as the scientific consensus on disproportionate impact from climate change.

The essential work that the IMO has to undertake is to decide how it will address this inequity so that no state is left behind. As a result, the revised strategy has to include the findings of the IPCCC reports as part of the volume of science-based data used to make its decisions and has adopt the principle of differential treatment based on the finding of the IPCC in relation to disproportionate impacts due to climate change with the vue of correcting those.

Lastly Chair, there are also other overarching principles of International Environmental Law that have been omitted from the initial strategy or not adequately implemented such as the principle of environmental integrity and the principle of precaution that will have to be better integrated in the revised strategy."

Statement by the delegation of the Bolivarian Republic of Venezuela

"Señor Presidente, Venezuela se alínea con los comentarios hechos por las delegaciones de China, India, Argentina y otros países en desarrollo. En particular, sobre las siguientes cuestiones:

1) En cuanto al nivel de ambición, creemos que cero netos será un esfuerzo por fortalecer marcadamente los niveles actuales, y un "cero total" para 2050 no sólo impactará fuertemente al comercio internacional, sino que además podría no ser viable por requerir el desarrollo a escala de combustibles alternativos y la adaptación de infraestructura portuaria a escala global en 28 años. Tampoco podemos apoyar el documento MEPC 78/7/24 que propone reforzar el nivel de ambición de 2030 y uno nuevo intermedio al 2040, sin contar con datos concretos y fiables.

2) Sobre cómo garantizar la transición justa, Coincidimos con Argentina y la India en la necesidad de tener en cuenta el principio de responsabilidad común pero diferenciada, o CBDR. No creemos que deba haber trato diferencial sobre la base del pabellón del buque, pero sí un trato que tenga en cuenta a los países en desarrollo, ya que ellos no son responsables del fenómeno del cambio climático. Creemos que la Convención Marco sobre Cambio Climático nos da un mandato que es total, e incluye metas de temperatura y principios. Debemos abordar todos en una revisión holística.

3) respecto a cómo asegurar que se llegará a MEPC 80, apoyamos la propuesta de la Argentina de acordar un paquete que incluya: 1. Visión y niveles de ambición 2. Principios rectores 3. Evaluación de impacto (procedimiento revisado basado en el procedimiento para la evaluación de impactos de medidas a corto plazo)

4) Seguimiento de medidas y seguimiento de impactos + revisión de medidas según sea necesario."

Statement by the observer from INTERCARGO

"INTERCARGO fully supports the drive and the ambition to achieve zero emission shipping by 2050, as a responsible response to, and considering, the tremendous challenges of decarbonisation and of the associated energy transition, from technological, economic, and societal points of view.However global challenges require global solutions and the commercial development of these solutions is within the direct control of other stakeholders and not shipowners.

INTERCARGO supports the IMO and urge governments to adopt the necessary measures to accelerate R&D of zero-carbon technologies and expedite their deployment. The net-zero target will only be plausible if governments take the necessary action to achieve this at IMO.
Such a target requires a drastic and urgently needed acceleration in the commercial development of the required technologies, fuels, propulsion systems and related infrastructure.
In order not to jeopardise the 2050 target, INTERCARGO advocates:

1. In the short term, the approval as immediate priority of the industry proposal for the "Establishment of an International Maritime Research and Development Board and an IMO Maritime Research Fund"
2. In the medium term, a global levy on carbon emissions from ships as a Market Based Measure, in order to accelerate the uptake and deployment of zero-carbon technologies and fuels.

Without the above concrete actions, it will be premature to revise intermediate targets for 2030 or for any year after 2030.

In view of a 2050 target, and in respect of the "polluter pays" principle, it could be also investigated whether ship types which emit more should reach net-zero earlier than other types. As it has been argued during this committee's deliberations, it may be useful to decarbonize first the bigger polluters based on ship type and size and ship specific reductions could be a possible way forward for international shipping to make its contribution.

Moreover, INTERCARGO shares the views of IACS (see recent document MSC 105/2/2) regarding the development of safety requirements at the needed pace and detail to support the achievement of a decarbonization goal, which follows up on an earlier document to the thirty-second Assembly of IMO, and considers aspects and risks associated with the options currently researched and trialled to deliver a safe zero-CO_2-emitting ship.

In conclusion, INTERCARGO supports the IMO in meeting the shared, global challenge of delivering on the shipping industry's decarbonisation agenda and, in representing the dry bulk ship owners, managers and operators, invites IMO to take action as appropriate."

Statement by the observer from the Inuit Circumpolar Council

First statement

"The Inuit Circumpolar Council represents Indigenous Inuit throughout the Arctic, or what we call Inuit Nunaat, our homeland. As with small island states and least developed countries, Inuit livelihoods and culture are severely threatened by the impacts of climate change. Our lives are being affected now, not by 2030 or 2040 or 2050. Climate impacts are immediate and need an immediate response and strong action from IMO members.

Revision of the IMO GHG emissions reduction strategy needs to respond to this immediate danger to our people and all vulnerable communities around the planet. A 2030 target needs to align with a 1.5 degree pathway, which is a reduction of 50% by 2030; The carbon intensity indicator should be strengthened, currently it's not much more than business as usual, which clearly isn't what's needed for vulnerable Inuit communities; and on black carbon, an issue which accelerates the melting of snow and ice, reducing these emissions could be achieved by mandating a fuel switch away from heavy fuel oil in Inuit Nunaat, and the global Arctic.

All of these measures need to allow for a transition which is equitable and accounts for disproportionate impacts to regions and communities like Inuit Nunaat and small island states, and least developed countries.

More attention and urgency needs to be focused on near term measures, and actions which will bring shipping climate emissions down rapidly and immediately. Measures exist and can be implemented in the next years, this committee should focus on those actions. The day to day lives of Inuit and vulnerable states depend on swift, ambitious action by all of you. Now is the time to revise the IMO strategy to address immediate impacts and immediate emissions reductions."

Second statement (concerning the outcome of ISWG-GHG 11)

"As a co-sponsor of document MEPC 78/7/19, Inuit Circumpolar Council would like to stress the importance of fully accounting for the impacts from marine fuels, in the short and long term, and especially black carbon, in the work of this committee. Including GWP 20 along with GWP 100 will allow for this, along with including black carbon in the substances covered by

the LCA guidelines. For Inuit this dialogue isn't theoretical or hypothetical. Inuit live the climate crisis every day, and as shipping increases, and ice and snow rapidly melt, our Inuit homeland is irreversibly impacted. Black carbon is a significant contribution to the shipping sector's climate impact, reducing and eliminating its emissions is consequential for Inuit way of life and survival."

OUTCOME OF ISWG GHG 12

Statement by the observer from ICS

"Thank you Chair, and good day to all. We would like to thank the coordinators of the carbon intensity correspondence group for their diligent work. Our thanks also to the submitters of all documents under this agenda item.

ICS reconfirms its support for the timely implementation of a robust and fair CII system, that incentivises further efficiency gains. However, we believe the scope of the draft G5 guidelines is inconsistent with such timely implementation. This is because 13 of the 23 proposed correction factors and voyage adjustments have not been carried forward, and many of these relate to factors that are outside the control of a shipowner or crew.

For example, a ship providing a North Atlantic liner service will experience above average adverse weather, but is constrained to operate within that region. As a result, it will consume fuel and produce emissions that are greater than average. Without recourse to the adverse weather voyage adjustment, and regardless of how well designed and operated the ship is, it can expect to receive a lower CII rating than a sister ship operating in a more benign region. Port efficiency also varies greatly and ships will on occasions incur port waiting time significantly greater than average. Whilst waiting at anchor a ship will consume fuel but will travel no distance, and without having recourse to the port waiting time correction factor, this will adversely affect the CII rating.

Therefore, under the current G5 guidelines, well designed and efficiently operated ships will incur lower CII ratings for a number of factors that are beyond their control.

Even as a non-mandatory instrument, it is likely that such lower ratings will impact unfairly on charter rates, availability of finance, and reputation.

Such weaknesses in the CII system will be highlighted with experience, and these missing elements will need to be addressed in 2026, at the end of the review period. But what then? Is it not likely that a second review period will then be required to further test and prove the upgraded system? Here lies our concern that the present system is insufficient in scope to ensure timely implementation.

The Carbon Intensity Correspondence Group was tasked with defining the G5 guidelines, and therefore deciding the scope of the correction factors and voyage adjustments. However, as participants in the group, our experience was that insufficient rounds were allowed to fully debate these elements. Hence we would welcome any opportunity that might be granted by the committee to expedite the further consideration of these elements. For example, by allowing submissions to subsequent MEPC meetings or by re-establishment of the Working Group. Such action would facilitate the evolution of CII to a fair and robust system. We hope more rapidly than waiting for the outcome of the 2026 review."

Statement by the observer from INTERTANKO

"INTERTANKO fully supports the adoption of the G5 Guidelines but need to make the Committee aware G5 draft lacks two important correction factors LNG and Gas carriers, as mentioned in document MEPC 78/7/16.

One correction factor is highly needed to avoid a perverse result in the application of the CII rating to LNG and Gas carriers engaged in many shorter voyages, having multiple cargo operations. A concrete example of the perverse result is that a LNG carrier bringing natural gas from the North Sea to Northern Europe will have a much poorer CII rating than in case of bringing less natural gas to Northern Europe from North America and Arabian Gulf, much longer voyages resulting in higher net CO_2 emissions than the former shorter voyage.

The other correction factor relates to the management of the Boil Off Gas (BOG) onboard the LNG carriers. Despite clear justification of the complexity and variety of equipment and use of energy onboard different LNG carriers as provided by Greece in their document MEPC 76/7/52, the Working Group did not properly address it because it was seen a complex issue. INTERTANKO agrees this is a complex issue, therefore it justifies the need of a correction factor to allow CII rating being based on the common denominator for all LNG carriers no matter the many different arrangements combining propulsion system and cargo handling equipment.

Based on the comments above, INTERTANKO fully agrees with ICS statement as supported by Argentina and others that the Committee instructs the Working Group to further consider these two correction factors which need to be added to the G5 guidelines before the application of the CII regulation."

Statement by the observer from CLIA

"CLIA thanks the Chair and all participants for the productive discussions and decisions made during ISWG-GHG 12. CLIA especially thanks Member States and NGOs interested in resolving the issues and the perverse incentives inherent in the existing CII calculation method for cruise passenger ships. There was general agreement among the group that the CII cruise calculation method is not fit-for-purpose, and that rectification is necessary via the development of an alternative metric.

The Group was unfortunately unable to support the inclusion of an appropriate Port Time Correction Factor in the G5 Guidelines. While CLIA remains concerned that the perverse incentive will negatively impact CII ratings for cruise passenger ships for the next few years, CLIA is supportive of the general agreement that more work is needed during the review period to address the flaws in the CII cruise calculation method.

The Report of the Intersessional in paragraph 44 notes that interested Member States and international organizations are invited to collect relevant data and continue work on defining an alternative cruise metric for cruise passenger ships. However, in action item 17, the Group decided to refer only generally to collection of relevant data for the review period. CLIA is concerned that the lack of specificity in the action requested may lead the Committee to not prioritize the work to develop an alternative metric for cruise passenger ships and may lead to some confusion within Administrations and Port State Control as it relates to compliance.

CLIA would like to inform the Committee that CLIA will continue to consult with relevant experts from operators, shipyards and classification societies within the Cruise Ship Safety Forum to develop an alternative CII metric for cruise passenger ships. CLIA will report the progress of these experts to MEPC 79. In the interim, we invite interested Member States and NGOs, including those who have co-sponsored relevant documents, to collaborate with CLIA on this work.

Our goal is to develop a metric which stays true to the intention of the IMO GHG Strategy without the perverse incentives associated with the existing CII cruise calculation method. Collaboration with experts within our industry and with Member States will allow us to arrive at the best result possible.

We request this intervention be included in the Report of the Committee.

Re: Establishment of an International Maritime Research and Development Board and an IMO Maritime Research Fund

CLIA is a co-sponsor of document MEPC 78/7/3. With this proposal, the IMRB would now make significant funds available annually to the GHG TC-Trust Fund, increase opportunities for companies and research institutes in any Member State to participate in the applied R&D programs which the IMRB will commission and to benefit from the knowledge and insights which will be generated by these programs in support of their own GHG reduction efforts. CLIA remains fully supportive of approval and adoption of the IMRB as soon as possible."

Statement by the observer from WSC

"I would like to speak to a matter we believe is critical to how we move forward in the Committee. At the conclusion of ISWG-GHG 12 a significant call of the Chairman was for Members to work together seeking to draw on elements of the various proposals and ideas presented to find a solution workable for everyone in the room. This is a sensible and constructive approach that is critical in dealing with a challenging and complex problem. Such efforts can always lead to solutions not previously articulated.

This flexibility is essential in negotiations that must deal with a complex problem with significant environmental and economic consequences. We would be unwise to define procedures that actually inhibit creative and workable solutions, including solutions that may not have been already tabled. Successful negotiation often requires creativity and we should be sure that we allow creativity and innovation in how we address this challenging issue."

ONBOARD CO_2 CAPTURE

Statement by the delegation of the Republic of Korea

"Thank you Mr. Chair.

Regarding the 2050 Net-Zero GHG emission, the Republic of Korea believes that it is necessary to provide technical tools to substantially reduce GHG in international shipping before the commercialization of zero-emission ship technology.

CCS is a technology that can cost-effectively reduce the GHG of fossil fuel propulsion ships. It will be a means to minimize negative impacts such as rising logistics costs before sufficient supply of alternative fuels is achieved.

Mr. Chair, we would like to remind that a document MEPC 76/7/44 to reflect CO_2 capture system into the CII framework had been considered in ISWG-GHG 8. Although supporting the proposal in principle, the technology was not deemed mature enough to be integrated. Following consideration, the Group agreed to not reflect onboard CO_2 capture at that stage.

About this, the delegation would like to express our concern in terms of promoting GHG reduction technologies. We are all aware that the availability of onboard CO_2 capture system is not sufficient at this moment. However, advances in technologies have always preceeded

the development of IMO regulations, and we believe that the IMO Convention needs to give positive signals to the relevant industry by promoting the introduction of potential new technologies to achieve the goals of the Initial IMO GHG Strategy.

In addition, we would like to highlight that it is also agreed to accelerate efforts toward the phasedown of unabated coal power in the Glasgow Climate Pact.

We stress that even coal power plants, which are the main culprits of global warming, have recognized greenhouse gas reduction devices considering the future growth potential of carbon capture technology. In this context, it is worthwhile to consider onboard CO_2 capture systems when setting IMO goals and considering reduction measures.

If this Committee agrees with the proposed amendments to EEDI and EEXI calculation guidelines for reflecting onboard CO_2 capture, we believe that this can give the industry a strong signal including IMO's commitment in terms of promoting the related technologies.

As a result, IMO will also be able to provide the industry with a good opportunity to further raise the technical readiness level of onboard CO_2 capture which is not currently mature.

Therefore, we would like to reiterate that whether or not the maturity of onboard CO_2 capture at this moment should not be acted as a barrier to limit the introduction of potentially new technologies to reduce absolute carbon emissions from ships, and thereby it will further promote the development of noble technology to achieve 1.5 degree temperature goal and Net-Zero GHG emission by 2050 under the Paris Agreement.

Thank you Mr. Chair."

ITEM 8

Statement by the delegation of Vanuatu

"Thank you Mr. Chair

Our intervention will focus specifically on the outcome of PPR 9 related to the mandatory marking of fishing gear as proposed by Vanuatu in document MEPC 75/8/4 which was debated at MEPC 77 during which many delegations spoke in support of Vanuatu proposal and then sent to PRR 9 for further technical discussion for the MEPC 78 to make a policy decision.

At PPR9 Vanuatu et al submitted a supplementary document to develop further why and how such mandatory marking of fishing gears could be implemented under MARPOL annex V and the Secretariat provided a legal advice in document PPR 9/15/6 detailing available options to consider making the mandatory making of fishing gears and concluded that MARPOL could very well be an appropriate tool to regulate such marking.

Vanuatu and the cosponsors of document PPR 9/15 are very much aware of the challenges ahead to regulate at the international level the mandatory marking of fishing gears and this is exactly why we have suggested that such regulatory framework would not be made through prescriptive-based regulations but through goal-based standards.

In other words, the contemplated mandatory marking of fishing gear regulatory framework would comprise of at least one goal and functional requirement(s) associated with that goal and in order to meet the goal and functional requirement(s), national Administrations would develop rules and regulations accordingly.

IMO expertise in developing goal-based standards is a fact that should give enough confidence to MARPOL Annex V Contracting Parties that any legal and or technical issues (raised in document MEPC 77/8/4) will be taken care of keeping in mind that some IMO Member States have already adopted binding rules for the mandatory marking of fishing gear without particular legal and implementation issues.

Distinguished Delegates, Chair, the global ban on discharge of fishing gear as currently prescribed under MARPOL Annex V and the mandatory reporting of the accidental loss or discharge of fishing gear to IMO as currently considered by PRR as instructed by this Committee can only be successful if the fishing gear so lost, discharged or deliberately discarded into the sea can allow for the identification of the owner.

Indeed, fishing gear marking encourages the notification and retrieval of lost, discharged or deliberately discarded fishing gear hence minimizing their ecological and economic impacts but also increasing safety and reducing navigational risks while also assisting in the fight against illegal, unreported, and unregulated (IUU) fishing as reported by FAO in document MEPC 75/8/2.

Applying goal-based standards for the overarching mandatory marking of fishing gear would address issues pertaining to the characteristics and situations of each region and fishing gear as recommended by Voluntary guidelines on the marking of fishing gears (VGMFG) developed by FAO while uniformly regulating the mandatory marking of fishing gear by MARPOL Annex V.

To conclude Chair, we wish to remind every Delegation that in terms of binding international law, the main legal provision relating to Abandoned, Lost and Discarded fishing gears (ALDFG) is contained in MARPOL Annex V, which basically prohibits the discharge of fishing gear in the marine environment

Of course, MARPOL Annex V does not define all fishing gear as garbage in any condition but it is a fact that any fishing gear may become garbage during the normal operation of the ship or if released into the water and not later retrieved and that should be regulated as a precautionary measure.

Vanuatu calls on all State Parties to MARPOL Annex V to make a high level policy decision on the mandatory marking of fishing gears and instruct PPR to progress its future work in this regard in parallel with the current on-going work on the mandatory reporting of lost fishing gears.

Yesterday was the World Ocean Day and it is time to make a difference considering the level of fishing gears lost, discharged or discarded every year."

Statement by the delegation of Argentina

"Thank you Mr. Chair,

The delegation of Argentina would like to express its concern at the manner in which this Committee has decided to undertake the question of marking of fishing gear, namely through a mandatory goal-based requirement under MARPOL Annex V when the room was not consensual, and wishes to highlight that particular consideration should be given to the challenge this can represent for developing countries.

Thank you."

ITEM 11

Statement by the delegation of Italy

"At the twenty-second meeting of Contracting Parties to the Barcelona Convention (COP 22), all the Contracting Parties agreed to submit to the Organization a proposal for the designation of the Mediterranean Sea, as a whole, as an Emission Control Area (ECA) to prevent, reduce and control emissions of sulphur oxides (SO_X) and particulate matter (PM) from ships pursuant to Regulation 14 and Appendix III to MARPOL Annex VI.

The proposal for designation of the Med SO_X ECA is set forth by countries bordering the Mediterranean Sea and by countries members of the European Union, who associate themselves with this proposal they share a common interest with the riparian states.

Italy believes that the designation of the proposed Med SO_X ECA will represent an important step to protect public health and the environment in the whole Mediterranean Sea, including regional waters and coastlines, and in the communities of the all Mediterranean coastal States due to the very significant reduction of the exposure to harmful levels of air pollution resulting from those emissions.

The designation of the whole Mediterranean Sea as a SO_X ECA area will significantly reduce emissions from ships and will significantly improve the air quality due to the 0.1 global sulfur limit, lower than the value of MARPOL Annex VI (0,5). This will lead to substantial benefits to large segments of the population, as well as to marine and terrestrial ecosystems since air pollution from ships occur not just in the Mediterranean ports and coastlines but also hundreds of kilometres inland.

The Mediterranean region includes a combined population of over 500 million inhabitants, more than half of which reside in coastal communities. Further, considering that ships' pollution travels great distances, much of the inland population is also affected by ships' emissions and will benefit from the cleaner air created thanks to the ECA fuel and engine controls. The populations of all Mediterranean countries are at risk of increased harm from shipping if an ECA will be not designated.

Moreover, meteorological conditions in the Mediterranean Sea bring to land a significant portion of emissions from ships at sea and the resulting pollutants formed in the atmosphere. The emissions from ships of SO_X and their derivatives (including PM) can remain airborne for around five to ten days before they are removed from the atmosphere (e.g. by deposition or chemical transformation).

As established in MARPOL Annex VI, an ECA designation is intended to prevent and reduce the adverse impacts on human health and the environment in areas that can demonstrate a need to prevent, reduce and control emissions of SO_X and PM.

Mr. Chair, ship emissions contribute significantly to air pollution, adverse human health outcomes and ecosystem damage in the Mediterranean Sea area. The designation of the proposed Med SO_X ECA will reduce these effects and improve public health and the environment within the Mediterranean coastal States. Applying SECA standards to vessels engaged in international shipping in the Mediterranean Sea area will achieve substantial benefits at comparable, and reasonable, costs.

Italy cosponsor and fully supports the proposal in document MEPC 78/11 (Albania et al.) to designate the Mediterranean Sea as an Emission Control Area for Sulphur Oxides (Med SO_x ECA) with an entry into force date in early 2025."

Statement by the delegation of India

"India appreciates the concern of the cosponsors on environmental challenges of the Mediterranean region. However, this delegation feels that the proposals to designate the Mediterranean Sea, as a whole, as an Emission Control Area for Sulphur Oxides, is premature and a knee-jerked reaction to a global issue which needs to be addressed through global regulatory frameworks and not through regionalized controls.

This delegation apprehends that the study submitted by the cosponsors to substantiate their proposals does not take into account the latest global regulatory changes in this regard. It apparently fails to review the environment conditions of the region further to the landmark IMO Sulphur Cap of 2020, globally enforced to address the SOx emissions.

It needs to be appreciated that the Mediterranean Sea route is vital to the world seaborne trade and we all beneficiaries the sea route, including the cosponsors themselves. While we respect the sovereign rights of the member states to have regulatory control measures within their geographical jurisdictions, it will be unfair to extend it beyond the territorial waters and even extending to the high seas.

We therefore appeal to the distinguished delegates that technical and economic impacts the proposal place before the international shipping community and the disruptions it may cause to the international trade also need to be assessed prior to finalizing the proposal."

Statement by the delegation of Spain

"Spain, as a co-sponsor of document MEPC 78/11 and as a coastal state in the Mediterranean region, fully supports the proposal to designate the Mediterranean Sea, as a whole, as a sulphur oxide emission control area.

For this delegation, there is no doubt that this proposal will lead to significant reductions in air pollution levels in the Mediterranean Sea as a whole and in the States bordering the Mediterranean, which will have significant benefits for human health and the environment.

We would also like to thank and congratulate all the interested parties who have worked on this proposal for the magnificent work done with particular mention to the Contracting Parties to the Barcelona Convention.

Finally, with regard to the intervention made by the United Kingdom on behalf of the Government of Gibraltar with regard to the interests that this territory may have as a coastal state in the Mediterranean region, this delegation makes the following observation.

At the time when this committee proceeds to adopt the amendments to rule 14.3 and Appendix VII to Annex VI to the MARPOL Convention on the designation of the Mediterranean Sea, as a whole, as a sulphur oxide emission control area, it declares that this act cannot be interpreted as recognition of any rights or situations relating to the maritime areas of Gibraltar. which are not covered by Article 10 of the Treaty of Utrecht of 13 July 1713, signed between the Crowns of Spain and Great Britain.

Spain also considers that Resolution Ill of the Third United Nations Conference on the Law of the Sea is not applicable to the case of the Colony of Gibraltar, which is undergoing a decolonization process in which only the relevant resolutions adopted by the General Assembly of the United Nations are applicable.

The Kingdom of Spain wishes to recall that it does not recognize to the United Kingdom any rights or situations relating to the areas of Gibraltar which are not covered by article X of the Treaty of Utrecht, signed by the Crowns of Spain and Great Britain in 1713.

In particular, Spain has never recognized, nor does it recognize, any sovereignty or jurisdiction of the United Kingdom over the purported "British territorial waters of Gibraltar". All the waters adjacent to the Rock of Gibraltar are Spanish territorial waters, as is clear from the declaration made in this regard by the Kingdom of Spain at the time of accession to the United Nations Convention on the Law of the Sea.

Consequently, Spain would consider that the delimitation that may be carried out by the United Kingdom of an area of environmental protection in the Spanish territorial waters adjacent to the Rock of Gibraltar would be illegitimate and contrary to international law.

In addition, Spain wishes to stress that these same waters are subject to special environmental protection by Spain, as a Site of Community Importance of the Mediterranean biogeographical area of the Natura 2000 Network of the European Union, through Royal Decree 1620/2012, of 30 November, which declares the Site of Community Importance 'Estrecho Oriental' a Special Area of Conservation together with the approval of their corresponding conservation measures.2

Statement by the delegation of Slovenia

"Slovenia as one of the co-sponsors of the document MEPC 78/11 would like to, in line with the actions proposed in the document, fully support the designation of the Mediterranean Sea as a whole, as an Emission controlled Area for Sulphur Oxides with an entry into force in 2025.

In the second half of 2021 Slovenia chaired the EU Council Presidency at the 22nd meeting of the contracting parties of the Barcelona Convention and invested significant efforts to achieve progress on this matter. It is with great pleasure that, after many years of hard work on this issue and comprehensive negotiations at COP22, we have reached an agreement and consensus among the 21 Contracting Parties in December 2021 in Turkey and are here today, inviting this Committee, to approve the proposed amendments to regulation 14.3 and Appendix VII to MARPOL Annex VI on the designation of the Mediterranean Sea, as a whole, as an Emission Control Area for Sulphur Oxides.

The delegation of Slovenia would like to use this opportunity to thank all the Parties and organizations involved in this process for their cooperation and extraordinary efforts to make our vision, to protect public health and the environment in the Mediterranean Sea, by reducing exposure to harmful levels of air pollution resulting from those emissions, a reality.

To this effect, Slovenia will also continue to actively engage with other Parties of the Barcelona Convention to also further investigate nitrogen oxide emissions in the Mediterranean."

Statement by the representative from UNEP

"As you know, the Mediterranean Action Plan of the United Nations Environment Programme (UNEP/MAP) is a regional cooperation platform established in 1975 as the first regional plan under the UNEP Regional Seas Programme.

Over the last four decades, the UNEP/MAP—Barcelona Convention system has responded to evolving environmental challenges and has worked with the Contracting Parties (21 Mediterranean coastal States and the European Union) as well as partners to fulfil the vision of a healthy Mediterranean Sea and Coast that underpin sustainable development in the region.

We are proud to say that the Proposal to Designate the Mediterranean Sea, as a whole, as an Emission Control Area for Sulphur Oxides (Med SO_X ECA) is the outcome of several years of work carried out within the framework of UNEP/MAP—Barcelona Convention.

Aware of the various adverse effects of ship emissions on human health and the environment, the Contracting Parties to the Barcelona Convention have been considering since early 2000's, the possibility of designating the Mediterranean Sea, as a SO_X ECA under MARPOL Annex VI.

The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) administered by the IMO in collaboration with UNEP/MAP, led the technical work and established, back in 2016, a SO_X ECA(s) Technical Committee of Experts composed of official representatives from all 21 Mediterranean coastal States and the European Union.

You heard the background of this work by the distinguished representative of Türkiye, so I am not spending and taking your time on this important element that involved fully all Contracting Parties to the Barcelona Convention.

The Decision IG.25/14 on the Designation of the Mediterranean Sea, as a whole, as an Emission Control Area for Sulphur Oxides (Med SO_X ECA) pursuant to MARPOL Annex VI by the last meeting of the Contracting Parties to the Barcelona Convention held in Antalya is the culmination of intense consultations among the Contracting Parties that have been facilitated by UNEP/MAP and cleared the way for the submission of this joint and coordinated proposal on the designation of the Med SO_X ECA to MEPC 78.

In the meantime, UNEP/MAP, in cooperation with IMO, have been providing continued assistance for the ratification and effective implementation of MARPOL Annex VI to the Contracting Parties to the Barcelona Convention, which have so requested, in line with the road map that has been approved by the Contracting Parties meeting in Naples, Italy in 2019."

Statement by the observer from IPIECA

"We thank the co-sponsors of document MEPC 78/11 to designate the Mediterranean Sea, as a whole, as an Emission Control Area for Sulphur Oxides, a SECA. Our contribution to highlight an observation and a request:

1. While the co-sponsors of document MEPC 78/11 coordinated several consultations with stakeholders, including representatives from the shipping industry, ports, master mariners, environmental interests, state and provincial governments, we noted the refiners were not involved, which we regret: the petroleum industry is committed to advance protection of the natural environment, minimize and mitigate risks and impacts from operations and products, as evidenced during the implementation of the global Sulphur cap in 2020. The refining industry is a key stakeholder which will make the change happen in the Mediterranean Sea.

2. The industry needs certainty for flawless transition to a SECA to manage investments, organize the new supply chain to deploy the 0.1% Sulphur offer in the new SECA before the entry into force of the regulation on January 1, 2025, as proposed by the co-sponsors. Our understanding is that the designation of the Mediterranean Sea, as a whole, as a SECA, relies on the ratification of the MARPOL Annex VI by all neighboring countries, still pending, for level-playing field application. Our industry is calling for the countries that have not yet ratified the MARPOL Annex VI to complete this process by Dec 31, 2023 so it provides the required certainty with sufficient delay before the entry into force of the

measure, as proposed. If the completion of the ratification process were delayed after Dec 31, 2023, a grace period after January 1, 2025 should be granted by the IMO to integrate the unfortunate delay in the revised timeline."

ITEM 14

Statement by the observer from ISO

"Mr. Chair, distinguished delegates

We thank the delegation of Norway and Finland for document MEPC 78/14/1 for the proposed inclusion of a maximum pour point into the definition of 'HFO'.

Our understanding of the proposal appears to be driven to overcome the limitations of the oil spillage uptake equipment / operating capacity - requiring the spilled fuel to be in a more liquid form and not in solid or highly viscous forms, which restricts/prevents the flow towards the skimmers/ brushes, hence the amendment request appears to be *'oil skimmer technology'* driven…. (Para 40 benefits)

We would therefore value more understanding as to why these further restrictions are required, considering the narrowing of the availability of such fuels that would result in such a decision, given that paraffinic fuels have been key to achieving the 0.50% sulfur fuels availability.

Equally therefore we wonder whether the focus should be on the evolution of spillage retrieval equipment design and method, to recover all oil spills (including distillates, which can have pour points above zero degrees C).

Noting in figure 5, of the document, the 900.0 kg/m^3 density has already restricted the bulk of fuels in the region of 97% from being used in the polar regions. Noting that addition of a pour point of maximum 'zero' degrees C, putting aside the complexity of enforcing this limit, does not necessarily eliminate the higher viscosity issues which can occur and need also to be considered. Setting a pour point of '0' degrees C, for the most part, will result in most fuels falling below a viscosity of 20cSt at 50 degrees C. Statistics today however show it is even possible for fuels with viscosity of up to around 60 cSt at 50 degrees C to fall into the proposed criteria. Noting that 20 cSt and 60cSt at 50 degrees C would equate to viscosities of about 250 and 1800 cSt respectively at 0 degrees C and higher when considering lower surface temperatures. The latter is above the upper normal pumping viscosity of approximately 1000 onboard ship. These higher viscosities will have implications on the effectiveness of the skimmers.

Noting that an allowance of 10 degrees C on the required pour point limit needs to be applied to achieve some certainty of the required result.

For paragraph 26 to be effective therefore, an upper pour point limit if to be set, would need to be better set at around -10 degrees C to avoid stated problems with solidification of the *'to be recovered'* spilled fuel oil. This therefore reduces further the available fuels to a very small subset of the marine fuels on the market, with consequential implications on availability. Noting that any such pour point restriction may also impact on availability of distillate fuels.

The above also raises the question as to how much the reported problem, as outlined in paragraphs 25 and 26, is more to do with viscosity as opposed to the pour point?

We also suggest considering whether the definition of 'HFO' is the right terminology in this context and a perhaps separate notation can be used such as '*Polar Fuel Oils'* whereby defining such would be more appropriate for all fuel oils being used in the Artic by specifically defining what is required and not required of such fuels.'

ISO will be pleased to support any further discussion on this subject matter to achieve the desired outcome sought after by Norway and Finland.

We would suggest that the following be further considered for clarification and understanding of the resulting implications of any decision made:

1) It is to be noted that the 0.50% S limit has not been a major issue as to its worldwide availability due to the more paraffinic stock generally used, which consequently has resulted in generally higher pour points. We therefore need to consider:

    a) Viscosity maximum of the spillage retrieval equipment, this to take in to account the effect of cold on the viscosity of the fuel and not just the pour point.

    b) Clarification of the nature of fuels in the specific charts/ figures to be further expanded confirming whether RM and DM or just RM?

2) It should be noted that many of the fuels that are categorised as a residual (RM) are, on further examination, considered to be heavy distillates rather than conventional residual products.

3) Since ordering to an ISO 8217 fuel grade is not mandated, under any MARPOL or other regulations – furthermore a purchaser is in their right to order a fuel to a specific grade with additional limitation criteria.

4) Additionally, it should be noted pour point testing is normally only undertaken in the normal ships service operating range and so any additional outliers such as in this case would likely require dedicating testing by the laboratory.

5) Bunker delivery note (BDN) may, at the discretion of the supplier, give a pour point value but typically even where given will only be within the normal ship operating range.

6) Where pour point depressants are used, they are administered prior to bunker delivery, noting also their limitation may not always be able to achieve the lower levels sought after.

7) Lowering maximum pour point has a counter benefit. In the case of a ship sinking/ or being holed, all fuel oils at temperatures below pour point would be more likely to be retained within the hull structure as it would likely remain solid and therefore not so likely to leak out into polar waters in an expansive manner. Hence a drive to reduce the pour point of fuel oils used within Arctic waters would have the effect of tending to increase the amount of fuel oil which could / would migrate in a liquid state from a wreck or other incident."

Statement by the observer from IBIA

"We thank the co-sponsors for the document MEPC 78/14/1 which proposes to amend the definition of HFO to include a pour point limit. We understand that the intention is to prevent fuels from solidifying in the event of an oil spill in cold Artic waters, because this makes oil-spill clean-up equipment less effective. While we appreciate this concern, we think more data would be needed to assess this proposal properly.

For example, while the document identifies that 97% of the 0.50%S compliant VLSFOs tested will be classified as HFO due to their high density, it states that some 0.10%S residual fuel grades are used in the Artic, of which most would not be classified as HFO due to low density, but would have high pour point. The document does not specify what is meant by 'some' 0.1%S fuel oils. As far as we know, the share of 0.10%S fuel in the market that are classified as residual fuels is really, really small. The vast majority of 0.10%S fuels are distillates, for the most part DMA-grade MGO.

The document proposes to include an upper pour point of 0°C in the HFO definition, in line with the requirements for MGO grades, and winter grades of MDO as well as RMA and RMB grade fuels. It should be noted, however, that marine distillate grades may also have a high paraffinic wax content. MGOs have been known to form solidified wax deposits in fuel tanks during operations in cold winter conditions, as MGO tanks are typically not heated and may be close to the outer skin of the ship.

It would be good to understand more about how MGOs with high paraffinic content behave when spilled in cold waters too, and the impact that would have on oil spill recovery.

Cold flow properties are an important operational aspect, and need to be known in order to ensure fuels are kept above temperatures when they start to form wax crystals or waxy sludge onboard ships. But rewriting the HFO definition by introducing an upper pour point of 0°C would mean that some fuels that are actually distillates would be classified as HFO. This would be confusing as HFO is widely understood to be products containing residual fuel oil.

If there is a case to control pour point because of how the fuel behaves in case of an accidental oil spill, it seems more appropriate to specify a limit on pour point for fuels used in the Arctic, rather than rewriting the definition of HFO.

We could support the proposal made by ISO to develop a separate notation for 'Polar Fuel Oils' or 'Polar fuels' with details on the specific fuel characteristics for fuels that can be used in polar regions, and mandate that only fuels meeting those criteria can be used and carried for use in the Artic."

Statement by the observer from IPIECA

"Dear Chair, distinguished delegates, we thank the co-sponsors of document MEPC 78/14/1.

We express our concurrence with many points addressed by ISO and IBIA, and add the following ones for the Committee's consideration:

- Changing the HFO pour point specification as proposed would reduce the degrees of freedom available to meet HFO quality requirements and could, in particular, limit the crude oil options and increase the difficulty in avoiding stability issues.

- The different levels of aromatic and paraffinic components to formulate fuels adapted to the revised pour point limit could also be counter-productive in reducing Black Carbon emissions in the Arctic waters, recognizing however these emissions depend on many factors related to the engine, its operational conditions and the fuel used.

- The Arctic waters represent a very small fraction of the global HFO demand. The resolution MEPC.329(76) that prohibits the use and carriage for use by ships in Arctic waters on or after 1 July 2024, will further reduce the volumes and proportion of HFO used in the Arctic waters.

- In that context, the change of a parameter to the HFO definition that set a global standard does not appear to be a practical or proportional measure, as claimed in paragraph 38 of document MEPC 78/14/1.

- To address the issue, we recommend no change to the HFO pour point specification but an approach to encourage that, on operability and environmental perspectives, the ship confirms with the supplier that 'the cold flow characteristics are suitable for the ship's design and intended voyage', as already mentioned in the section 6.11 of the ISO 8217. We will be pleased to be involved in these developments"