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REPORT FROM IMO MEPC SEVENTY-SIXTH SESSION (MEPC 76)

IMO's Marine Environment Protection Committee 76th session (MEPC 76) was held remotely from 10th to 17th June 2021 with limited agenda related to the adoption of amendments to mandatory instruments including short-term technical and operational measures to reduce GHG emissions from ships.

The MEPC 76 adopted amendments to the following IMO instruments.

MARPOL Annex I

Amendments to MARPOL Annex I related to the ban of use and carriage of heavy fuel oil in Arctic waters were adopted. On and after 1 July 2024, the use and carriage for use as fuel in Arctic waters of the oils, other than crude oils, having a density at 15°C higher than 900 kg/m³ or a kinematic viscosity at 50°C higher than 180 mm²/s are prohibited. A five-year delay in the implementation of such ban (i.e. 1 July 2029) is granted for vessels that already comply with MARPOL, Annex I, Reg. 12A or with Reg. 1.2.1 of the Polar Code, as these ships have existing fuel tank protections that reduce the risk of fuel oil spills.

Refer to Resolution [MEPC.329\(76\) - 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 \(Prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters\)](#).

Entry into force: 1 November 2022.

MARPOL Annex VI

Amendments were adopted as a new consolidated MARPOL Annex VI, including re-structuring and re-numbering of existing Regulations, under Resolution [MEPC.328\(76\) - Amendments to the Annex of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto \(MARPOL Annex VI\)](#).

The short-term measures to reduce GHG emissions from ships have been adopted as amendments to MARPOL Annex VI. They include the following technical and operational requirements:

- calculation and verification of the Energy Efficiency index for existing ships (EEXI);
- the strengthen of Ship Energy Efficiency Management Plan (SEEMP); and
- introduction of a rating mechanism linked to the operational carbon intensity indicators (CII).

Entry into force: 1 November 2022.

1. EEXI index requirements

New Regulations 23 and 25 to MARPOL Annex VI, applicable to bulk carriers, combination carriers, containerships, cruise passenger ships having non-conventional propulsion, gas carriers, general cargo ships, refrigerated cargo carriers, LNG carriers, ro-ro cargo ships, ro-ro cargo ships (vehicle carrier), ro-ro passenger ships and tankers having GT ≥ 400 engaged in international voyages were adopted. For such ships types the Attained EEXI shall be calculated and this shall result equal or less than the Required EEXI calculated as $(1-Y/100) \times$ EEDI Reference line value. The reduction factors Y are specific for each ship type.

For those ships already having a verified attained EEDI, this value may be taken as the Attained EEXI if it is equal to or less than the required EEXI. In this case, the Attained EEXI shall be verified based on the EEDI Technical File.

Amendments to the 2018 guidelines on the method of calculation of the attained energy efficiency design index (EEDI) for new ships were approved under Resolution [MEPC.332\(76\) – Amendments 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 resolution MEPC.322\(74\)](#). The Guidelines have been amended to reflect the mandatory requirements introduced in MARPOL Annex VI in relation to the obligation of the Administration/RO to report the Required and the Attained EEDI values and relevant information via electronic communication to IMO database.

Guidelines on the method for the calculation of the Attained EEXI for existing ships were approved under Resolution [MEPC.333\(76\) - 2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index \(EEXI\)](#).

Guidelines on survey and certification of the EEXI were approved under Resolution [MEPC.334\(76\) - 2021 Guidelines on survey and certification of the Energy Efficiency Existing Ship Index \(EEXI\)](#).

Entry into force: The verification of the ship's Attained EEXI shall take place at the first annual, intermediate or renewal survey of the IAPP Certificate or the initial survey of the IEEC Certificate, whichever is the first, on or after 1 January 2023.

2. SEEMP requirements

New Regulation 26 to MARPOL Annex VI, applicable to ships having conventional propulsion having GT ≥ 5.000 engaged in international voyages, has been adopted and shall include in the SEEMP:

- a description of the methodology that will be used to calculate the ship's Attained annual operational Carbon Intensity Indicator (CII) and the processes that will be used to report this value to the ship's flag Administration;
- the Required annual operational CII for the next 3 years;
- an implementation plan documenting how the Required annual operational CII will be achieved during the next 3 years; and
- a procedure for self-evaluation and improvement.

The SEEMP of these ships shall be subject to verification and Company audits taking into account the Guidelines which are still to be developed.

Proposals for allowing fleet averaging of the CII were not agreed but may, in principle, be considered in future as an option under mid- and long-term measures.

MEPC 76 agreed to make the regulatory text clear in that the verification and audit requirement for the SEEMP would only apply to ships above 5,000 GT subject to the CII requirements.

Entry into force: Confirmation of compliance shall be provided by the Administration/RO and retained onboard prior to 1 January 2023.

3. Operational carbon intensity-indicators (CII) and rating

New Regulation 28 to MARPOL Annex VI, applicable to ships having conventional propulsion of 5.000GT and above has been adopted and shall:

- from 2023, after the end of each calendar year, calculate the Attained annual operational CII over a 12-month period from 1 January to 31 December in that calendar year and electronically report it to its Administration/RO within March of each calendar year; and
- calculate the Required annual operational CII as $(1-Z/100) \times CIIR$, where the annual reduction factor Z is a flat rate for all ship types (i.e. 5% for 2023; 7% for 2024; 9% for 2025; 11% for 2026 and % still to be decided for 2027-2030) and the reference values CIIR are calculated according to the IMO implementing Guidelines (see below).

The Administration/RO shall verify the Attained annual operational CII against the Required annual operational CII to determine operational carbon intensity rating A, B, C, D or E. The middle point of rating level C shall be the value equivalent to the required annual operational CII.

A ship rated D for 3 consecutive years or rated as E shall develop a corrective action plan to achieve the required annual operational CII. Such a plan shall be included in the SEEMP which shall be submitted to the Administration/RO for verification within 1 month after reporting the Attained annual operational CII.

Entry into force: The above is to take effect from 1 January 2023.

4. IMO Implementing Guidelines

The MARPOL Annex VI amendments refer to the following Implementing Guidelines adopted by MEPC76:

- 2021 Guidelines on the shaft/engine power limitation system to comply with the EEXI requirements and use of a power reserve (Res. MEPC.335(76))
- 2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines, G1) (Res. MEPC.336(76))
- 2021 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference line guidelines, G2) (Res. MEPC.337(76))
- 2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factor guidelines, G3) (Res. MEPC.338(76))
- 2021 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4) (Res. MEPC.339(76))

The main decisions regarding EEXI guidelines include:

- In case an engine power limitation (EPL) is installed, the engine power in the EEXI calculation (PME) should be 83% of the maximum limited power (MCRlim) or 75% of maximum power (MCR), whichever is lower.
- Numerical calculations were accepted as an alternative to tank tests when calculating the speed in the EEXI calculation (v_{ref}).
- Additional options for calculating v_{ref} using in-service speed measurements will be further discussed and may be included at a later stage.
- Consideration of energy efficiency technologies such as wind propulsion systems was deferred.
- An additional capacity correction factor for ro-ro cargo ships (vehicle carrier) was agreed.

The remaining work will be conducted through a Correspondence Group reporting to MEPC 78 in 2022, and should include:

- Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP)
- Guidelines on correction factors for certain ship types, operational profiles and/or voyages for the CII calculations (G5)
- Guidelines on the audit and verification processes of SEEMP, including for ships required to develop a plan of corrective actions (PCA)
- Development of possible parameters and templates for reporting, verification and submission of data for trial CIIs of individual ships on a voluntary basis
- Various other guidelines, e.g. Procedures for Port State Control (PSC) and Verification of ship fuel oil consumption data (DCS)
- Guidelines on aggregation and reporting of ship's fuel consumption data to the new Administration and/or Company in the event of change from one Administration to another and/or from one Company to another

Amendments to MARPOL Annexes I, IV and VI

Unmanned non-self-propelled (UNSP) barges, having no system, equipment and/or machinery fitted that may generate discharges or emissions regulated by Annex I, IV and VI, may be exempted from survey and certification requirements under MARPOL Annexes I, IV and VI for periods not exceeding 5 years. Exemption certificate valid for 5 years will be issued instead of relevant MARPOL certificate.

The specific guidance for flag States, port States and interested parties, including shipowners and operators, on the application of such exemption for UNSP barges ([MEPC.1/Circ.892](#) as approved at MEPC 76) clarifies:

- the technical and operational requirements not applicable to UNSP barges;
- procedures for granting exemptions;
- maintenance of conditions after survey; and
- pushing and towing.

Resolution [MEPC.MEPC.330\(76\)](#) - 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 Annexes I and IV (Exemption of unmanned non-self-propelled barges from survey and certification requirements) and circular [MEPC.1/Circ.892](#) - Guidelines for exemption of unmanned non-self-propelled (UNSP) barges from the survey and certification requirements under the MARPOL Convention should be considered.

Entry into force: 1 November 2022.

AFS Convention

Amendments to AFS convention introducing the ban of systems containing cybutryne has been adopted by the Resolution [MEPC.331\(76\)](#) - Amendments to the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 - Amendments to Annexes 1 and 4 (Controls on cybutryne and form of the International Anti-Fouling System Certificate)

The use of Anti-Fouling Systems containing cybutryne is prohibited as follows:

- ships shall not apply or re-apply anti-fouling systems containing this substance from 1 January 2023; and
- ships with an anti-fouling system that contains this substance in the external coating layer of their hulls or external parts or surfaces on 1 January 2023 shall either:
 - remove the anti-fouling system; or
 - apply a coating that forms a barrier to this substance leaching from the underlying non-compliant anti-fouling system not later than 60 months following the last application to the ship of an antifouling system containing cybutryne.

The requirement to remove or seal does not apply to:

- fixed and floating platforms, FSUs and FPSOs constructed prior to 1 January 2023 and not dry-docked on or after that date;
- ships not engaged in international voyages; and
- ships of less than 400 GT engaged in international voyages, if accepted by the coastal state.

The Form of the Certificate has been amended to reflect the above and identify also the cases where ships that had applied an anti-fouling system containing cybutryne previously, but have such a system not currently contained in the external coating layer of their hulls or external parts or surfaces.

Entry into force: 1 January 2023.

Other agreed measures

Unified interpretations to MARPOL Annex VI

Unified interpretations to Reg. 2.23 of MARPOL Annex VI concerning the clarification of the dates related to EEDI Phase 2 and 3 for new ships were approved by the circular [MEPC.1/Circ.795/Rev.5 – Unified interpretations to MARPOL Annex VI](#).

Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions

At MEPC 76 amendments to the 2013 Interim Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions (MEPC.1/Circ.850/Rev.2) were approved under circular [MEPC.1/Circ.850/Rev.3](#).

The Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions have been revised to:

- modify the adverse weather conditions (i.e. significant wave height 6 m; mean wind speed 22.6m/s); and
- include a new method of the assessment procedure (i.e. minimum power assessment), replacing the current simplified assessment level 2.

The Committee agreed to keep the Guidelines under review to further consider additional issues that may arise from their application.

Guidelines for the reduction of underwater noise from commercial shipping to address impacts on marine life

At MEPC 76 it has been agreed that new outputs for the review of the MEPC.1/Circ.833 - 2014 Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life should be assessed and next steps to be identified.

Marine plastic litter

At MEPC 76 two circulars related to marine plastic litter were approved:

- [Circular MEPC.1/Circ.893 - Provision of adequate facilities at ports and terminals for the reception of plastic waste from ships](#)
- [Circular MEPC.1/Circ.894 - Sharing of results from research on marine litter and encouraging studies to better understand microplastics from ships](#)

List of Resolutions and Circulars adopted at MEPC 76:

MEPC.328(76) - Amendments to the Annex of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL Annex VI)

MEPC.329(76) - 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 (Prohibition on the use and carriage for use as fuel of heavy fuel oil By ships in Arctic waters)

MEPC.330(76) - 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 Annexes I and IV (Exemption of unmanned non-self-propelled barges from survey and certification requirements)

MEPC.331(76) - Amendments to the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 – Amendments to Annexes 1 And 4 (Controls on cybutryne and form of the International Anti-Fouling System Certificate)

MEPC.332(76) - Amendments 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 resolution MEPC.322(74))

MEPC.333(76) - 2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)

MEPC.334(76) - 2021 Guidelines on survey and certification of the Energy Efficiency Existing Ship Index (EEXI)

MEPC.335(76) - 2021 Guidelines on the shaft/engine power limitation system to comply with the EEXI requirements and use of a power reserve

MEPC.336(76) - 2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)

MEPC.337(76) - 2021 Guidelines on the reference lines for use with operational carbon intensity indicators (CII Reference Lines Guidelines, G2)

MEPC.338(76) - 2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII Reduction Factor Guidelines, G3)

MEPC.339(76) - 2021 Guidelines on the operational carbon intensity rating of ships (CII Rating Guidelines, G4)

MEPC.1/Circ.850/Rev.3 - Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions

MEPC.1/Circ.892 - Guidelines for exemption of unmanned non-self-propelled (UNSP) barges from the survey and certification requirements under the MARPOL Convention

MEPC.1/Circ.893 - Provision of adequate facilities at ports and terminals for the reception of plastic waste from ships

MEPC.1/Circ.894 - Sharing of results from research on marine litter and encouraging studies to better understand microplastics from ships

MEPC.1/Circ.895 - Unified interpretations to the NOX Technical Code 2008, as amended

MEPC.1/Circ.795/Rev.5 - Unified interpretations to MARPOL ANNEX VI

MEPC.1/Circ.850/Rev.3 - Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions

Resolutions and Circulars attached to this Newsletter:

MEPC.329(76) - 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 (Prohibition on the use and carriage for use as fuel of heavy fuel oil By ships in Arctic waters)

MEPC.330(76) - 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 Annexes I and IV (Exemption of unmanned non-self-propelled barges from survey and certification requirements)

MEPC.331(76) - Amendments to the International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 – Amendments to Annexes 1 And 4 (Controls on cybutryne and form of the International Anti-Fouling System Certificate)

MEPC.332(76) - Amendments 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 resolution MEPC.322(74))

MEPC.333(76) - 2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)

MEPC.334(76) - 2021 Guidelines on survey and certification of the Energy Efficiency Existing Ship Index (EEXI)

MEPC.335(76) - 2021 Guidelines on the shaft/engine power limitation system to comply with the EEXI requirements and use of a power reserve

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MEPC.338(76) - 2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII Reduction Factor Guidelines, G3)

MEPC.339(76) - 2021 Guidelines on the operational carbon intensity rating of ships (CII Rating Guidelines, G4)

MEPC.1/Circ.850/Rev.3 - Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions

MEPC.1/Circ.892 - Guidelines for exemption of unmanned non-self-propelled (UNSP) barges from the survey and certification requirements under the MARPOL Convention

MEPC.1/Circ.893 - Provision of adequate facilities at ports and terminals for the reception of plastic waste from ships

MEPC.1/Circ.894 - Sharing of results from research on marine litter and encouraging studies to better understand microplastics from ships

MEPC.1/Circ.895 - Unified interpretations to the NOX Technical Code 2008, as amended

MEPC.1/Circ.795/Rev.5 - Unified interpretations to MARPOL ANNEX VI

ANNEX 2

**RESOLUTION MEPC.329(76)
(adopted on 17 June 2021)**

**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

**(Prohibition on the use and carriage for use as fuel of heavy fuel oil
by ships in Arctic waters)**

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 and adopting amendments thereto,

HAVING CONSIDERED, at its seventy-sixth session, proposed amendments to MARPOL Annex I concerning the prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters, which were circulated in accordance with article 16(2)(a) of MARPOL,

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 May 2022 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% 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 2022 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 REQUESTS ALSO 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

(Prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters)

1 The title of chapter 9 is amended as follows:

"Chapter 9 – Special requirements for the use or carriage of oils in polar waters"

2 A new regulation 43A is added in chapter 9 after existing regulation 43, as follows:

"Regulation 43A

Special requirements for the use and carriage of oils as fuel in Arctic waters

1 With the exception of ships engaged in securing the safety of ships or in search and rescue operations, and ships dedicated to oil spill preparedness and response, the use and carriage of oils listed in regulation 43.1.2 of this Annex as fuel by ships shall be prohibited in Arctic waters, as defined in regulation 46.2 of this Annex, on or after 1 July 2024.

2 Notwithstanding the provisions of paragraph 1 of this regulation, for ships to which regulation 12A of this Annex or regulation 1.2.1 of chapter 1 of part II-A of the Polar Code applies, the use and carriage of oils listed in regulation 43.1.2 of this Annex as fuel by those ships shall be prohibited in Arctic waters, as defined in regulation 46.2 of this Annex, on or after 1 July 2029.

3 When prior operations have included the use and carriage of oils listed in regulation 43.1.2 of this Annex as fuel, the cleaning or flushing of tanks or pipelines is not required.

4 Notwithstanding the provisions of paragraphs 1 and 2 of this regulation, the Administration of a Party to the present Convention the coastline of which borders on Arctic waters may temporarily waive the requirements of paragraph 1 of this regulation for ships flying the flag of that Party while operating in waters subject to the sovereignty or jurisdiction of that Party, taking into account the guidelines to be developed by the Organization. No waivers issued under this paragraph shall apply on or after 1 July 2029.

5 The Administration of a Party to the present Convention which allows application of paragraph 4 of this regulation shall communicate to the Organization for circulation to the Parties particulars of the waiver thereof, for their information and appropriate action, if any."

ANNEX 3

**RESOLUTION MEPC.330(76)
(adopted on 17 June 2021)**

**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 Annexes I and IV

**(Exemption of unmanned non-self-propelled barges from certain survey and
certification requirements)**

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 and adopting amendments thereto,

HAVING CONSIDERED, at its seventy-sixth session, proposed amendments to MARPOL Annexes I and IV concerning the exemption of unmanned non-self-propelled (UNSP) barges from survey and certification requirements, which were circulated in accordance with article 16(2)(a) of MARPOL,

1 ADOPTS, in accordance with article 16(2)(d) of MARPOL, amendments to MARPOL Annexes I and IV, 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 2022 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% 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 2022 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 annexes to all Parties to MARPOL;

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

ANNEX

AMENDMENTS TO MARPOL ANNEX I

(Exemption of UNSP barges from certain survey and certification requirements)

Regulation 1

Definitions

1 A new paragraph 40 is added as follows:

"40 *Unmanned non-self-propelled (UNSP) barge* means a barge that:

- .1 is not propelled by mechanical means;
- .2 carries no oil (as defined in regulation 1.1 of this Annex);
- .3 has no machinery fitted that may use oil or generate oil residue (sludge);
- .4 has no oil fuel tank, lubricating oil tank, oily bilge water holding tank and oil residue (sludge) tank; and
- .5 has neither persons nor living animals on board."

Regulation 3

Exemptions and waivers

2 Paragraph 2 is replaced by the following:

"2 Particulars of any such exemption, except those under paragraph 7 of this regulation, granted by the Administration shall be indicated in the Certificate referred to in regulation 7 of this Annex."

3 A new paragraph 7 is added as follows:

"7 The Administration may exempt a UNSP barge* from the requirements of regulations 6.1 and 7.1 of this Annex, by an International Oil Pollution Prevention Exemption Certificate for Unmanned Non-self-propelled Barges, for a period not exceeding five years provided that the UNSP barge has undergone a survey to confirm that the conditions referred to in regulations 1.40.1 to 1.40.5 of this Annex are met.

* Refer to the *Guidelines for exemption of unmanned non-self-propelled barges from certain survey and certification requirements under the MARPOL Convention* (MEPC.1/Circ.892)."

Regulation 8

Issue of endorsement of certificate by another Government

4 Paragraph 4 is replaced by the following:

"4 No International Oil Pollution Prevention Certificate or UNSP Exemption Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party."

Regulation 9

Form of certificate

5 The existing paragraph is numbered as paragraph 1 and a new paragraph 2 is added as follows:

"2 The International Oil Pollution Prevention Exemption Certificate for Unmanned Non-self-propelled Barges shall be drawn up in the form corresponding to the model given in appendix IV to this Annex and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in the event of a dispute or discrepancy."

6 A new appendix IV is added as follows:

"APPENDIX IV

Form of Exemption Certificate for UNSP Barges

**INTERNATIONAL OIL POLLUTION PREVENTION EXEMPTION CERTIFICATE FOR
UNMANNED NON-SELF-PROPELLED (UNSP) BARGES**

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978, as amended, relating 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.....
Port of registry
Gross tonnage

THIS IS TO CERTIFY:

1 That the UNSP barge has been surveyed in accordance with regulation 3.7 of Annex I to the Convention;

2 That the survey shows that the UNSP barge:

- .1 is not propelled by mechanical means;
- .2 carries no oil (as defined in regulation 1.1 of Annex I to the Convention);
- .3 has no machinery fitted that may use oil or generate oil residue (sludge);
- .4 has no oil fuel tank, lubricating oil tank, oily bilge water holding tank and oil residue (sludge) tank; and
- .5 has neither persons nor living animals on board; and

3 That the UNSP barge is exempted, under regulation 3.7 of Annex I to the Convention, from the certification and related survey requirements of regulations 6.1 and 7.1 of Annex I to the Convention.

This certificate is valid until (dd/mm/yyyy).....

subject to the exemption conditions being maintained.

Completion date of the survey on which this certificate is based (dd/mm/yyyy).....

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

Issued at
(place of issue of certificate)

.....
(date of issue) (dd/mm/yyyy)

.....
*(signature of duly authorized
official issuing the certificate)*

(seal or stamp of the authority, as appropriate)"

AMENDMENTS TO MARPOL ANNEX IV

(Exemption of UNSP barges from certain survey and certification requirements)

Regulation 1

Definitions

1 A new paragraph 16 is added as follows:

"16 *Unmanned non-self-propelled (UNSP) barge* means a barge that:

- .1 is not propelled by mechanical means;
- .2 has neither persons nor living animals on board;
- .3 is not used for holding sewage during transport; and
- .4 has no arrangements that could produce sewage as defined in regulation 1.3 of this Annex."

Regulation 3

Exceptions

2 The title of the regulation is replaced by the following:

"Exceptions and exemptions"

3 A new paragraph 2 is added as follows:

"2 The Administration may exempt an unmanned non-self-propelled (UNSP) barge* from the requirements of regulations 4.1 and 5.1 of this Annex, by an International Sewage Pollution Prevention Exemption Certificate for Unmanned Non-self-propelled (UNSP) Barges, for a period not exceeding 5 years provided that the barge has undergone a survey to confirm that the conditions referred to in regulations 1.16.1 to 1.16.4 of this Annex are met."

* Refer to the *Guidelines for exemption of unmanned non-self-propelled barges from the survey and certification requirements under the MARPOL Convention* (MEPC.1/Circ.892).

Regulation 6

Issue of endorsement of a Certificate by another Government

4 Paragraph 4 is replaced by the following:

"4 No International Sewage Pollution Prevention Certificate or UNSP Exemption Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party."

Regulation 7

Form of Certificate

5 The existing paragraph is numbered as paragraph 1 and the reference to "appendix" is replaced by "appendix 1".

6 A new paragraph 2 is added as follows:

"2 The International Sewage Pollution Prevention Exemption Certificate for Unmanned Non-self-propelled (UNSP) Barges shall be drawn up in the form corresponding to the model given in appendix II to this Annex and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in the event of a dispute or discrepancy."

Appendices

7 The existing appendix is numbered as appendix I and a new appendix II is added as follows:

"APPENDIX II

Form of Exemption Certificate for UNSP Barges

INTERNATIONAL SEWAGE POLLUTION PREVENTION EXEMPTION CERTIFICATE FOR UNMANNED NON-SELF-PROPELLED (UNSP) BARGES

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978, as amended, relating 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
Port of registry
Gross tonnage

THIS IS TO CERTIFY:

1 That the unmanned non-self-propelled (UNSP) barge has been surveyed in accordance with regulation 3.2 of Annex IV to the Convention;

2 That the survey shows that the unmanned non-self-propelled (UNSP) barge:

- .1 is not propelled by mechanical means;
- .2 has neither persons nor living animals on board;
- .3 is not used for holding sewage during transport; and
- .4 has no arrangements that could produce sewage as defined in regulation 1.3 of Annex IV to the Convention; and

3 That the UNSP barge is exempted, under regulation 3.2 of Annex IV to the Convention, from the certification and related survey requirements of regulations 4.1 and 5.1 of Annex IV to the Convention.

This certificate is valid until (dd/mm/yyyy).....

subject to the exemption conditions being maintained.

Completion date of the survey on which this certificate is based (dd/mm/yyyy).....

Issued at
(place of issue of certificate)

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

.....
(date of issue) (dd/mm/yyyy):

.....
*(signature of duly authorized
official issuing the certificate)*

(seal or stamp of the authority, as appropriate)"

ANNEX 4

**RESOLUTION MEPC.331(76)
(adopted on 17 June 2021)**

**AMENDMENTS TO THE INTERNATIONAL CONVENTION ON THE
CONTROL OF HARMFUL ANTI-FOULING SYSTEMS ON SHIPS, 2001**

Amendments to Annexes 1 and 4

(Controls on cybutryne and form of the International Anti-fouling System Certificate)

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 on the Control of Harmful Anti-fouling Systems on Ships, 2001 (the AFS Convention), which specifies the amendment procedure and confers upon the Marine Environment Protection Committee of the Organization the function of considering amendments thereto for adoption by the Parties,

HAVING CONSIDERED, at its seventy-sixth session, proposed amendments to the AFS Convention regarding controls on cybutryne and the form of the International Anti-fouling System Certificate,

1 ADOPTS, in accordance with article 16(2)(c) of the AFS Convention, amendments to Annexes 1 and 4, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article 16(2)(e)(ii) of the AFS Convention, that the amendments shall be deemed to have been accepted on 1 July 2022 unless prior to that date more than one third of the Parties have notified the Secretary-General that they object to the amendments;

3 INVITES the Parties to note that, in accordance with articles 16(2)(f)(ii) and (iii) of the AFS Convention, the said amendments shall enter into force on 1 January 2023 upon their acceptance in accordance with paragraph 2 above;

4 INVITES ALSO the Parties to remind ships that fly their flag and that are confirmed to be affected by the amendments to Annex 1 to the AFS Convention adopted through the present resolution to make a timely request for a survey for the issuance of an International Anti-fouling System Certificate, in the amended model form adopted through the present resolution, using the procedure outlined in paragraphs 4 and 5.3 of the annex to resolution MEPC.195(61), as may be amended by the Organization, so that ships have a valid International Anti-fouling System Certificate on board not later than 24 months after the entry into force of the amendments to Annex 1 to the AFS Convention adopted through the present resolution;

5 INVITES FURTHER the Parties to issue new International Anti-fouling System Certificates, in the amended model form adopted through the present resolution, at the next anti-fouling system application, in the case of ships that are confirmed not to be affected by the amendments to Annex 1 to the AFS Convention adopted through the present resolution;

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

7 REQUESTS ALSO the Secretary-General to transmit copies of the present resolution and its annex to Members of the Organization which are not Parties to the AFS Convention;

8 REQUESTS FURTHER the Secretary-General to prepare a consolidated certified text of the AFS Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CONVENTION ON THE
CONTROL OF HARMFUL ANTI-FOULING SYSTEMS ON SHIPS, 2001**

**Annex 1
Controls on anti-fouling systems**

1 The following rows are added to the table in Annex 1 to the 2001 AFS Convention:
"

Anti-fouling system	Control measures	Application	Effective date
Cybutryne CAS No. 28159-98-0	Ships shall not apply or re-apply anti-fouling systems containing this substance	All ships	1 January 2023
Cybutryne CAS No. 28159-98-0	Ships bearing an anti-fouling system that contains this substance in the external coating layer of their hulls or external parts or surfaces on 1 January 2023 shall either: (1) remove the anti-fouling system; or (2) apply a coating that forms a barrier to this substance leaching from the underlying non-compliant anti-fouling system	All ships except: (1) fixed and floating platforms, FSUs, and FPSOs that have been constructed prior to 1 January 2023 and that have not been in dry-dock on or after 1 January 2023; (2) ships not engaged in international voyages; and (3) ships of less than 400 gross tonnage engaged in international voyages, if accepted by the coastal State(s)	At the next scheduled renewal of the anti-fouling system after 1 January 2023, but no later than 60 months following the last application to the ship of an anti-fouling system containing cybutryne

"

Annex 4**Surveys and certification requirements for anti-fouling systems**

2 Regulation 2(3) is replaced by the following:

"(3) For ships bearing an anti-fouling system controlled under Annex 1 that was applied before the date of entry into force of a control for such a system, the Administration shall issue a Certificate in accordance with paragraphs (1) and (2) of this regulation not later than two years after entry into force of that control. This paragraph shall not affect any requirement for ships to comply with Annex 1."

Appendix 1 to Annex 4**Model form of International Anti-fouling System Certificate**

3 The section of the model form of the International Anti-fouling System Certificate (appendix 1) listing the compliance options for controlled anti-fouling systems on the ship is replaced by the following:

"An anti-fouling system controlled under Annex 1 containing:

	Has not been applied during or after construction of this ship	Has been applied on this ship previously, but has been removed by	Has been applied on this ship previously, but has been covered with a sealer coat applied by	Has been applied on this ship previously, but is not in the external coating layer of the hull or external parts or surfaces on	Was applied on this ship prior to
Organotin compounds which act as biocides	<input type="checkbox"/> <i>(insert name of the facility)</i> on <i>(dd/mm/yyyy)</i> <input type="checkbox"/> <i>(insert name of the facility)</i> on <i>(dd/mm/yyyy)</i> <input type="checkbox"/>	Not applicable	Not applicable
Cybutryne	<input type="checkbox"/> <i>(insert name of the facility)</i> on <i>(dd/mm/yyyy)</i> <input type="checkbox"/> <i>(insert name of the facility)</i> on <i>(dd/mm/yyyy)</i> <input type="checkbox"/>	1 January 2023 <input type="checkbox"/>	1 January 2023, but must be removed or covered with a sealer coat prior to <i>(dd/mm/yyyy)</i> <input type="checkbox"/>

"

ANNEX 5

**RESOLUTION MEPC.332(76)
(adopted on 17 June 2021)**

**AMENDMENTS 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 RESOLUTION MEPC.322(74))**

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,

RECALLING ALSO that, at its sixty-second session, it adopted, by resolution MEPC.203(62), *Amendments to the annex of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto* (inclusion of regulations on energy efficiency for ships in MARPOL Annex VI),

NOTING that the aforementioned amendments to MARPOL Annex VI entered into force on 1 January 2013,

NOTING ALSO that regulation 22 (Attained Energy Efficiency Design Index (attained EEDI)) of MARPOL Annex VI, as amended, requires that the EEDI shall be calculated taking into account the guidelines developed by the Organization,

NOTING FURTHER the *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, adopted at its sixty-third session by resolution MEPC.212(63), superseded by the *2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.245(66)), which were subsequently superseded by the *2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.308(73)),

NOTING that, at its seventy-fourth session, it adopted, by resolution MEPC.322(74), *Amendments to the 2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*,

HAVING CONSIDERED, at its seventy-sixth session, proposed amendments 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 resolution MEPC.322(74)),

1 ADOPTS amendments 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 resolution MEPC.322(74)), as set out in the annex to the present resolution;

2 INVITES Administrations to take into account the aforementioned amendments when developing and enacting national laws which give force to, and implement provisions set forth in regulation 20 of MARPOL Annex VI, as amended;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the amendments to the attention of shipowners, ship operators, shipbuilders, ship designers and any other interested parties;

4 AGREES to keep these Guidelines, as amended, under review, in light of experience gained with their implementation.

ANNEX

**AMENDMENTS TO THE 2018 GUIDELINES ON THE METHOD OF CALCULATION OF
THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS**

1 A new section 3 is added, as follows:

"3 Mandatory Reporting of Attained EEDI Values and Related Information

3.1 In accordance with regulation 22.3 of MARPOL Annex VI, for each ship subject to regulation 24, the Administration or any organization duly authorized by it shall report the required and attained EEDI values and relevant information taking into account these Guidelines via electronic communication.

3.2 Information to be reported are as follows:

- .1 applicable EEDI phase (e.g. Phase 1, Phase 2, etc.);
- .2 identification number (IMO Secretariat use only);
- .3 ship type;
- .4 common commercial size reference* (see Note (3) in appendix 5 to these Guidelines), if available;
- .5 DWT or GT (as appropriate);
- .6 year of delivery;
- .7 required EEDI value;
- .8 attained EEDI value;
- .9 dimensional parameters (length L_{pp} (m), breadth B_s (m), and draught (m));
- .10 V_{ref} (knots) and P_{ME} (kW);
- .11 use of innovative technologies (4th and 5th terms in the EEDI equation, if applicable);
- .12 short statement* describing the principal design elements or changes employed to achieve the attained EEDI (as appropriate), if available;
- .13 type of fuel used in the calculation of the attained EEDI, and for dual-fuel engines, the f_{DFgas} ratio; and
- .14 ice class designation (if applicable).

* Not subject to verification.

- 3.3 The information in paragraph 3.2 is not required to be reported for ships for which the required and attained EEDI values had been already reported to the Organization.
 - 3.4 A standardized reporting format for Mandatory Reporting of Attained EEDI Values and Related Information is presented in appendix 5."
- 2 A new appendix 5 is added, as follows:

"APPENDIX 5

STANDARD FORMAT TO SUBMIT EEDI INFORMATION TO BE INCLUDED IN THE EEDI DATABASE

IMO Number (1)	Type of ship (2)	Common commercial size (3)	Capacity (4)		Dimensional parameters			Year of delivery	Applicable phase	Required EEDI	Attained EEDI	Vref (knot) (9)	PME (kW) (10)	Type of fuel (11)	f _{DF} gas (12)	Ice class (13)	EEDI 4th term (Installation of innovative electrical technology)		EEDI 5th term (Installation of innovative mechanical technology)		Short statement as appropriate describing the principal design elements or changes employed to achieve the attained EEDI (15)	
			DWT	GT (5)	Lpp (m) (6)	Bs (m) (7)	Draught (m) (8)										Yes/No	Name, outline and means/ways of performance of technology (14)	Yes/No	Name, outline and means/ways of performance of technology (14)		

- Note:**
- (1) IMO number to be submitted for Secretariat use only.
 - (2) As defined in regulation 2 of MARPOL Annex VI.
 - (3) Common commercial size reference (TEU for containership, CEU (RT43) for ro-ro cargo ship (vehicle carrier), cubic meter for gas carrier and LNG carrier), if available, should be provided.
 - (4) The exact DWT or GT, as appropriate, should be provided. The Secretariat should round the DWT or GT data up to the nearest 500 when these data are subsequently provided to MEPC. (For containerships, 100% DWT should be provided while 70% of DWT should be used when calculating the EEDI value).
 - (5) GT should be provided for a cruise passenger ship having non-conventional propulsion as defined in regulations 2.2.11 and 2.2.19, respectively, of MARPOL Annex VI. Both DWT and GT should be provided for a ro-ro cargo ship (vehicle carrier) as defined in regulation 2.2.27 of MARPOL Annex VI.
 - (6) As defined in paragraph 2.2.13 of 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 exact Lpp should be provided. The Secretariat will round the Lpp data up to the nearest 10 when these data are subsequently provided to MEPC.
 - (7) As defined in paragraph 2.2.16 of 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 exact Bs should be provided. The Secretariat will round the Bs data up to the nearest 1 when these data are subsequently provided to MEPC.
 - (8) As defined in paragraph 2.2.15 of 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 exact draught should be provided. The Secretariat will round the draught data up to the nearest 1 when these data are subsequently provided to MEPC.
 - (9) As defined in paragraph 2.2.2 of 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 exact Vref should be provided. The Secretariat will round the Vref data up to the nearest 0.5 when these data are subsequently provided to MEPC.
 - (10) As defined in paragraph 2.2.5.1 of 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 exact P_{ME} should be provided. The Secretariat will round the P_{ME} data up to the nearest 100 when these data are subsequently provided to MEPC.
 - (11) As defined in paragraph 2.2.1 of 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) or other (to be stated). In case of a ship equipped with a dual-fuel engine, type of "primary fuel" should be provided.
 - (12) As defined in paragraph 2.2.1 of 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), if applicable.
 - (13) Ice class, which was used to calculate correction factors for ice-classed ships as defined in paragraphs 2.2.8.1 and 2.2.11.1 of 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), if applicable, should be provided.
 - (14) In the case that the innovative energy efficiency technologies are already included in the *2013 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI* (MEPC.1/Circ.815), the name of technology should be identified. Otherwise, name, outline and means/ways of performance of the technology should be identified.
 - (15) To assist the IMO in assessing relevant design trends, provide a short statement as appropriate, describing the principal design elements or changes employed to achieve the attained EEDI.

ANNEX 6

UNIFIED INTERPRETATION TO REGULATION 2.23 OF MARPOL ANNEX VI

(update to the unified interpretation provided in paragraphs 1.2.3 and 1.2.4 of the annex to MEPC.1/Circ.795/Rev.4)

1 Definition of "new ship"

Regulation 2
Definitions

Regulation 2.23 reads as follows:

"*New ship* means a ship:

- .1 for which the building contract is placed on or after 1 January 2013; or
- .2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013; or
- .3 the delivery of which is on or after 1 July 2015."

Interpretation:

1.1 For the application of the definition "new ship" as specified in regulation 2.23 to each phase specified in table 1 of regulation 21, it should be interpreted as follows:

- .1 the date specified in regulation 2.23.1 should be replaced with the start date of each phase;
- .2 the date specified in regulation 2.23.2 should be replaced with the date six months after the start date of each phase; and
- .3 the date specified in regulation 2.23.3 should, for Phase 1, 2 and 3, be replaced with the date 48 months after the start date of each phase.

1.2 With the above interpretations, the required EEDI of each phase is applied to the following new ship which falls into one of the categories defined in regulations 2.25 to 2.31 and to which chapter 4 is applicable:

(.....)

- .3 the required EEDI of Phase 2 is applied to the following new ship:
 - .1 for ship types where Phase 2 ends on 31 March 2022*:
 - .1 the building contract of which is placed in Phase 2, and the delivery is before 1 April 2026; or

* Unified Interpretation is applicable when resolution MEPC.324(75) enters into force on 1 April 2022.

- .2 the building contract of which is placed before Phase 2, and the delivery is on or after 1 January 2024 and before 1 April 2026; or

in the absence of a building contract:

- .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2020 and before 1 October 2022, and the delivery is before 1 April 2026; or
- .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2020, and the delivery is on or after 1 January 2024 and before 1 April 2026.

- .2 for ship types where Phase 2 ends on 31 December 2024:

- .1 the building contract of which is placed in Phase 2, and the delivery is before 1 January 2029; or
- .2 the building contract of which is placed before Phase 2, and the delivery is on or after 1 January 2024 and before 1 January 2029; or

in the absence of a building contract:

- .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2020 and before 1 July 2025, and the delivery is before 1 January 2029; or
- .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2020, and the delivery is on or after 1 January 2024 and before 1 January 2029.

- .4 the required EEDI of Phase 3 is applied to the following new ship:

- .1 for ship types where Phase 3 commences with 1 April 2022 and onwards:

- .1 the building contract of which is placed in Phase 3; or
- .2 the building contract of which is placed before Phase 3, and the delivery is on or after 1 April 2026; or

in the absence of a building contract:

- .3 the keel of which is laid or which is at a similar stage of construction on or after 1 October 2022; or
- .4 the keel of which is laid or which is at a similar stage of construction before 1 October 2022 and the delivery of which is on or after 1 April 2026.

- .2 for ship types where Phase 3 commences with 1 January 2025 and onwards:

- .1 the building contract of which is placed in Phase 3; or
- .2 the building contract of which is placed before Phase 3, and the delivery is on or after 1 January 2029; or

in the absence of a building contract:

- .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2025; or
- .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2025 and the delivery of which is on or after 1 January 2029.

(.....)

ANNEX 7

**RESOLUTION MEPC.333(76)
(adopted on 17 June 2021)**

**2021 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 conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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 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,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI)*,

1 ADOPTS the *2021 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 and in light of the review of EEXI regulations to be completed by the Organization by 1 January 2026 as identified in regulation 25.3 of MARPOL Annex VI.

ANNEX

2021 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY EXISTING SHIP INDEX (EEXI)

CONTENTS

- 1 Definitions
- 2 Energy Efficiency Existing Ship Index (EEXI)
 - 2.1 EEXI formula
 - 2.2 Parameters
 - 2.2.1 $P_{ME(i)}$; Power of main engines
 - 2.2.2 $P_{AE(i)}$; Power of auxiliary engines
 - 2.2.3 V_{ref} ; Ship speed
 - 2.2.4 SFC ; Certified specific fuel consumption
 - 2.2.5 C_F ; Conversion factor between fuel consumption and CO₂ emission
 - 2.2.6 Correction factor for ro-ro cargo and ro-ro passenger ships (f_{jRoRo})
 - 2.2.7 Correction factor for ro-ro cargo ships (vehicle carrier) ($f_{cVEHICLE}$)
- APPENDIX Parameters to calculate $V_{ref,app}$

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:

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

* 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 *2021 Guidelines on survey and certification of the attained EEXI* (resolution MEPC.334(76)).

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 containerhips, 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 containerhips with 120,000 DWT or less;
- .2 0.93 for containerhips 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 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 ship 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:

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

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:

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

2.2.3.6 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 dedicated model tests; and/or
- .3 numerical calculations.

* Devices that shift the power curve, which results in the change of P_P and V_{ref} , as specified in MEPC.1/Circ.815 on 2013 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI.

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 *SFCs* 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 CO₂ 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:

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

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:

$$f_{jRoRo} = \frac{1}{F_{nL}^\alpha \cdot \left(\frac{L_{pp}}{B_S}\right)^\beta \cdot \left(\frac{B_S}{d_S}\right)^\gamma \cdot \left(\frac{L_{pp}}{V^{1/3}}\right)^\delta} \quad ; \text{ if } f_{jRoRo} > 1 \text{ then } f_j = 1$$

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

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

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:

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

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
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.

ANNEX 8

**RESOLUTION MEPC.334(76)
(adopted on 17 June 2021)**

**2021 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 conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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 (Surveys) of MARPOL Annex VI, as amended, 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,

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

- 1 ADOPTS the *2021 Guidelines on survey and certification of the 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 and in light of the review of EEXI regulations to be completed by the Organization by 1 January 2026 as identified in regulation 25.3 of MARPOL Annex VI.

ANNEX

**2021 GUIDELINES ON SURVEY AND CERTIFICATION OF THE ATTAINED ENERGY
EFFICIENCY EXISTING SHIP INDEX (EEXI)**

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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 DEFINITIONS¹

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

4.1.2 The 2013 Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI (MEPC.1/Circ.815) 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 *2021 Guidelines on the method of calculation of the attained EEXI* (resolution MEPC.333(76)).

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 calculation process of $V_{ref,app}$ for pre-EEDI ships in cases where the speed-power curve is not available, as specified in paragraph 2.2.3.5 of the EEXI Calculation Guidelines;
- .11 type of fuel;

- .12 the specific fuel consumption (*SFC*) of the main and auxiliary engines, as specified in paragraph 2.2.3 of the EEXI Calculation Guidelines;
- .13 the electric power table² for certain ship types, as necessary, as defined in the EEDI Calculation Guidelines;
- .14 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;
- .15 calculation process of $P_{AE,app}$, as specified in paragraph 2.2.2.3 of the EEXI Calculation Guidelines, if applicable;
- .16 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;
- .17 description of energy saving equipment, if available;
- .18 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
- .19 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 m³ 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
 - .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.

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).

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 2.2.3 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 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.

4.2.9 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.

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

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
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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.

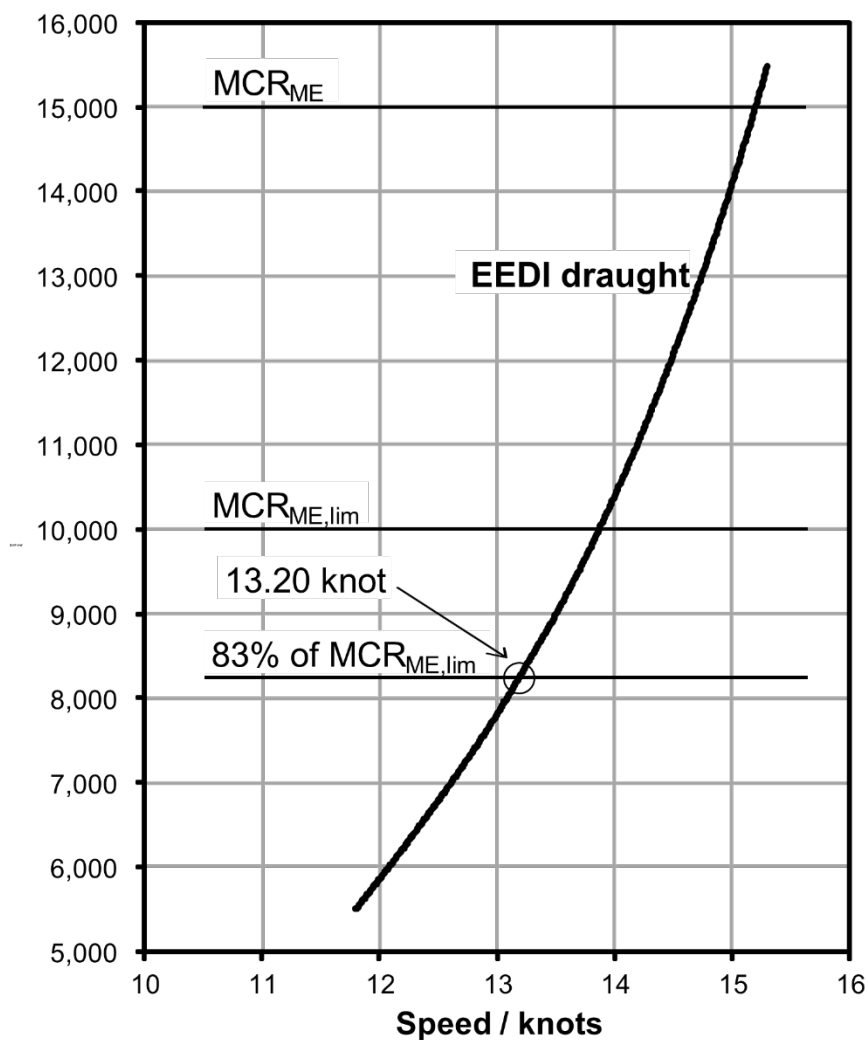


Figure 2.1: Power curve

(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.

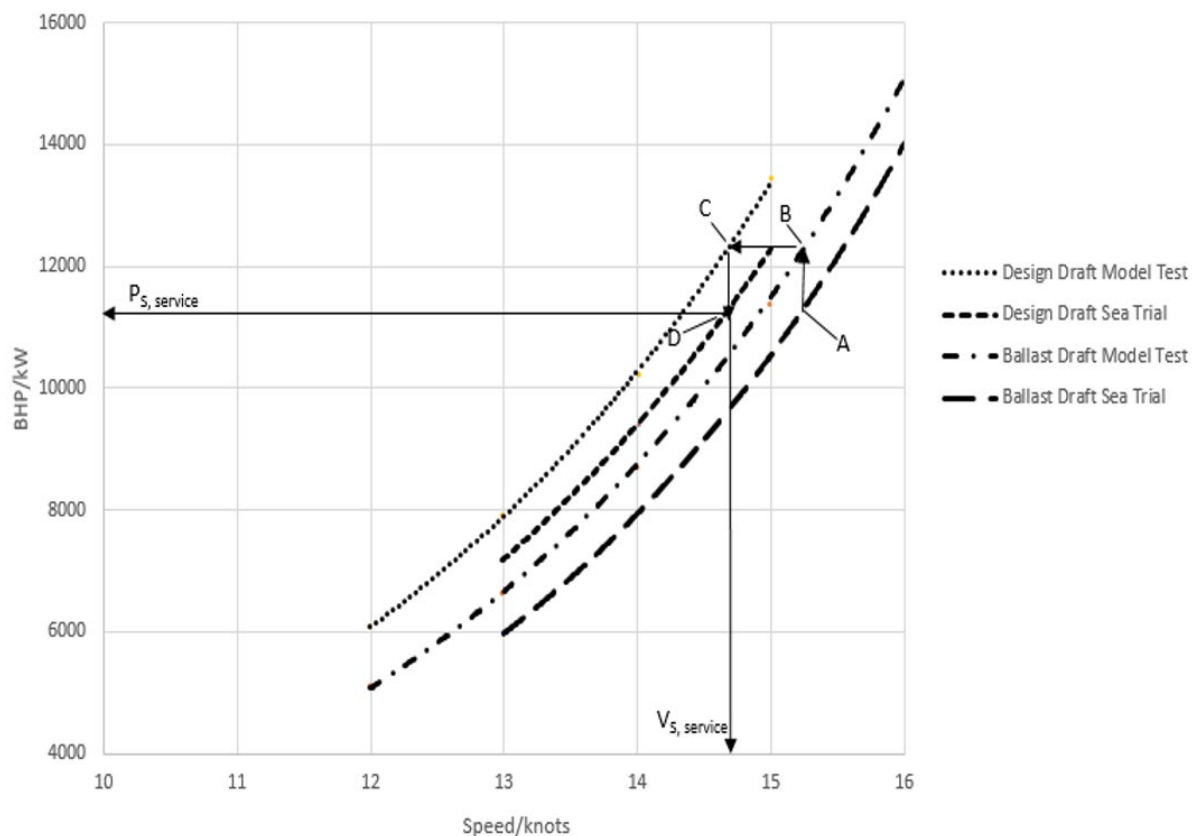


Figure 2.2: Power curve

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

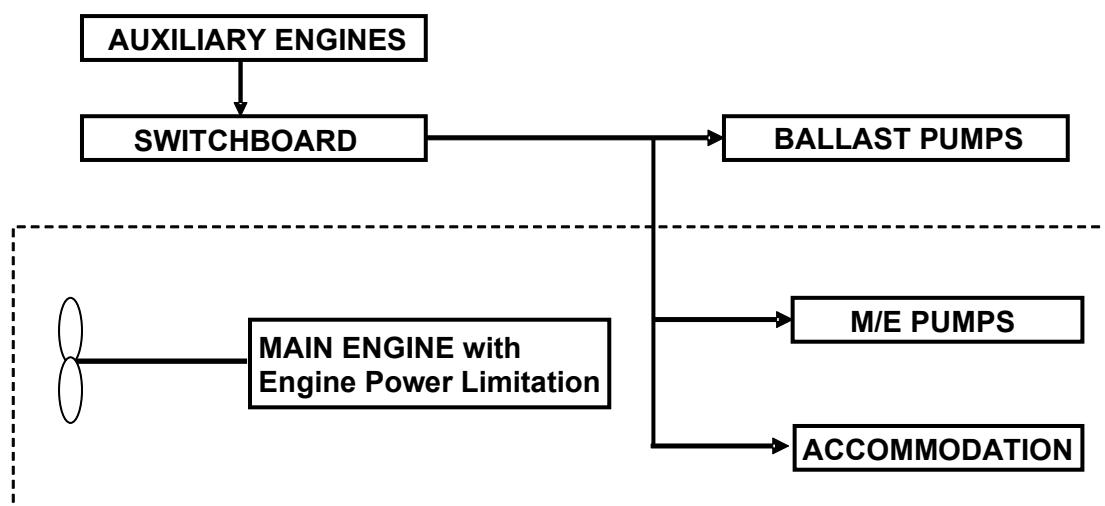


Figure 3.1: Schematic figure of propulsion and electric power supply system

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.

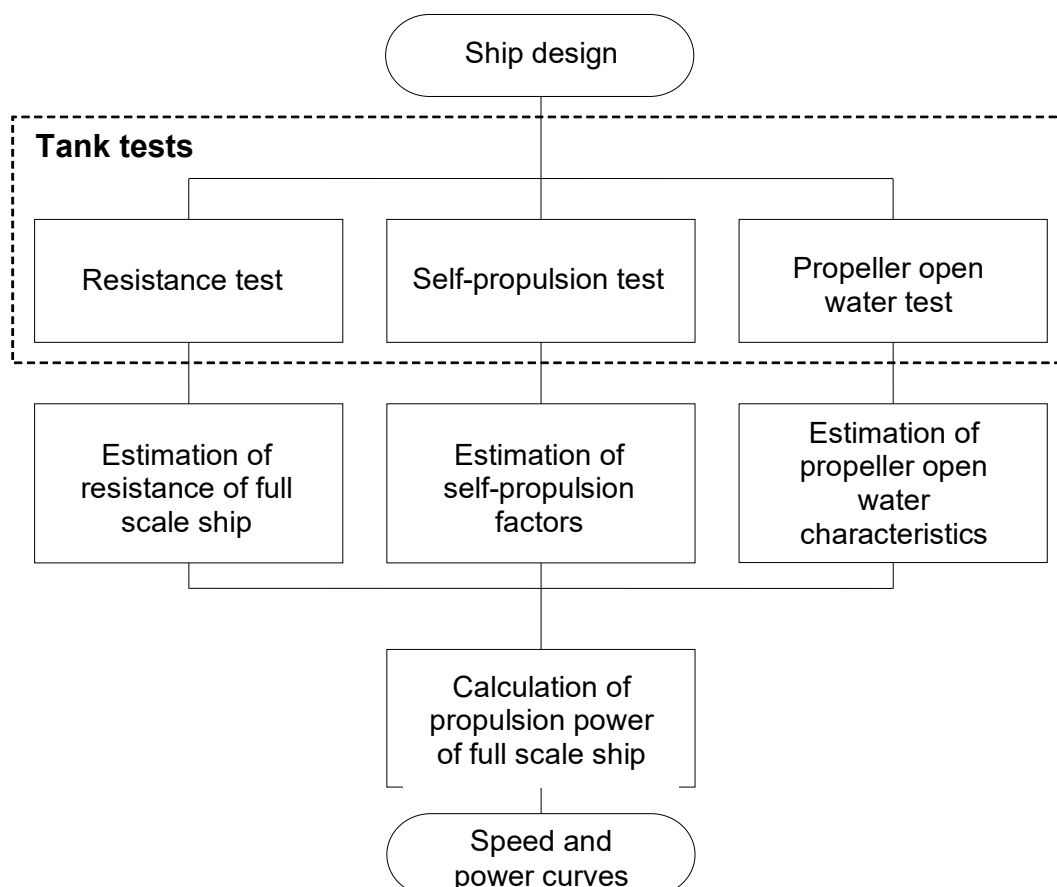


Figure 4: Flow chart of process for estimating speed-power curve from tank tests

5 Description of energy saving equipment

5.1 Energy saving equipment the effects of which are expressed as $P_{AEff(i)}$ 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

$$\begin{aligned}
 EEXI &= \frac{(\prod_{j=1}^M f_j)(\sum_{i=1}^{n_{ME}} P_{ME(i)} \cdot C_{FME(i)} \cdot SFC_{ME(i)}) + (P_{AE} \cdot C_{FAE} \cdot SFC_{AE})}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m} \\
 &+ \frac{\{(\prod_{j=1}^M f_j \cdot \sum_{i=1}^{n_{PTI}} P_{PTI(i)} - \sum_{i=1}^{n_{eff}} f_{eff(i)} \cdot P_{AE_{eff(i)}})\} \cdot C_{FAE} \cdot SFC_{AE}}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m} \\
 &- \frac{(\sum_{i=1}^{n_{eff}} f_{eff(i)} \cdot P_{eff(i)} \cdot C_{FME} \cdot SFC_{ME})}{f_i \cdot f_c \cdot f_l \cdot Capacity \cdot f_w \cdot V_{ref} \cdot f_m} \\
 &= \frac{1 \times (8250 \times 3.206 \times 166.5) + (625 \times 3.206 \times 220.0) + 0 - 0}{1 \times 1 \times 1 \times 150000 \times 1 \times 13.20 \times 1} \\
 &= 2.45 \text{ (g - CO}_2\text{/ton} \cdot \text{mile)}
 \end{aligned}$$

attained EEXI: 2.45 g-CO₂/ton mile

ANNEX 9

**RESOLUTION MEPC.335(76)
(adopted on 17 June 2021)**

**2021 GUIDELINES ON THE SHAFT / ENGINE POWER LIMITATION SYSTEM TO
COMPLY WITH THE EEXI REQUIREMENTS AND USE OF A POWER RESERVE**

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,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

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

NOTING FURTHER that ships may be equipped with a Shaft / Engine Power Limitation system in order to comply with regulation 25 (Required EEXI),

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-sixth session, draft *2021 Guidelines on the shaft / engine power limitation system to comply with the EEXI requirements and use of a power reserve*,

1 ADOPTS the *2021 Guidelines on the shaft / engine power limitation system to comply with the EEXI requirements and use of a power reserve*, 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 regulations 23 and 25 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 and in light of the review of EEXI regulations to be completed by the Organization by 1 January 2026 as identified in regulation 25.3 of MARPOL Annex VI;

5 NOTES that the Guidelines may be consolidated with possible future guidelines on the shaft / engine power limitation system under the EEDI framework as appropriate upon consideration by the Committee, taking into account circumstances and technical limitation of existing ships.

ANNEX

**2021 GUIDELINES ON THE SHAFT / ENGINE POWER LIMITATION SYSTEM TO
COMPLY WITH THE EEXI REQUIREMENTS AND USE OF A POWER RESERVE**

Table of contents

0	General
1	Definitions
2	Technical requirements for the SHaPoLi / EPL system
3	Use of a power reserve by unlimiting the shaft / engine power limitation
4	Onboard Management Manual (OMM) for SHaPoLi / EPL
5	Demonstration of compliance of the SHaPoLi / EPL system

0 General

The purpose of these Guidelines is to provide technical and operational conditions that the SHaPoLi / EPL system should satisfy in complying with the EEXI requirements and in using a power reserve for existing ships. However, noting that guidelines on the SHaPoLi / EPL system under EEDI framework on new ships are currently considered at the Committee, these guidelines under EEXI and EEDI may be consolidated into one set of guidelines as appropriate upon consideration by the Committee, taking into account circumstances and technical limitation of existing ships.

1 Definitions

1.1 *Shaft power* means the mechanical power transmitted by the propeller shaft to the propeller hub. It is the product of the shaft torque and the shaft rotational speed. In case of multiple propeller shafts, the shaft power means the sum of the power transmitted to all propeller shafts.

1.2 *Engine power* means the mechanical power transmitted from the engine to the propeller shaft. In case of multiple engines, the engine power means the sum of the power transmitted from the engines to the propeller shafts.

1.3 *Overridable Shaft Power Limitation (SHaPoLi) system* means a verified and approved system for the limitation of the maximum shaft power by technical means that can only be overridden by the ship's master or the officer in charge of navigational watch (OICNW) for the purpose of securing the safety of a ship or saving life at sea. (See figure 1 for an illustration of engine load diagram.)

1.4 *Overridable Engine Power Limitation (EPL) system* means a verified and approved system for the limitation of the maximum engine power by technical means that can only be overridden by the ship's master or OICNW for the purpose of securing the safety of a ship or saving life at sea. (See figure 1 for an illustration of engine load diagram.)

1.5 *Power reserve* means shaft / engine power above the limited power which cannot be used in normal operation unless in the case when SHaPoLi / EPL is unlimited for the purpose of securing the ship safety.

1.6 *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.

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

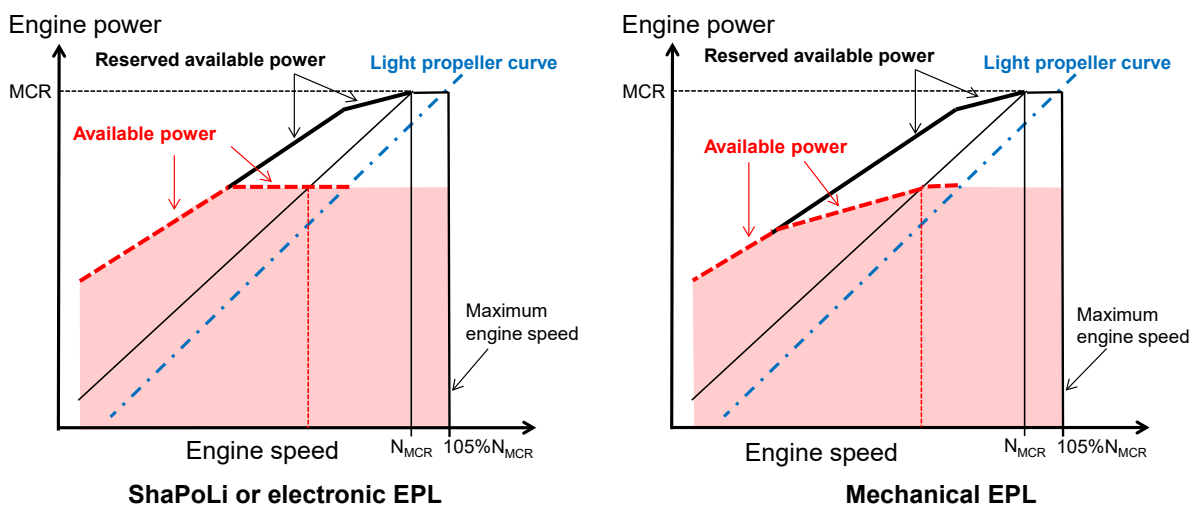


Figure 1: Engine load diagram on Shaft/Engine Power Limitation

2 Technical requirements for the SHaPoLi / EPL system

2.1 Required main systems

The SHaPoLi / EPL system should consist of the following main arrangements:

- .1 SHaPoLi:
 - .1 sensors for measuring the torque and rotational speed delivered to the propeller(s) of the ship. The system includes the amplifier and the analogue to the digital converter;
 - .2 a data recording and processing device for tracking and calculation of the data as given in paragraph 2.2.5.1 of these Guidelines; and
 - .3 a control unit for calculation and limitation of the power transmitted by the shaft to the propeller(s);
- .2 EPL:
 - .1 for the mechanically controlled engine, a sealing device which can physically lock the fuel index by using a mechanical stop screw sealed by wire or an equivalent device with governor limit setting so that the ship's crew cannot release the EPL without permission from the ship's master or OICNW, as shown in figure 2; or
 - .2 for the electronically controlled engine, fuel index limiter which can electronically lock the fuel index or direct limitation of the power in the engine's control system so that the ship's crew cannot release the EPL without permission from the ship's master or OICNW; and
 - .3 where technically possible and feasible, the Sha/PoLi/EPL system should be controlled from the ships' bridge and not require attendance in the machinery space by ship's personnel.

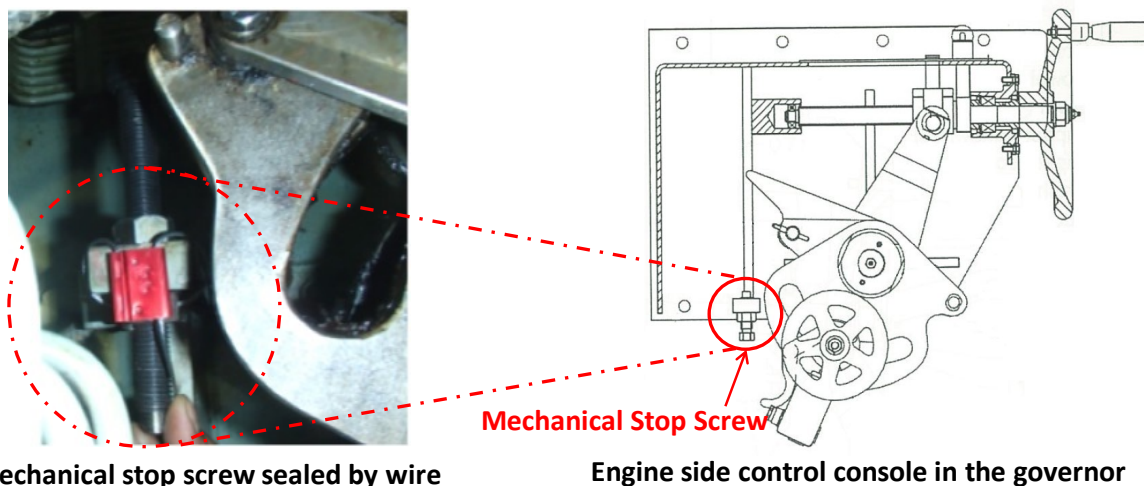


Figure 2: Sealing of mechanical stop screw

2.2 General system requirements

2.2.1 The SHaPoLi / EPL system should be non-permanent but should require the deliberate action of the ship's master or OICNW to enable the use of unlimited shaft / engine power (power reserve) of the ship. For systems that use a Password/PIN to control access to the power reserve override, attention should be paid to ensure that the necessary Password/PIN is always available when override is required.

2.2.2 For SHaPoLi / EPL system for the electronically controlled engine, the control unit should inform the ship's master or OICNW clearly and conspicuously when the ship's shaft / engine power exceeds the limited shaft / engine power as stated in the Onboard Management Manual (OMM) for SHaPoLi / EPL or in any case of system malfunction.

2.2.3 For EPL for the mechanically controlled engine, the sealing device should either:

- .1 visibly indicate removal of the sealing when the ship's engine power exceeds the limited engine power as stated in the OMM for EPL or in any case of system malfunction; or
- .2 be equipped with other systems such as an alert-monitoring system which can indicate when the ship's engine power exceeds the limited engine power as stated in the OMM for EPL or in any case of system malfunction and recording the use of unlimited mode, verified by the Administration or the RO.

2.2.4 The SHaPoLi / EPL system (or each subsystem) should be tamper-proof.

2.2.5 The SHaPoLi / EPL system for the electronically controlled engine should indicate the following data during operation:

- .1 for SHaPoLi, shaft rotational speed, shaft torque and shaft power (and total shaft power in case of multiple shaft arrangements) to be recorded constantly in unlimiting mode; or
- .2 for EPL, a fuel index sealing system or power limitation system which can indicate and record the use of unlimited mode.

2.2.6 The procedure for SHaPoLi / EPL depends on the propulsion system and should be described in the OMM for SHaPoLi / EPL in accordance with section 4 of these Guidelines.

3 Use of a power reserve by un-limiting the shaft / engine power limitation

3.1 The use of a power reserve is only allowed for the purpose of securing the safety of a ship or saving life at sea, consistent with regulation 3.1 of MARPOL Annex VI (e.g. operating in adverse weather and ice-infested waters, participation in search and rescue operations, avoidance of pirates and engine maintenance). Use of a power reserve should not have adverse impact on the propeller, shaft and related systems. It is important that the ship master and OICNW are not restricted from exercising judgement to override the SHaPoLi / EPL when required for safety purposes. The authority for this should be clearly set out in the OMM and/or the Safety Management System manual, as appropriate.

3.2 Any use of a power reserve should be recorded in the record page of the OMM for SHaPoLi / EPL, signed by the master and should be kept on board. The record should include:

- .1 ship type;
- .2 IMO number;
- .3 ship size in DWT and/or GT, as applicable;
- .4 ship's limited shaft / engine power and ship's maximum unlimited shaft / engine power;
- .5 position of the ship and timestamp when the power reserve was used;
- .6 reason for using the power reserve;
- .7 Beaufort number and wave height or ice condition in case of using the power reserve under adverse weather condition;
- .8 supporting evidence (e.g. expected weather condition) in case of using the power reserve for avoidance action;
- .9 records from the SHaPoLi / EPL system for the electronically controlled engine during the power reserve was used; and
- .10 position of the ship and timestamp when the power limit was reactivated or replaced.

3.3 Where an EPL/ShaPoLi override is activated but the power reserve is not subsequently used, this event should be recorded in the bridge and engine-room logbooks. The engine-room logbook should record power used during the period when the override was activated. The EPL/ShaPoLi should be reset as soon as possible, and details of the reset should also be recorded in the bridge and engine-room logbooks.

3.4 In case of having used a power reserve, the ship should without delay notify its Administration or RO responsible for issuing the relevant certificate and the competent authority of the relevant port of destination with the information recorded in accordance with paragraph 3.2. On an annual basis, the Administration should report uses of a power reserve to IMO with the information recorded in accordance with paragraph 3.2.

3.5 Once the risks have been mitigated, the ship should be operated below the certified level of engine power under the SHaPoLi / EPL. The SHaPoLi / EPL system should be reactivated or replaced by the crew immediately after the risks have been prevented and the ship can be safely operated with the limited shaft / engine power. The reactivation or replacement of the SHaPoLi / EPL system should be confirmed (e.g. validation of mechanical sealing) with supporting evidence (e.g. engine power log, photo taken at the occasion of resetting the mechanical sealing) by the Administration or the RO at the earliest opportunity.

3.6 Any defect of the SHaPoLi / EPL system should be reported to the Administration or RO responsible for issuing the relevant certificate in accordance with regulation 5.6 of MARPOL Annex VI.

3.7 The port State control officers should inspect whether the SHaPoLi / EPL system has been properly installed and used in accordance with the IEE Certificate and the OMM as described in section 4 of these Guidelines. If overriding of the SHaPoLi / EPL without proper notification in accordance with paragraph 3.3 of these Guidelines has been detected, the reactivation or replacement of the SHaPoLi / EPL should be immediately conducted in the presence of the Administration or the RO at the port.

4 Onboard Management Manual (OMM) for SHaPoLi / EPL

4.1 The SHaPoLi / EPL system should be accompanied by the OMM for SHaPoLi / EPL that should be permanently on board the ship for inspection.

4.2 The OMM for SHaPoLi / EPL should be verified by the Administration or the RO after a survey verifying the ship's attained EEXI, as required by regulation 5.4 of MARPOL Annex VI.

4.3 The OMM for SHaPoLi / EPL should, as a minimum, include:

.1 SHaPoLi:

- .1 a technical description of the main system as specified in section 2 of these guidelines as well as relevant auxiliary systems;
- .2 identification of key components of the system by manufacturer, model/type, serial number and other details as necessary;
- .3 description of a verification procedure demonstrating that the system is in compliance with the technical description in accordance with items .1 and .2;
- .4 the maximum shaft power for which the unit is designed;
- .5 service, maintenance and calibration requirements of sensors according to sensor manufacturer and a description how to monitor the appropriateness of the calibration intervals, if applicable;
- .6 the SHaPoLi record book for the recording of service, maintenance and calibration of the system;
- .7 the description how the shaft power can be limited and unlimited and how this is displayed by the control unit as required by paragraph 2.2.5 of these Guidelines;

- .8 the description of how the controller limits the power delivered to the propeller shaft;
 - .9 the identification of responsibilities;
 - .10 procedures for notification of the use of power reserve and the detections of malfunctions of the system in accordance with paragraphs 3.4 and 3.5 of these Guidelines;
 - .11 time required for un-limiting the SHaPoLi; and
 - .12 procedures for survey of the SHaPoLi system by the Administration/RO.
- .2 EPL:
- .1 rated installed power (MCR) or motor output (MPP) and engine speed (N_{MCR});
 - .2 limited installed power (MCR_{lim}) or motor output (MPP_{lim}) and engine speed ($N_{MCR,lim}$);
 - .3 technical description of the EPL system;
 - .4 method for sealing the EPL (mechanically controlled engine);
 - .5 method for locking and monitoring the EPL (electronically controlled engine);
 - .6 procedures and methods for releasing the EPL;
 - .7 time required for unlimiting the EPL;
 - .8 procedures for survey of the EPL system by the Administration/RO;
 - .9 procedure for the report on release of the EPL; and
 - .10 administrator of the EPL system.

5 Demonstration of compliance of the SHaPoLi / EPL system

5.1 The demonstration of compliance of the SHaPoLi / EPL system should be verified by an appropriate survey in accordance with regulation 5.4 of MARPOL Annex VI for the verification of the ship's EEXI according to regulation 23. The survey should include the verification and validation of the system by addressing the following items:

- .1 the verification of compliance of the system with the OMM for SHaPoLi / EPL;
- .2 the verification of compliance of the system with the specifications set out in section 2 of these Guidelines; and
- .3 the verification of the OMM for SHaPoLi / EPL that the OMM for SHaPoLi / EPL is in compliance with the specifications set out in section 4 of these Guidelines.

5.2 In cases where the SHaPoLi / EPL system is applied and no changes are made to NO_x critical settings and/or components* outside what is allowed by the engine technical file as defined in the 2008 NO_x Technical Code (NTC 2008), engine re-certification is not needed.

5.3 In cases where the SHaPoLi / EPL system is applied and the NO_x critical settings and/or components are altered beyond what is allowed by the engine technical file as defined in NTC 2008, the engine needs to be re-certified. In such a case, for an EEDI-certified ship where the SHaPoLi / EPL system is applied at a power below that required by regulation 24.5 of MARPOL Annex VI (minimum power requirement), the certified engine power should be at the power satisfying that requirement.

* NO_x critical parameters and components are listed in NO_x Technical File under the section "Components, setting and operating values of the engine which may influence its NO_x emission".

ANNEX 10

**RESOLUTION MEPC.336(76)
(adopted on 17 June 2021)**

**2021 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 conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1)*,

1 ADOPTS the *2021 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 consider substantiated proposals for CII correction factors for certain ship types, operational profiles and/or voyages with a view to enhancing, as appropriate, the annexed Guidelines before entry into force of the aforementioned amendments to MARPOL Annex VI;

5 AGREES to keep the Guidelines under review in light of experience gained with their implementation and in light of the review of CII regulations to be completed by the Organization by 1 January 2026 as identified in regulation 28.11 of MARPOL Annex VI.

ANNEX

2021 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 CO₂ 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 CO₂ 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 CO₂ (M) emitted to the total transport work (W) undertaken in a given calendar year, as follows:

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

4.1 Mass of CO₂ emissions (M)

The total mass of CO₂ is the sum of CO₂ emissions (in grams) from all the fuel oil consumed on board a ship in a given calendar year, as follows:

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

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 CO₂ 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:

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

where:

- C represents the ship's capacity:
 - For bulk carriers, tankers, container ships, gas carriers, LNG carriers, ro-ro cargo ships, 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) 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.

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.

² Gross tonnage (GT) should be calculated in accordance with the International Convention on Tonnage Measurement of Ships, 1969.

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)

$$EEPI = \frac{M}{C \times D_t}$$

- .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 CO₂ (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_t 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.

ANNEX 11

**RESOLUTION MEPC.337(76)
(adopted on 17 June 2021)**

**2021 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 conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on the reference lines for use with operational carbon intensity indicators (CII reference lines guidelines, G2)*,

1 ADOPTS the *2021 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 and in light of the review of CII regulations to be completed by the Organization by 1 January 2026 as identified in regulation 28.11 of MARPOL Annex VI.

ANNEX

2021 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 *2021 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:

$$CII_{ref} = aCapacity^{-c} \quad (1)$$

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	<i>a</i>	<i>c</i>
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	40853	0.812
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	14479E10	2.673
Ro-ro cargo ship (vehicle carrier)		GT	5739	0.631
Ro-ro cargo ship		DWT	10952	0.637
Ro-ro passenger ship		GT	7540	0.587
Cruise passenger ship		GT	930	0.383

ANNEX 12

**RESOLUTION MEPC.338(76)
(adopted on 17 June 2021)**

**2021 GUIDELINES ON THE OPERATIONAL CARBON INTENSITY REDUCTION
FACTORS RELATIVE TO REFERENCE LINES (CII REDUCTION
FACTORS GUIDELINES, G3)**

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,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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 reduction factors to be established for each ship type to which regulation 28 is applicable,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)*,

1 ADOPTS the *2021 Guidelines on the operational carbon intensity reduction factors relative to reference lines (CII reduction factors guidelines, G3)*, 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 and in light of the review of CII regulations to be completed by the Organization by 1 January 2026 as identified in regulation 28.11 of MARPOL Annex VI, and that annual reduction rates for the period 2027-2030 will be further strengthened and developed taking into account that review.

ANNEX

2021 GUIDELINES ON THE OPERATIONAL CARBON INTENSITY REDUCTION FACTORS RELATIVE TO REFERENCE LINES (CII REDUCTION FACTORS GUIDELINES, G3)

1 Introduction

1.1 These Guidelines provide the methods to determine the annual operational carbon intensity reduction factors and their concrete values from year 2023 to 2030, as referred to in regulation 28 of MARPOL Annex VI.

1.2 The annual operational carbon intensity reduction factors apply to each ship type to which regulation 28 of MARPOL Annex VI applies, in a transparent and robust manner, based on the specific carbon intensity indicators stipulated in the *2021 Guidelines on operational carbon intensity indicators and the calculation methods (G1)* (resolution MEPC.336(76)) and the reference lines developed in the *2021 Guidelines on the reference lines for use with operational carbon intensity indicators (G2)*(resolution MEPC.337(76)).

1.3 The reduction factors have been set at the levels to ensure that, in combination with other relevant requirements of MARPOL Annex VI, the reduction in CO₂ emissions per transport work by at least 40% by 2030, compared to 2008, can be achieved as an average across international shipping.

1.4 Section 5 of these Guidelines provides background information on rational ranges of reduction factors of ship types in year 2030 using demand-based measurement and supply-based measurement.

1.5 The Organization should continue to monitor development in annual carbon intensity improvement using both demand-based measurement and supply-based measurement in parallel to the annual analysis of the fuel consumption data reported to the IMO DCS.

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 annual operational carbon intensity reduction factor, generally denoted as "Z" in regulation 28 of MARPOL Annex VI, is a positive value, stipulating the percentage points of the required annual operational carbon intensity indicator of a ship for a given year lower than the reference value.

3 Method to determine the annual reduction factor of ship types

3.1 Operational carbon intensity of international shipping

Given significant heterogeneity across ship types, the attained annual operational CII of international shipping as a whole is calculated as the ratio of the aggregated mass (in grams) of CO₂ (*aggregated M*) emitted to the aggregated mass (in tonne·nmiles) of transport work (*aggregated W*) undertaken by all individual ships of representative ship types in a given calendar year, as follows:

$$\text{attained } CII_{shipping} = \text{aggregated } M / \text{aggregated } W \quad (1)$$

In the absence of the data on actual annual transport work of individual ships, the aggregated transport work obtained from other reliable sources, such as UNCTAD, can be taken as approximation. The representative ship types refer to bulk carriers, gas carriers, tankers, container ships, general cargo ships, refrigerated cargo carrier and LNG carriers, as per the *Fourth IMO GHG Study 2020*.

3.2 The achieved carbon intensity reduction in international shipping

For a given year y , the achieved carbon intensity reduction in international shipping relative to the reference year y_{ref} , denoted as $R_{shipping,y}$, can be calculated as follows:

$$R_{shipping,y} = 100\% \times (\text{attained } CII_{shipping,y} - \text{attained } CII_{shipping,y_{ref}}) / \text{attained } CII_{shipping,y_{ref}} \quad (2)$$

where the $\text{attained } CII_{shipping,y}$ and $\text{attained } CII_{shipping,y_{ref}}$ represents the attained annual operational carbon intensity of international shipping in year y and in the reference year y_{ref} , as defined in Eq.(1).

The achieved carbon intensity reduction in international shipping can be alternatively calculated on the carbon intensity performance of ship types. Since CII metrics for different ship types may not be identical, the weighted average of the carbon intensity reduction achieved by ship types can be applied, as follows:

$$R_{shipping,y} = \sum_{type} f_{type,y} R_{type,y} \quad (3)$$

In Eq(3),

- $type$ represents the ship type;
- $f_{type,y}$ is the weight, which is equal to the proportion of CO₂ emitted by the ship type to the total CO₂ emissions of international shipping in year y ; and
- $R_{type,y}$ represents the carbon intensity reduction achieved by the ship type in year y , calculated as $R_{type,y} = 100\% \times (\text{attained } CII_{type,y} - \text{attained } CII_{type,y_{ref}}) / \text{attained } CII_{type,y_{ref}}$, where the $\text{attained } CII_{type,y}$ and $\text{attained } CII_{type,y_{ref}}$ represents the attained annual operational carbon intensity of the ship type in year y and in the reference year y_{ref} , as defined in Eq.(4), as follows:

$$\text{attained } CII_{type} = \sum_{ship} M_{ship,t} / \sum_{ship} W_{ship,t} \quad (4)$$

where:

$M_{ship,t}$ and $W_{ship,t}$ represents the total mass of CO₂ emitted from and the total transport work undertaken by a ship of this type in a given calendar year, as stipulated in the *Guidelines on operational carbon intensity indicators and the calculation methods (G1)*.

4 The reduction factors for the required annual operational CII of ship types

4.1 In accordance with regulation 28 of MARPOL Annex VI, the required annual operational CII for a ship is calculated as follows:

$$\text{Required annual operational CII} = (1 - Z / 100) \times CII_R$$

where CII_R is the reference value in year 2019 as defined in the *Guidelines on the reference lines for use with operational carbon intensity indicators (G2)*, Z is a general reference to the reduction factors for the required annual operational CII of ship types from year 2023 to 2030, as specified in table 1.

Table 1: Reduction factor (Z%) for the CII relative to the 2019 reference line

Year	Reduction factor relative to 2019
2023	5%*
2024	7%
2025	9%
2026	11%
2027	- **
2028	- **
2029	- **
2030	- **

Note:

- * Z factors of 1%, 2% and 3% are set for the years of 2020 to 2022, similar as business as usual until entry into force of the measure.
- ** Z factors for the years of 2027 to 2030 to be further strengthened and developed taking into account the review of the short-term measure.

5 Background information on rational ranges of reduction factors of ship types in year 2030

5.1 In the *Initial IMO Strategy on Reduction of GHG Emissions from Ships* (Resolution MEPC.304(72)), the levels of ambition on carbon intensity of international shipping have been set taking year 2008 as reference. The carbon intensity of international shipping in year 2008, as well as the improvement through 2012 to 2018, has been estimated in the *Fourth IMO GHG Study 2020*. However, since the scope and data collection methods applied in the *Fourth IMO GHG Study 2020* were inconsistent with those under IMO DCS, the results derived from the two sources cannot be compared directly.

5.2 To ensure the comparability of the attained carbon intensity of international shipping through year 2023 to 2030 with the reference line, the following methods are applied to calculate the equivalent carbon intensity target in year 2030 ($eR_{shipping,2030}$), taking year 2019 as reference, i.e. how much additional improvement is needed by 2030 from the 2019 performance level.

5.3 The achieved carbon intensity reduction of international shipping in year 2019 relative to year 2008 ($R_{shipping,2019}$) can be estimated as the sum of the achieved carbon intensity reduction of international shipping in year 2018 relative to year 2008 ($R_{shipping,2018}$) as given by the *Fourth IMO GHG Study 2020* and the estimated average annual improvement during 2012 and 2018 ($\bar{r}_{shipping}$), as follows:

$$R_{shipping,2019} = R_{shipping,2018} + \bar{r}_{shipping} \quad (5)$$

5.4 The following provides the calculations using demand-based measurement and supply-based measurement.

5.4.1 Demand-based measurement of 2030 target

As estimated by the *Fourth IMO GHG Study 2020*, the attained CII of international shipping (on aggregated demand-based metric) has reduced by **31.8%** ($R_{shipping,2018} = 31.8\%$) compared to 2008, with an estimated average annual improvement at **1.5** percentage points ($\bar{r}_{shipping} = 1.5\%$). In accordance with Eq.(5), the carbon intensity reduction achieved in year 2019 is estimated as **33.3%** ($R_{shipping,2019} = 33.3\%$).

5.4.2 Supply-based measurement of 2030 target

As estimated by the *Fourth IMO GHG Study 2020*, the attained CII of international shipping (on aggregated supply-based metric) has reduced by **22.0%** ($R_{shipping,2018} = 22.0\%$) compared to 2008, with an estimated average annual improvement at **1.6** percentage points ($\bar{r}_{shipping} = 1.6\%$). In accordance with Eq.(5), the carbon intensity reduction achieved in year 2019 relative to 2008 is estimated as **23.6%** ($R_{shipping,2019} = 23.6\%$).

5.5 Given the achieved carbon intensity reduction of international shipping in year 2019 relative to year 2008, the carbon intensity reduction target of international shipping in year 2030 can be converted to the equivalent target ($eR_{shipping,2030}$) relative to year 2019, as follows:

$$eR_{shipping,2030} = \frac{40\% - R_{shipping,2019}}{1 - R_{shipping,2019}} \quad (6)$$

5.5.1 Demand-based measurement of 2030 target

In accordance with Eq.(6), the equivalent reduction factor of international shipping in year 2030 relative to year 2019 ($eR_{shipping,2030}$) would be at least **10.0%** measured in aggregated demand-based CII metric, i.e. at least additional **10.0%** improvement from the 2019 level is needed by 2030.

5.5.2 Supply-based measurement of 2030 target

In accordance with Eq.(6), the equivalent reduction factor of international shipping in 2030 relative to year 2019 ($eR_{shipping,2030}$) would be at least **21.5%**, measured in aggregated supply-based CII metric, i.e. at least additional **21.5%** improvement from the 2019 level is needed by 2030.

ANNEX 13

**RESOLUTION MEPC.339(76)
(adopted on 17 June 2021)**

**2021 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 conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised 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,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on the operational carbon intensity rating of ships (CII rating guidelines, G4)*,

1 ADOPTS the *2021 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, and in light of the review of CII regulations to be completed by the Organization by 1 January 2026 as identified in regulation 28.11 of MARPOL Annex VI.

ANNEX

2021 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 28 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 annually assigned 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, the lower 20% and further lower 15% of the individuals are to be assigned rating B and A respectively, as illustrated in figure 1.

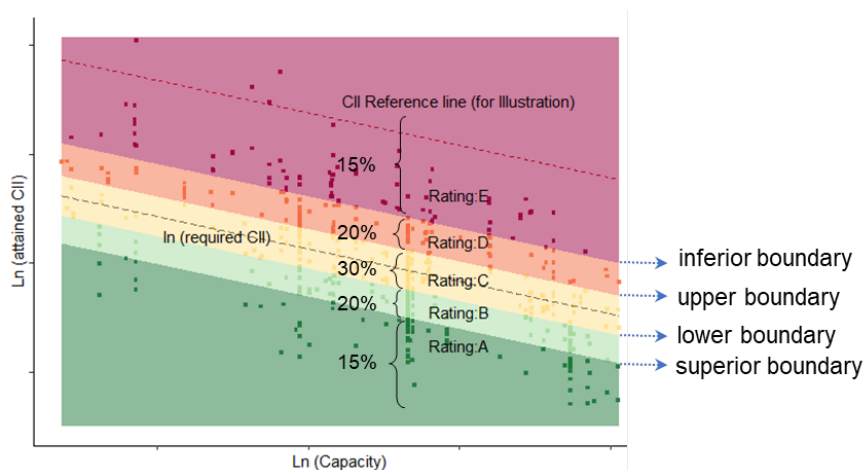


Figure 1: Operational energy efficiency performance rating scale

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.

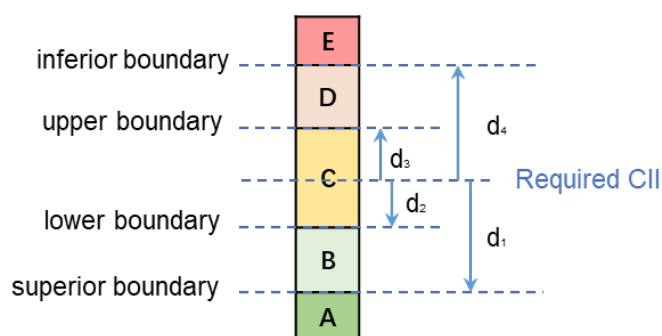


Figure 2: dd vectors and rating bands

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:

$$\ln(\text{attained CII}) = \delta^{(p)} - c \ln(\text{Capacity}) + \varepsilon^{(p)}, \quad p = \{0.15, 0.35, 0.50, 0.65, 0.85\} \quad (5)$$

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.

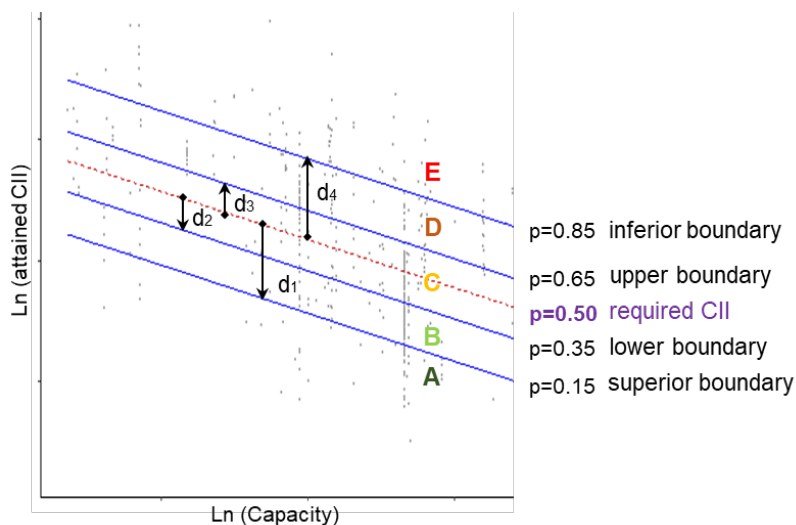


Figure 3: Quantile regression lines in logarithm form

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:

$$\left. \begin{aligned} d_1 &= \hat{\delta}^{(0.15)} - \hat{\delta}^{(0.50)} \\ d_2 &= \hat{\delta}^{(0.35)} - \hat{\delta}^{(0.50)} \\ d_3 &= \hat{\delta}^{(0.65)} - \hat{\delta}^{(0.50)} \\ d_4 &= \hat{\delta}^{(0.85)} - \hat{\delta}^{(0.50)} \end{aligned} \right\} \quad (6)$$

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:

$$\left. \begin{aligned} \text{superior boundary} &= \exp(d_1) \cdot \text{required } CII \\ \text{lower boundary} &= \exp(d_2) \cdot \text{required } CII \\ \text{upper boundary} &= \exp(d_3) \cdot \text{required } CII \\ \text{inferior boundary} &= \exp(d_4) \cdot \text{required } CII \end{aligned} \right\} \quad (7)$$

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	<i>dd</i> 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		DWT	0.66	0.90	1.11	1.37
Ro-ro passenger ship		GT	0.72	0.90	1.12	1.41
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 gCO₂/(dwt.nmile), then the superior boundary, lower boundary, upper boundary, and inferior boundary is 8.6, 9.4, 10.6 and 11.8 gCO₂/(dwt.nmile). If the attained CII is 9 gCO₂/(dwt.nmile), the ship would be rated as "B".

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MEPC.1/Circ.850/Rev.3
7 July 2021

**GUIDELINES FOR DETERMINING MINIMUM PROPULSION POWER TO MAINTAIN THE
MANOEUVRABILITY OF SHIPS IN ADVERSE CONDITIONS**

- 1 The Marine Environment Protection Committee (the Committee), at its seventy-sixth session (10 to 17 June 2021), approved amendments to the 2013 *Interim Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions* (MEPC.1/Circ.850/Rev.2) including the change of title to *Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions*.
- 2 The *Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions* are set out in the annex.
- 3 The Committee also agreed to keep the Guidelines under review and invited Member States and international organizations to report on the experiences gained in the implementation of the Guidelines to a future session of the Committee.
- 4 Member Governments are invited to bring the annexed *Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions* to the attention of Administrations, industry, relevant shipping organizations, shipping companies and other stakeholders concerned.
- 5 This circular revokes MEPC.1/Circ.850/Rev.2.

ANNEX

GUIDELINES FOR DETERMINING MINIMUM PROPULSION POWER TO MAINTAIN THE MANOEUVRABILITY OF SHIPS IN ADVERSE CONDITIONS

0 Purpose

The purpose of these Guidelines is to assist Administrations and recognized organizations in verifying that ships, complying with Energy Efficiency Design Index (EEDI) requirements set out in regulations on energy efficiency for ships, have sufficient installed propulsion power to maintain the manoeuvrability in adverse conditions, as specified in regulation 21.5 of chapter 4 of MARPOL Annex VI.

1 Definition

1.1 "Adverse conditions" mean sea conditions with the following parameters:

Significant wave height h_s , m	Peak wave period T_P , s	Mean wind speed V_w , m/s
6.0	7.0 to 15.0	22.6

JONSWAP sea spectrum with the peak parameter of 3.3 is to be considered for coastal waters.

1.2 The following adverse condition should be applied to ships defined as the following threshold value of ship size:

Ship length, m	Significant wave height h_s , m	Peak wave period T_P , s	Mean wind speed V_w , m/s
Less than 200	4.5	7.0 to 15.0	19.0
$200 \leq L_{pp} \leq 250$	Parameters linearly interpolated depending on ship's length		
More than 250	Refer to paragraph 1.1		

2 Applicability*

2.1 These Guidelines should be applied in the case of all new ships of types as listed in table 1 of appendix 1 required to comply with regulations on energy efficiency for ships according to regulation 21 of MARPOL Annex VI.

2.2 Notwithstanding the above, these Guidelines should not be applied to ships with non-conventional propulsion systems, such as pod propulsion.

2.3 These Guidelines are intended for ships in unrestricted navigation; for other cases, the Administration should determine appropriate guidelines, taking the operational area and relevant restrictions into account.

2.4 These Guidelines are applied in maximum summer load condition.

* These guidelines are applied to ships required to comply with regulations on energy efficiency for ships according to regulation 24 of MARPOL Annex VI (i.e. for those ship types as in table 1 of appendix 1 with the size of equal or more than 20,000 DWT).

3 Assessment procedure

3.1 The assessment can be carried out at two different levels as listed below:

- .1 minimum power lines assessment; and
- .2 minimum power assessment.

3.2 The ship should be considered to have sufficient power to maintain the manoeuvrability in adverse conditions if it fulfils one of these assessment levels.

4 Assessment level 1 – minimum power lines assessment

4.1 If the ship under consideration has installed power not less than the power defined by the minimum power line for the specific ship type, the ship should be considered to have sufficient power to maintain the manoeuvrability in adverse conditions.

4.2 The minimum power lines for the different types of ships are provided in appendix 1.

5 Assessment level 2 – minimum power assessment

5.1 The methodology for the minimum power assessment is provided in appendix 2.

5.2 If the ship under consideration fulfils the requirements as defined in the minimum power assessment, the ship should be considered to have sufficient power to maintain the manoeuvrability in adverse conditions.

6 Documentation

Test documentation should include at least, but not be limited to, a:

- .1 description of the ship's main particulars;
- .2 description of the ship's relevant manoeuvring and propulsion systems;
- .3 description of the assessment level used and results; and
- .4 description of the test method(s) used with references, if applicable.

APPENDIX 1

THE METHODOLOGY FOR THE MINIMUM POWER LINES ASSESSMENT

1 The minimum power line values of total installed MCR, in kW, for different types of ships should be calculated as follows:

$$\text{Minimum Power Line Value} = a \times (DWT) + b$$

where:

DWT is the deadweight of the ship in metric tons; and

a and *b* are the parameters given in table 1 for tankers, bulk carriers and combination carriers.

Table 1: Parameters a and b for determination of the minimum power line values for the different ship types

Ship type	a	b
Bulk carrier which DWT is less than 145,000	0.0763	3374.3
Bulk carrier which DWT is 145,000 and over	0.0490	7329.0
Tanker	0.0652	5960.2
Combination Carrier	see tanker above	

2 The total installed MCR of all main propulsion engines should not be less than the minimum power line value, where MCR is the value specified on the EIAPP Certificate.

APPENDIX 2

THE METHODOLOGY FOR THE MINIMUM POWER ASSESSMENT

1 Minimum Power Assessment is based on the solution of a one degree-of-freedom manoeuvring equation in longitudinal direction to demonstrate that the ship can move with the speed of 2.0 knots through water in wind and wave directions from head to 30 degrees off-bow for a situation of weather vaning. The assessment consists of the following steps:

- .1 calculate the maximum total resistance in the longitudinal ship direction over wind and wave directions from head to 30 degrees off-bow;
- .2 calculate corresponding required brake power and rotation speed of the installed engine, considering the resistance and propulsion characteristics of the ship including appendages; and
- .3 check whether the required brake power does not exceed the maximum available brake power of the installed engine, defined according to the engine manufacturer data at the actual rotation speed of the installed engine.

2 The maximum total resistance is defined as sum of the resistance in calm-water at the 2.0 knots forward speed U and the maximum added resistance in seaway X_a over wind and wave directions from head to 30 degrees off-bow.

Requirement

3 To satisfy the requirements of Minimum Power Assessment, the required brake power P_B^{req} in the adverse conditions at the forward speed 2.0 knots through water should not exceed the available brake power of the installed engine P_B^{av} in the same conditions:

$$P_B^{\text{req}} \leq P_B^{\text{av}}$$

4 The required brake power P_B^{req} is calculated as

$$P_B^{\text{req}} = \frac{2\pi n_P Q}{\eta_s \eta_g \eta_R}$$

where

- | | |
|-------------|---|
| n_P (1/s) | is the propeller rotation rate in the specified adverse conditions and the specified forward speed; |
| Q (N·m) | is the corresponding propeller torque; |
| η_s | is the mechanical transmission efficiency of the propeller shaft, approved for the EEDI verification; |
| η_g | is the gear efficiency, approved for the EEDI verification; and |
| η_R | is the relative rotative efficiency. |

5 The available brake power P_B^{av} in the adverse conditions at the forward speed is defined as the maximum engine output at the actual rotation speed, taking into account maximum torque limit, surge/air limit and all other relevant limits in accordance with the engine manufacturer's data.

Definition of propulsion point

6 The propeller rotation rate n_p and the corresponding propeller advance ratio J in the adverse conditions at the forward speed are defined from the propeller open-water characteristics by solving the following equation:

$$\frac{K_T}{J^2} = \frac{T}{\rho u_a^2 D_p^2}$$

where

- K_T is the thrust coefficient of the propeller, defined from the propeller open-water characteristics;
- T (N) is the required propeller thrust;
- ρ (kg/m³) is the sea water density, $\rho = 1025$ kg/m³;
- u_a (m/s) is the propeller advance speed; and
- D_p (m) is the propeller diameter.

7 The corresponding torque of the propeller is calculated as

$$Q = K_Q \rho n_p^2 D_p^5$$

where

- K_Q is the torque coefficient of the propeller, defined from the propeller open-water characteristics.

8 The propeller advance speed u_a is calculated as

$$u_a = U(1 - w)$$

where

- U (m/s) is the forward speed 2.0 knots through water; and
- W is the wake fraction.

Definition of required propeller thrust

9 The required propeller thrust T is defined from the equation

$$T = \frac{X_s + X_a}{1 - t}$$

where

- X_s (N) is the resistance in calm-water at the forward speed including resistance due to appendages;
- X_a (N) is the maximum added resistance in seaway X_a ; and
- t is the thrust deduction factor taking into account suction force on the ship hull due to propeller thrust.

Definition of calm water characteristics

10 The calm-water characteristics used for the assessment, such as calm-water resistance, self-propulsion factors and propeller open-water characteristics, are defined by the methods approved for EEDI verification, including:

- .1 the calm-water resistance X_s , defined from the following equation:

$$X_s = (1 + k)C_F \frac{1}{2} \rho S U^2$$

where k is the form factor, C_F is the frictional resistance coefficient, ρ is sea water density, $\rho = 1025 \text{ kg/m}^3$, S is the wetted surface area of the hull and the appendages and U is the forward speed;

- .2 the thrust deduction factor t and wake fraction w at the forward speed and relative rotative efficiency η_R . Default conservative estimate may also be used for thrust deduction factor and wave fraction; $t=0.1$ and $w=0.15$ respectively; and
- .3 the propeller open-water characteristics $K_T(J)$ and $K_Q(J)$.

Definition of added resistance

11 The maximum added resistance in seaway X_a is defined as sum of maximum added resistance due to wind X_w , maximum added resistance due to waves X_d and maximum added rudder resistance due to manoeuvring in seaway X_r over wind and wave directions from head to 30 degrees off-bow.

Definition of wind resistance

12 The maximum added resistance due to wind X_w is calculated as

$$X_w = 0.5X'_w(\varepsilon)\rho_a v_{wr}^2 A_F$$

where

$X'_w(\varepsilon)$	is the non-dimensional aerodynamic resistance coefficient;
ε (degree)	is the apparent wind angle;
ρ_a (kg/m^3)	is the air density, $\rho_a = 1.2 \text{ kg/m}^3$;
v_{wr} (m/s)	is the relative wind speed, $v_{wr} = U + v_w \cos\mu$;
v_w (m/s)	is the absolute wind speed, defined by the adverse conditions in paragraph 1 of these guidelines; and
A_F (m^2)	is the frontal windage area of the hull and superstructure.

13 The maximum added resistance due to wind X_w is defined as maximum over wind directions from head $\varepsilon = 0$ to 30 degrees off-bow $\varepsilon = 30$.

14 The non-dimensional aerodynamic resistance coefficient X'_w is defined from wind tunnel tests or equivalent methods verified by the Administrations or the Recognized Organizations. Alternatively, it can be assumed with $X'_w = 1.1$, as the maximum over wind directions from head to 30 degrees off-bow. If deck cranes are installed in the ship and the lateral projected area of the deck cranes is equal to or exceeds 10% of the total lateral

projected area above the waterline of the ship, $X'_w = 1.4$ should be assumed instead of $X'_w = 1.1$.

Definition of added resistance due to waves

15 The maximum added resistance due to waves X_d is defined in accordance with either

.1 expression

$$X_d = 1336(5.3 + U) \left(\frac{B \cdot d}{L_{PP}} \right)^{0.75} \cdot h_s^2$$

where

L_{PP} (m)	is the length of the ship between perpendiculars;
B	is the breadth of the ship;
d	is the draft at the specified condition of loading; and
h_s (m)	is the significant wave height, defined according to paragraph 1 of these guidelines.

This expression defines the maximum added resistance over wave directions from head to 30 degrees off-bow.

.2 or spectral method

$$X_d = 2 \int_0^\infty \int_0^{2\pi} \frac{X_d(U, \mu, \omega')}{A^2} S_{\zeta\zeta}(\omega') D(\mu - \mu') d\omega' d\mu'$$

where

$\frac{X_d}{A^2}$ (N/m ²)	is the quadratic transfer function of the added resistance in regular waves and A is the wave amplitude;
$S_{\zeta\zeta}(\omega')$	is the seaway spectrum specified as JONSWAP spectrum with the peak parameter 3.3;
$D(\mu - \mu')$	is the spreading function of wave energy with respect to mean wave direction specified as \cos^2 -directional spreading;
ω' (rad/s)	is the wave frequency of component;
μ (rad)	is the encountered angle between ship and wave; and
μ' (rad)	is the direction of the wave component.

16 The maximum added resistance due to waves X_d is defined as maximum over wave directions from head $\mu = 0$ to 30 degrees off-bow $\mu = 30$. The range of peak wave periods T_p applied in the assessment is from $3.6\sqrt{h_s}$ to the greater one of $5.0\sqrt{h_s}$ or 12.0 seconds, with the step of peak wave period not exceeding 0.5 seconds.

17 The added resistance in short-crested irregular head waves may be regarded as the maximum added resistance over wave directions from head to 30 degrees off-bow, because in short-crested waves, the maximum added resistance over wave directions from head waves to 30 degrees off-bow occurs in head waves.

18 The spreading function $D(\mu - \mu')$ is defined as \cos^2 -directional spreading. Alternatively, long-crested seaway may be assumed with $D(\mu - \mu') = 1$; in this case, the

maximum added resistance due to waves X_d can be determined by multiplying the added resistance in long-crested irregular head waves by the correction factor 1.3, to consider that maximum of the added resistance in long-crested waves does not always correspond to head wave direction.

19 The quadratic transfer functions of added resistance in regular waves $\frac{X_d}{A^2}$ are defined from seakeeping tests or equivalent methods verified by the Administrations or the Recognized Organizations. Alternatively, the semi-empirical method specified in appendix of this document can be used.

Definition of added rudder resistance due to manoeuvring in seaway

20 The maximum additional rudder resistance due to manoeuvring in seaway X_r may be calculated for practicality in a simplified way as

$$X_r = 0.03 \cdot T_{er}, \text{ where } T_{er} \text{ is the propeller thrust excluding } X_r \text{ from } T.$$

APPENDIX TO APPENDIX 2

SEMI-EMPIRICAL METHOD FOR QUADRATIC TRANSFER FUNCTIONS OF ADDED RESISTANCE IN REGULAR WAVES

The method for the calculation of the quadratic transfer functions of added resistance give in this appendix can be applied to wave directions from head to beam. Therefore, this method can be used for obtaining the added resistance in short-crested irregular waves of the head mean wave direction.

The quadratic transfer functions of added resistance in regular head to beam waves $X'_d = \frac{X_d}{A^2}$, N/m^2 , can be calculated as a sum

$$X'_d = X'_{dM} + X'_{dR}$$

of X'_{dM} , the component of added resistance due to motion (radiation) effect, and X'_{dR} , the component of added resistance due to reflection (diffraction) effect in regular waves.

The expression of X'_{dM} is given as follows:

$$X'_{dM} = 4\rho g \frac{B^2}{L_{pp}} a_1 a_2 \bar{\omega}^{b_1} e^{\frac{b_1}{d_1}(1-\bar{\omega}^{d_1})}$$

where

$$\bar{\omega} = \begin{cases} 2.142 \sqrt[3]{k_{yy}} \sqrt{\frac{L_{pp}}{\lambda}} \left[1 - \frac{0.111}{C_B} \left(\ln \frac{B}{d} - \ln 2.75 \right) \right] \frac{(2-\cos\beta)}{3} (Fr + 0.62) & \text{for } Fr < 0.1 \\ 2.142 \sqrt[3]{k_{yy}} \sqrt{\frac{L_{pp}}{\lambda}} \left[1 - \frac{0.111}{C_B} \left(\ln \frac{B}{d} - \ln 2.75 \right) \right] \frac{(2-\cos\beta)}{3} Fr^{0.143} & \text{for } Fr \geq 0.1 \end{cases}$$

$$a_1 = 60.3 C_B^{1.34} (4k_{yy})^2 \left(\frac{0.87}{C_B} \right)^{-(1+Fr)\cos\beta} \left(\ln \frac{B}{d} \right)^{-1} \frac{(1-2\cos\beta)}{3} \quad \text{for } \frac{\pi}{2} \leq \beta \leq \pi$$

$$a_2 = \begin{cases} 0.0072 + 0.1676 Fr & \text{for } Fr < 0.12 \\ Fr^{1.5} \exp(-3.5 Fr) & \text{for } Fr \geq 0.12 \end{cases}$$

for $C_B > 0.75$

$$b_1 = \begin{cases} 11.0 & \text{for } \bar{\omega} < 1 \\ -8.5 & \text{elsewhere} \end{cases}$$

$$d_1 = \begin{cases} 566 \left(\frac{L_{pp}}{B} \right)^{-2.66} & \text{for } \bar{\omega} < 1 \\ -566 \left(\frac{L_{pp}}{B} \right)^{-2.66} \times 6 & \text{elsewhere} \end{cases}$$

for $C_B \leq 0.75$

$$b_1 = \begin{cases} 11.0 & \text{for } \bar{\omega} < 1 \\ -8.5 & \text{elsewhere} \end{cases}$$

$$d_1 = \begin{cases} 14.0 & \text{for } \bar{\omega} < 1 \\ -566 \left(\frac{L_{pp}}{B} \right)^{-2.66} \times 6 & \text{elsewhere} \end{cases}$$

where

$\beta = \pi - \mu$ is the wave direction, $\beta = \pi$ means head seas;

λ (m) is the length of the incident wave;

B (m) is the beam of the ship;

d (m) is the draft of the ship; and

k_{yy} is the non-dimensional radius of gyration of pitch.

The expression of X'_{dR} is given as follows:

$$X'_{dR} = \sum_{i=1}^4 X'_{dR}{}^i$$

where

$X'_{dR}{}^i$ is the added resistance due to reflection/diffraction effect of the S_i waterline segment, as shown in Figure 1.

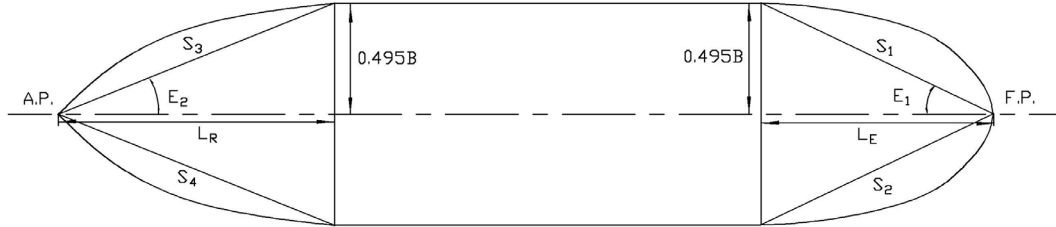


Figure 1: Sketch of the waterline profile of a ship and related definitions

when $E_1 \leq \beta \leq \pi$

$$X'_{dR}{}^1 = \frac{2.25}{4} \rho g B \alpha_{d^*} \left\{ \sin^2(E_1 - \beta) + \frac{2\omega_0 U}{g} [\cos E_1 \cos(E_1 - \beta) - \cos \beta] \right\} \left(\frac{0.87}{C_B} \right)^{(1+4\sqrt{Fr})f(\beta)}$$

when $\pi - E_1 \leq \beta \leq \pi$

$$X'_{dR}{}^2 = \frac{2.25}{4} \rho g B \alpha_{d^*} \left\{ \sin^2(E_1 + \beta) + \frac{2\omega_0 U}{g} [\cos E_1 \cos(E_1 + \beta) - \cos \beta] \right\} \left(\frac{0.87}{C_B} \right)^{(1+4\sqrt{Fr})f(\beta)}$$

when $0 \leq \beta \leq \pi - E_2$

$$X'_{dR}{}^3 = -\frac{2.25}{4} \rho g B \alpha_{d^*} \left\{ \sin^2(E_2 + \beta) + \frac{2\omega_0 U}{g} [\cos E_2 \cos(E_2 + \beta) - \cos \beta] \right\}$$

when $0 \leq \beta \leq E_2$

$$X'_{dR}{}^4 = -\frac{2.25}{4} \rho g B \alpha_{d^*} \left\{ \sin^2(E_2 - \beta) + \frac{2\omega_0 U}{g} [\cos E_2 \cos(E_2 - \beta) - \cos \beta] \right\}$$

where

ω_0 is the frequency of the incident wave;

α_{d^*} is the draft coefficient, calculated as

$$\alpha_{d^*} = \begin{cases} 0 & \text{for } \frac{\lambda}{L_{pp}} > 2.5 \\ 1 - \exp \left[-4\pi \left(\frac{d^*}{\lambda} - \frac{d^*}{2.5L_{pp}} \right) \right] & \text{for } \frac{\lambda}{L_{pp}} \leq 2.5 \end{cases}$$

where for S_1 and S_2 segments

$$d^* = d$$

and for S_3 and S_4 segments

$$d^* = \begin{cases} \frac{d(4 + \sqrt{|\cos\beta|})}{5} & \text{for } C_B \leq 0.75 \\ \frac{d(2 + \sqrt{|\cos\beta|})}{3} & \text{for } C_B > 0.75 \end{cases}$$
$$f(\beta) = \begin{cases} -\cos\beta & \text{for } \pi - E_1 \leq \beta \leq \pi \\ 0 & \text{for } \beta < \pi - E_1 \end{cases}$$

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MEPC.1/Circ.892
9 July 2021

**GUIDELINES FOR EXEMPTION OF UNMANNED
NON-SELF-PROPELLED (UNSP) BARGES FROM CERTAIN SURVEY AND
CERTIFICATION REQUIREMENTS UNDER THE MARPOL CONVENTION**

1 The Marine Environment Protection Committee, at its seventy-sixth session (10 to 17 June 2021), adopted amendments to MARPOL Annexes I and IV and amendments to MARPOL Annex VI, concerning the exemption of unmanned non-self-propelled (UNSP) barges from certain survey and certification requirements, by resolutions MEPC.330(76) and MEPC.328(76), respectively.

2 The Marine Environment Protection Committee, at its seventy-sixth session, with a view to providing more specific guidance for the application of the above-mentioned amendments, approved the *Guidelines for exemption of unmanned non-self-propelled (UNSP) barges from certain survey and certification requirements under the MARPOL Convention*, as set out in the annex.

3 Member Governments are invited to use the annexed Guidelines when exempting UNSP barges from the relevant provisions of the MARPOL Convention, and to bring them to the attention of all parties concerned.

ANNEX

GUIDELINES FOR EXEMPTION OF UNMANNED NON-SELF-PROPELLED (UNSP) BARGES FROM CERTAIN SURVEY AND CERTIFICATION REQUIREMENTS UNDER THE MARPOL CONVENTION

1 Introduction

1.1 The Guidelines are intended to provide specific guidance for flag States, port States and relevant parties, including shipowners and operators, on the application of the relevant requirements of the MARPOL Convention concerning exemption of unmanned non-self-propelled (UNSP) barges from certain survey and certification requirements pursuant to the amendments to MARPOL Annexes I and IV, as adopted by resolution MEPC.330(76), and the amendments to MARPOL Annex VI, as adopted by resolution MEPC.328(76).

1.2 For the purpose of reducing the administrative burden of flag States, port States and relevant parties, an exemption of a UNSP barge from certain survey and certification requirements under MARPOL Annexes I, IV and VI may be granted. In this connection, the exemption certificate(s) for a UNSP barge should be issued by the Administration, in accordance with regulations 3.7 and 9.2 of MARPOL Annex I, regulations 3.2 and 7.2 of MARPOL Annex IV, regulations 3.4 and 8.4 of MARPOL Annex VI, using the forms set out in the appendices of MARPOL Annexes I, IV and VI.

1.3 Such certificates should be issued either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificates.

2 Application

The Guidelines are applicable to the exemption(s) of UNSP barges from certain requirements as regulated in regulation 3.7 of MARPOL Annex I, regulation 3.2 of MARPOL Annex IV and regulation 3.4 of MARPOL Annex VI.

2.2 Technical and operational requirements

2.2.1 Certain technical requirements of MARPOL Annex I, IV, and VI are not applicable to UNSP barges. The following regulations are not required to be complied with by UNSP barges if exempted:

- .1 MARPOL Annex I:
regulations 12 (Tanks for oil residues (sludge)), 12A (Oil fuel tank protection), 13 (Standard discharge connection), 14 (Oil filtering equipment) and 16 (Segregation of oil and water ballast and carriage of oil in forepeak tanks);
- .2 MARPOL Annex IV:
regulations 9 (Sewage systems) and 10 (Standard discharge connections);
and

- .3 MARPOL Annex VI:
regulations 12 (Ozone-depleting substances), 13 (Nitrogen oxides (NO_x)), 14 (Sulphur oxides (SO_x) and particulate matter) and 16 (Shipboard incineration).

2.2.2 As UNSP barges do not have onboard sources of relevant pollutants of the marine environment, as defined in MARPOL Annexes I, IV and VI, operational requirements in the following provisions of MARPOL are not applicable to UNSP barges:

- .1 MARPOL Annex I:
regulations 15 (Control of discharge of oil), 17 (Oil Record Book Part I – Machinery space operations) and 37 (Shipboard oil pollution emergency plan); and
- .2 MARPOL Annex IV:
regulation 11 (Discharge of sewage).

3 Procedures for granting exemptions

3.1 The shipowner or operator should apply to the Administration, or the Recognized Organization (RO) acting on its behalf, for exemption(s) with relevant information on the exemption(s) conditions for UNSP barges and relevant drawings (General Arrangement Plan, Capacity Plan and any other plans or documents, as necessary).

3.2 The Administration, or the RO acting on its behalf, should review the General Arrangement Plan, Capacity Plan and other relevant information to confirm that the relevant conditions referred to in regulation 3.7 of MARPOL Annex I, regulation 3.2 of MARPOL Annex IV, or regulation 3.4 of MARPOL Annex VI, as appropriate, are met.

3.3 After a satisfactory review of the submitted plans and information, a survey of the UNSP barge should be carried out to confirm if the actual arrangements on board comply with the exemption conditions, as appropriate.

3.4 Exemption requirements may not be met where, whether temporarily or permanently, the barge has a means of generating oil residues, exhausts gas emissions, sewage, or other pollutants as defined in MARPOL Annexes I, IV or VI. In such cases, the exemption of survey and certification requirements for the applicable MARPOL Annexes should not be granted.

3.5 Based on satisfactory results of the survey, certificates for exemption of a UNSP barge from certain survey and certification requirements under MARPOL Annexes I, IV and/or VI, as per regulations 3.7 and 9.2 of MARPOL Annex I, regulations 3.2 and 7.2 of MARPOL Annex IV, regulations 3.4 and 8.4 of MARPOL Annex VI and forms set out in appendices of MARPOL Annexes I, IV and VI, respectively, should be issued by the Administration or, by the RO acting on its behalf.

4 Maintenance of conditions after survey

After issuance of any of those exemption certificates, the UNSP barge should maintain its exemption conditions in accordance with the definitions specified in regulation 1.40 of MARPOL Annex I, regulation 1.16 of MARPOL Annex IV, and regulation 2.1.32 of MARPOL Annex VI. The exemption certificate(s) cease(s) to be valid if any of the approved exemption conditions are not met or any conversion or alteration has occurred affecting the conditions under which the exemption certificate(s) is(are) issued. The shipowner or operator should inform the Administration and port State of such non-compliance. In the event of such

a conversion or alteration, the Administration, or the RO acting on its behalf, may re-issue a corresponding exemption certificate(s) to the UNSP barge, based on a further review of the arrangements, in order to verify that the UNSP barge complies with the definitions as applicable.

5 Pushing and towing

During towing or pushing operations, the exemption certificates for each UNSP barge should be available to the towing or pushing vessel.

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PROVISION OF ADEQUATE FACILITIES AT PORTS AND TERMINALS FOR THE RECEPTION OF PLASTIC WASTE FROM SHIPS

1 The Marine Environment Protection Committee (the Committee) at its seventy-third session, having recognized that more needed to be done to address the environmental and health problems posed by marine plastic litter, adopted the *Action plan to address marine plastic litter from ships* (resolution MEPC.310(73)) (Action Plan).

2 The Action Plan, which builds on existing policy and regulatory frameworks, identifies opportunities to enhance these frameworks and introduce new supporting measures to address the issue of marine plastic litter from ships. The Action Plan includes, inter-alia, some measures to improve the effectiveness of port reception facilities and treatment in reducing marine plastic litter.

3 To progress the Action Plan, the Committee reminds Parties to MARPOL Annex V of their obligation under regulation 8 of MARPOL Annex V to ensure the provision of adequate facilities at ports and terminals for the reception of garbage, including plastic waste from ships and fishing gear, without causing undue delay to ships, and according to the needs of the ships using these facilities.

4 Parties are also reminded that the Committee had, with a view to facilitating efficient and environmentally responsible disposal of MARPOL wastes/residues, adopted and/or approved the following manual and guidelines relating to port reception facilities:

- .1 *Port Reception Facilities – How to do it (2016)*;
- .2 *Guidelines for ensuring the adequacy of port waste reception facilities* (resolution MEPC.83(44)); and
- .3 *Consolidated guidance for port reception facility providers and users* (MEPC.1/Circ.834/Rev.1).

5 Parties are further reminded of their obligation to notify the Organization for transmission to the Contracting Parties concerned of all cases where the facilities provided under regulation 8 of MARPOL Annex V are alleged to be inadequate. Such notification should be submitted through the Port Reception Facilities module in the Global Integrated Shipping Information System (GISIS).

6 In this regard, port States are also reminded to provide proper arrangements to consider and respond appropriately and effectively to reports of inadequacies, informing the Organization and the reporting flag State of the outcome of their investigation (MEPC.1/Circ.834/Rev.1, paragraph 41).

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MEPC.1/Circ.894
9 July 2021

SHARING OF RESULTS FROM RESEARCH ON MARINE LITTER AND ENCOURAGING STUDIES TO BETTER UNDERSTAND MICROPLASTICS FROM SHIPS

1 The Marine Environment Protection Committee, at its seventy-third session, having recognized that more needed to be done to address the environmental and health problems posed by marine plastic litter, adopted the *Action plan to address marine plastic litter from ships* (resolution MEPC.310(73)) (Action Plan).

2 The Action Plan, which builds on existing policy and regulatory frameworks, identifies opportunities to enhance these frameworks and introduce new supporting measures to address the issue of marine plastic litter from ships. One measure to improve understanding of the contribution of ships to marine plastic litter is the sharing of results from research related to marine litter.

3 To progress the Action Plan, Member States and international organizations are encouraged to:

- .1 provide to the Organization results of any research conducted on marine litter, including any information on the areas contaminated by marine litter from ships; and
- .2 undertake studies to better understand microplastics from ships and provide the results of such studies to the Organization.

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MEPC.1/Circ.895
9 July 2021

UNIFIED INTERPRETATIONS TO THE NO_x TECHNICAL CODE 2008, AS AMENDED

- 1 The Marine Environment Protection Committee, at its seventy-sixth session (10 to 17 June 2021), approved unified interpretations to the NO_x Technical Code 2008, as amended.
- 2 The updated consolidated text of all existing unified interpretations to the NO_x Technical Code 2008, as amended, including those set out in circular MEPC.1/Circ.865, are set out in the annex.
- 3 Member Governments are invited to apply the annexed unified interpretations to the NO_x Technical Code 2008, as amended, as appropriate, and bring them to the attention of all parties concerned.
- 4 This circular revokes MEPC.1/Circ.865.

ANNEX

UNIFIED INTERPRETATIONS TO THE NO_x TECHNICAL CODE 2008, AS AMENDED

1 Paragraph 2.2.4.1

Paragraph 2.2.4.1 reads as follows:

"There are engines which, due to their size, construction and delivery schedule, cannot be pre-certified on a test-bed. In such cases, the engine manufacturer, shipowner or shipbuilder shall make application to the Administration requesting an onboard test (see 2.1.2.2). The applicant must demonstrate to the Administration that the onboard test fully meets all of the requirements of a test-bed procedure as specified in chapter 5 of this Code. In no case shall an allowance be granted for possible deviations of measurements if an initial survey is carried out on board a ship without any valid pre-certification test. For engines undergoing an onboard certification test, in order to be issued with an Engine International Air Pollution Prevention (EIAPP) Certificate, the same procedures apply as if the engine had been pre-certified on a test-bed, subject to the limitations given in paragraph 2.2.4.2."

Interpretation:

1.1 Engines undergoing an onboard certification test should have a preliminary approved Technical File, pending the results of the emission test.

1.2 If the result of the emission test does not comply with the applicable NO_x regulation, the engines should be re-adjusted to the compliance condition originally approved, if any, or the applicant should apply to the flag Administration for acceptance of further testing.

2 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 a selective catalytic reduction (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.

3 Paragraph 4.4.6.2

Paragraph 4.4.6.2 reads as follows:

"The following parameters and specifications shall be common to engines within an Engine Group

- .1 bore and stroke dimensions;
- .2 method and design features of pressure charging and exhaust gas system:
 - constant pressure;
 - pulsating system;
- .3 method of charge air cooling system:
 - with/without charge air cooler;
- .4 design features of the combustion chamber that effect NO_x emission;
- .5 design features of the fuel injection system, plunger and injection cam or gas valve which may profile basic characteristics that effect NO_x emission; and
- .6 rated power at rated speed. The permitted ranges of engine power (kW/cylinder) and/or rated speed are to be declared by the manufacturer and approved by the Administration."

Interpretation:

3.1 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 and that new parameters derived from the SCR chamber and catalyst blocks may be used instead, such as the SCR space velocity (SV), catalyst block geometry and catalyst material.

3.2 Whilst the provisions of paragraph 4.4.6.2.1 should remain common to all engines within the group, the remaining parameters listed in paragraph 4.4.6.2 may be replaced by alternative SCR parameters, provided that the applicant is able to demonstrate that these alternative parameters are suitable for defining the Engine Group.

3.3 The applicant remains responsible for selecting the parent engine and demonstrating the basis of this selection to the satisfaction of the Administration.

4 Paragraph 5.10.1

Paragraph 5.10.1 reads as follows:

"For every Individual Engine or Parent Engine tested to establish an Engine Family or Engine Group, the engine manufacturer shall prepare a test report which shall contain the necessary data to fully define the engine performance and enable calculation of the gaseous emissions including the data as set out in section 1 of appendix 5 of this Code. The original of the test report shall be maintained on file with the engine manufacturer and a certified true copy shall be maintained on file by the Administration."

Interpretation:

4.1 The "necessary data to fully define the engine performance and enable calculation of the gaseous emissions" should be incorporated, in accordance with 5.12, from the raw data units to the cycle weighted NO_x emission value in g/kWh. The data set given under appendix 5 should not be considered definitive and any other test data (i.e. engine performance or setting data, description of control devices) relevant to the approval of a specific engine design and/or on-board NO_x verification procedures should also be given. For the engine fitted with SCR, under scheme A, the parameters listed in sub-paragraphs of paragraph 5.2.2 of IMO resolution MEPC. 291(71) should be measured and recorded in the engine test report. Under scheme B, the exhaust gas temperature at the intended inlet of the SCR chamber should be determined and recorded in the test report. For dual fuel engines, the ratio of liquid-to-gas, gas fuel temperature and its measurement point position should be recorded during the testing.

4.2 With reference to appendix 5 of the Code, it should be further interpreted that:

- .1 the term "Deviation" as given under "Sheet 3/5, Measurement equipment, Calibration" refers to the deviation of the analyser calibration and not the deviation of the span gas concentration; and
- .2 the "Fuel properties" as given under "Sheet 3/5, Fuel Characteristics, Fuel properties" should, include sufficient data to justify the ISO 8217:2017 grade (i.e. DMA, DMB, etc.) as given on EIAPP Certificate Supplement 1.9.4 by considering other additional analysis results for the fuel oil characteristics, i.e. Cetane index (ISO 4264:2018), carbon residue (ISO 10370:2014).

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MEPC.1/Circ.795/Rev.5
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UNIFIED INTERPRETATIONS TO MARPOL ANNEX VI

- 1 The Marine Environment Protection Committee, at its seventy-sixth session (10 to 17 June 2021), approved unified interpretations to regulation 2.23 of MARPOL Annex VI concerning the clarification of the dates related to EEDI Phase 2 and 3 for new ships.
- 2 The updated consolidated text of all existing unified interpretations to MARPOL Annex VI, including those set out in circular MEPC.1/Circ.795/Rev.4, are set out in the annex.
- 3 Member Governments are invited to apply the annexed unified interpretations to MARPOL Annex VI, as appropriate, and bring them to the attention of all Parties concerned.
- 4 This circular revokes MEPC.1/Circ.795/Rev.4.

ANNEX

UNIFIED INTERPRETATIONS TO MARPOL ANNEX VI

1 Definition of "new ship"

Regulation 2

Definitions

Regulation 2.23 reads as follows:

"*New ship* means a ship:

- .1 for which building contract is placed on or after 1 January 2013; or
- .2 in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013; or
- .3 the delivery of which is on or after 1 July 2015."

Interpretation:

1.1 For the application of the definition "new ship" as specified in regulation 2.23 to each Phase specified in table 1 of regulation 21, it should be interpreted as follows:

- .1 the date specified in regulation 2.23.1 should be replaced with the start date of each Phase;
- .2 the date specified in regulation 2.23.2 should be replaced with the date six months after the start date and end date of each Phase; and
- .3 the date specified in regulation 2.23.3 should, for Phase 1, 2 and 3, be replaced with the date 48 months after the start date and end date of each Phase.

1.2 With the above interpretations, the required EEDI of each phase is applied to the following new ship which falls into one of the categories defined in regulations 2.25 to 2.31 and to which chapter 4 is applicable:

- .1 the required EEDI of Phase 0 is applied to the following new ship:
 - .1 the building contract of which is placed in Phase 0, and the delivery is before 1 January 2019; or
 - .2 the building contract of which is placed before Phase 0, and the delivery is on or after 1 July 2015 and before 1 January 2019; orin the absence of a building contract:
 - .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013 and before 1 July 2015, and the delivery is before 1 January 2019; or

- .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2013, and the delivery is on or after 1 July 2015 and before 1 January 2019;
- .2 the required EEDI of Phase 1 is applied to the following new ship:
 - .1 the building contract of which is placed in Phase 1, and the delivery is before 1 January 2024; or
 - .2 the building contract of which is placed before Phase 1, and the delivery is on or after 1 January 2019 and before 1 January 2024; orin the absence of a building contract:
 - .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2015 and before 1 July 2020, and the delivery is before 1 January 2024; or
 - .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2015, and the delivery is on or after 1 January 2019 and before 1 January 2024;
- .3 the required EEDI of Phase 2 is applied to the following new ship:
 - .1 for ship types where Phase 2 ends on 31 March 2022:¹
 - .1 the building contract of which is placed in Phase 2, and the delivery is before 1 April 2026; or
 - .2 the building contract of which is placed before Phase 2, and the delivery is on or after 1 January 2024 and before 1 April 2026; orin the absence of a building contract:
 - .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2020 and before 1 October 2022, and the delivery is before 1 April 2026; or
 - .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2020, and the delivery is on or after 1 January 2024 and before 1 April 2026;
 - .2 for ship types where Phase 2 ends on 31 December 2024:
 - .1 the building contract of which is placed in Phase 2, and the delivery is before 1 January 2029; or
 - .2 the building contract of which is placed before Phase 2, and the delivery is on or after 1 January 2024 and before 1 January 2029; orin the absence of a building contract:

¹ Unified Interpretation is applicable when resolution MEPC.324(75) enters into force on 1 April 2022.

- .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2020 and before 1 July 2025, and the delivery is before 1 January 2029; or
 - .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2020, and the delivery is on or after 1 January 2024 and before 1 January 2029;
- .4 the required EEDI of Phase 3 is applied to the following new ship:
- .1 for ship types where Phase 3 commences with 1 April 2022 and onwards:²
 - .1 the building contract of which is placed in Phase 3; or
 - .2 the building contract of which is placed before Phase 3, and the delivery is on or after 1 April 2026; or

in the absence of a building contract:

 - .3 the keel of which is laid or which is at a similar stage of construction on or after 1 October 2022; or
 - .4 the keel of which is laid or which is at a similar stage of construction before 1 October 2022 and the delivery of which is on or after 1 April 2026;
 - .2 for ship types where Phase 3 commences with 1 January 2025 and onwards:
 - .1 the building contract of which is placed in Phase 3; or
 - .2 the building contract of which is placed before Phase 3, and the delivery is on or after 1 January 2029; or

in the absence of a building contract:

 - .3 the keel of which is laid or which is at a similar stage of construction on or after 1 July 2025; or
 - .4 the keel of which is laid or which is at a similar stage of construction before 1 July 2025 and the delivery of which is on or after 1 January 2029.

² Unified Interpretation is applicable when resolution MEPC.324(75) enters into force on 1 April 2022.

2 Major conversion

Regulation 2

Definitions

Regulation 2.24 reads as follows:

"*Major conversion* means in relation to chapter 4 of this Annex a conversion of a ship:

- .1 which substantially alters the dimensions, carrying capacity or engine power of the ship; or
- .2 which changes the type of the ship; or
- .3 the intent of which in the opinion of the Administration is substantially to prolong the life of the ship; or
- .4 which otherwise so alters the ship that, if it were a new ship, it would become subject to relevant provisions of the present Convention not applicable to it as an existing ship; or
- .5 which substantially alters the energy efficiency of the ship and includes any modifications that could cause the ship to exceed the applicable required EEDI as set out in regulation 21 of this Annex."

Interpretation:

2.1 For regulation 2.24.1, any substantial change in hull dimensions and/or capacity (e.g. change of length between perpendiculars (L_{PP}) or change of assigned freeboard) should be considered a major conversion. Any substantial increase of total engine power for propulsion (e.g. 5% or more) should be considered a major conversion. In any case, it is the Administration's authority to evaluate and decide whether an alteration should be considered as major conversion, consistent with chapter 4.

Note: Notwithstanding paragraph 2.1, assuming no alteration to the ship structure, both decrease of assigned freeboard and temporary increase of assigned freeboard due to the limitation of deadweight or draft at calling port should not be construed as a major conversion. However, an increase of assigned freeboard, except a temporary increase, should be construed as a major conversion.

2.2 Notwithstanding paragraph 2.1, for regulation 2.24.5, the effect on Attained EEDI as a result of any change of ships' parameters, particularly any increase in total engine power for propulsion, should be investigated. In any case, it is the Administration's authority to evaluate and decide whether an alteration should be considered as major conversion, consistent with chapter 4.

2.3 A company may, at any time, voluntarily request re-certification of the EEDI, with IEE Certificate reissuance, on the basis of any new improvements to the ships' efficiency that are not considered to be major conversions.

2.4 In regulation 2.24.4, the terms "new ship" and "existing ship" should be understood as they are used in MARPOL Annex I, regulation 1.9.1.4, rather than as the defined terms in regulations 2.22 and 2.23.

2.5 The term "a ship" referred to in regulation 5.4.2 is interpreted as "new ship".

3 Ships dedicated to the carriage of fruit juice in refrigerated cargo tanks

Regulation 2

Definitions

Regulation 2.30 reads as follows:

"Refrigerated cargo carrier means a ship designed exclusively for the carriage of refrigerated cargoes in holds."

Interpretation:

3.1 Ships dedicated to the carriage of fruit juice in refrigerated cargo tanks should be categorized as refrigerated cargo carrier.

4 Timing for existing ships to have on board a SEEMP

Regulation 5

Surveys

Regulation 5.4.4 reads as follows:

"For existing ships, the verification of the requirement to have a SEEMP on board according to regulation 22 shall take place at the first intermediate or renewal survey identified in paragraph 1 of this regulation, whichever is the first, on or after 1 January 2013."

Regulation 6

Issue or endorsement of a Certificate

Regulation 6.4 reads as follows:

"An International Energy Efficiency Certificate for the ship shall be issued after a survey in accordance with the provisions of regulation 5.4 of this Annex to any ship of 400 gross tonnage and above before that ship may engage in voyages to ports or offshore terminals under the jurisdiction of other Parties."

Regulation 22

Ship Energy Efficiency Management Plan (SEEMP)

Regulation 22.1 reads as follows:

"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 (SMS)."

Interpretation:

4.1 The International Energy Efficiency Certificate (IEEC) should be issued for both new and existing ships to which chapter 4 applies. Ships which are not required to keep an SEEMP on board are not required to be issued with an IECC.

4.2 The SEEMP required by regulation 22.1 is not required to be placed on board an existing ship to which this regulation applies until the verification survey specified in regulation 5.4.4 is carried out.

4.3 For existing ships, a SEEMP required in accordance with regulation 22 should be verified on board according to regulation 5.4.4, and an IEEC should be issued, not later than the first intermediate or renewal survey, in accordance with chapter 2, whichever is earlier, on or after 1 January 2013, i.e. a survey connected to an intermediate/renewal survey of the IAPP Certificate.

4.4 The intermediate or renewal survey referenced in paragraph 4.3 relates solely to the timing of the verification of the SEEMP on board, i.e. these IAPP Certificate survey windows will also become the IEEC initial survey date for existing ships. The SEEMP is, however, a survey item solely under chapter 4 and is not a survey item relating to IAPP Certificate surveys.

4.5 In the event that the SEEMP is not available on board during the first intermediate/renewal survey of the IAPP Certificate on or after 1 January 2013, the RO should seek the advice of the Administration concerning the issuance of an IEEC and be guided accordingly. However, the validity of the IAPP Certificate is not impacted by the lack of a SEEMP as the SEEMP is a survey item solely under chapter 4 and not under the IAPP Certificate surveys.

4.6 With respect to ships required to keep on board a SEEMP, such ships exclude platforms (including FPSOs and FSUs) and drilling rigs, regardless of their propulsion, and any other ship without means of propulsion.

4.7 The SEEMP should be written in a working language or languages understood by ships' personnel.

5 Section 2.3 of the supplement to the IAPP Certificate

Regulation 8

Form of Certificates

Regulation 8.1 reads as follows:

"The International Air Pollution Prevention Certificate shall be drawn up in a form corresponding to the model given in appendix I to this Annex and shall be at least in English, French or Spanish. If an official language of the issuing country is also used, this shall prevail in case of a dispute or discrepancy."

Appendix I

Form of International Air Pollution Prevention (IAPP) Certificate (Regulation 8)

Section 2.3 of the supplement to International Air Pollution Prevention Certificate reads as follows:

- "2.3 Sulphur oxides (SO_x) and particulate matter (regulation 14).
- 2.3.1 When the ship operates outside of an emission control area specified in regulation 14.3, the ship uses:
 - .1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.50% m/m, and/or
 - .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SO_x emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.50% m/m
- 2.3.2 When the ship operates inside an emission control area specified in regulation 14.3, the ship uses:
 - .1 fuel oil with a sulphur content as documented by bunker delivery notes that does not exceed the limit value of 0.10% m/m, and/or
 - .2 an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6 that is at least as effective in terms of SO_x emission reductions as compared to using a fuel oil with a sulphur content limit value of 0.10% m/m
- 2.3.3 For a ship without an equivalent arrangement approved in accordance with regulation 4.1 as listed in paragraph 2.6, the sulphur content of fuel oil carried for use on board the ship shall not exceed 0.50% m/m as documented by bunker delivery notes

Interpretation:

5.1 Section 2.3 of the Supplement ("as documented by bunker delivery notes") allows for an "x" to be entered in advance of the dates indicated in all of the relevant check boxes recognizing that the bunker delivery notes, required to be retained on board for a minimum period of three years, provide the subsequent means to check that a ship is actually operating in a manner consistent with the intent as given in section 2.3.

6 Identical replacement engines

Regulation 13

Nitrogen oxides (NO_x)

Regulation 13.1.1.2 reads as follows:

"Each marine diesel engine with a power output of more than 130 kW which undergoes a major conversion on or after 1 January 2000 except when demonstrated to the satisfaction of the Administration that such engine is an identical replacement to the engine which it is replacing and is otherwise not covered under paragraph 1.1.1 of this regulation."

Regulation 13.2.2 reads as follows:

"For a major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine or the installation of an additional marine diesel engine, the standards in this regulation in force at the time of the replacement or addition of the engine shall apply."

Interpretation:

6.1 In regulation 13.1.1.2, the term "identical" (and hence, by application of the converse, in regulation 13.2.2 the term "non-identical") as applied to engines under regulation 13 should be taken as:

6.2 An "identical engine" is, as compared to the engine being replaced,³ an engine which is of the same:

- .1 design and model;
- .2 rated power;
- .3 rated speed;
- .4 use;
- .5 number of cylinders; and
- .6 fuel system type (including, if applicable, injection control software):

³ In those instances where the replaced engine will not be available to be directly compared with the replacing engine at the time of updating the Supplement to the IAPP Certificate reflecting that engine change it is to be ensured that the necessary records in respect of the replaced engine are available in order that it can be confirmed that the replacing engine represents "an identical engine".

- .1 for engines without EIAPP certification, have the same NO_x critical components and settings;⁴ or
- .2 for engines with EIAPP certification, belonging to the same Engine Group/Engine Family.

7 Time of replacement of an engine

Regulation 13

Nitrogen oxides (NO_x)

Regulation 13.2.2 reads as follows:

"For a major conversion involving the replacement of a marine diesel engine with a non-identical marine diesel engine, or the installation of an additional marine diesel engine, the standards in this regulation in force at the time of the replacement or addition of the engine shall apply."

Interpretation:

7.1 The term "time of the replacement or addition" of the engine in regulation 13.2.2 should be taken as the date of:

- .1 the contractual delivery date of the engine to the ship;⁵ or
- .2 in the absence of a contractual delivery date, the actual delivery date of the engine to the ship,⁵ provided that the date is confirmed by a delivery receipt; or
- .3 in the event the engine is fitted on board and tested for its intended purpose on or after six months from the date specified in sub-paragraphs of regulation 13.5.1.2, as appropriate, the actual date that the engine is tested on board for its intended purpose applies in determining the standards in this regulation in force at the time of the replacement or addition of the engine.

7.2 Entry of the date in paragraph 7.1 above, provided the conditions associated with those dates apply, should be made in the item 8.a "Major conversion – According to regulations 13.2.1.1 and 13.2.2" of the Supplement of IAPP Certificate.

⁴ For engines without EIAPP Certification there will not be the defining NO_x critical component markings or setting values as usually given in the approved Technical File. Consequently, in these instances, the assessment of "... same NO_x critical components and settings ..." shall be established on the basis that the following components and settings are the same:

Fuel system:

- .1 fuel pump model and injection timing; and
- .2 injection nozzle model;

Charge air:

- .1 configuration and, if applicable, turbocharger model and auxiliary blower specification; and
- .2 Cooling medium (seawater/freshwater).

⁵ The engine is to be fitted on board and tested for its intended purpose within six months after the date specified in sub-paragraphs of regulation 13.5.1.2, as appropriate.

7.3 If the engine is not tested within six months after the date specified in sub-paragraphs of regulation 13.5.1.2, as appropriate due to unforeseen circumstances beyond the control of the shipowner, then the provisions of "unforeseen delay in delivery" may be considered by the Administration in a manner similar to UI4 of MARPOL Annex I.

8 Engine changeover/on-off recording requirements

Regulation 13

Nitrogen oxides (NO_x)

Regulation 13.5.3 reads as follows:

"The tier and on/off status of marine diesel engines installed on board a ship to which paragraph 5.1 of this regulation applies which are certified to both Tier II and Tier III or which are certified to Tier II only shall be recorded in such logbook as prescribed by the Administration at entry into and exit from an emission control area designated under paragraph 6 of this regulation, or when the on/off status changes within such an area, together with the date, time and position of the ship."

Interpretation:

8.1 For the application of this regulation:

- .1 "marine diesel engines installed on board a ship to which paragraph 5.1 of this regulation applies" includes additional or replaced engines⁶; installed on or after the relevant emission control area takes effect;
- .2 "certified to Tier II only" means a Tier II engine that is installed on board a ship which is constructed on or after the emission control area where the ship is operating takes effect;
- .3 Tier II engines stipulated under the Tier II requirement of regulation 13.4, i.e. Tier II engines installed on board a ship constructed before the entry into force of the emission control area where the ship is operating, are not considered to be a "Tier II only" engine in the context of record keeping. Such exclusion is extended to Tier II engines replaced after the entry into force of the relevant emission control areas on board ships of this category, if the replacement engines meet resolution MEPC.230(65);
- .4 if an engine installed on a ship constructed before the entry into force of the emission control area where the ship is operating has undergone a major conversion as described in regulation 13.2.1, those engines are to be Tier III engines; thus the above interpretation in .1 above applies; and
- .5 recording is required for the Tier II engine operation in a NECA under the exemption according to regulation 13.5.4.

9 Application of sulphur limit to emergency equipment

Regulation 14

Sulphur oxides (SO_x) and particulate matter

Regulation 14.1 reads as follows:

⁶ Additional or replaced engine: refer to section 7.1 of MEPC.1/Circ.795/Rev.5.

"The sulphur content of fuel oil used or carried for use on board a ship shall not exceed 0.50% m/m."

Interpretation:

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

10 VOC management plan

Regulation 15

Volatile organic compounds (VOCs)

Regulations 15.6 and 15.7 read as follows:

"6 A tanker carrying crude oil shall have on board and implement a VOC management plan approved by the Administration. Such a plan shall be prepared taking into account the guidelines developed by the Organization. The plan shall be specific to each ship and shall at least:

- .1 provide written procedures for minimizing VOC emissions during the loading, sea passage and discharge of cargo;
- .2 give consideration to the additional VOC generated by crude oil washing;
- .3 identify a person responsible for implementing the plan; and
- .4 for ships on international voyages, be written in the working language of the master and officers and, if the working language of the master and officers is not English, French or Spanish, include a translation into one of these languages.

7 This regulation shall also apply to gas carriers only if the types of loading and containment systems allow safe retention of non-methane VOCs on board or their safe return ashore.[†]"

Interpretation:

10.1 The requirement for a VOC management plan applies only to a tanker carrying crude oil.

11 Continuous-feed type shipboard incinerators

Regulation 16

Shipboard incineration

Regulation 16.9 reads as follows:

"For incinerators installed in accordance with the requirements of paragraph 6.1 of this regulation the combustion chamber gas outlet temperature shall be monitored at

[†] Resolution MSC.30(61), International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.

all times the unit is in operation. Where that incinerator is of the continuous-feed type, waste shall not be fed into the unit when the combustion chamber gas outlet temperature is below 850°C. Where that incinerator is of the batch-loaded type, the unit shall be designed so that the combustion chamber gas outlet temperature shall reach 600°C within five minutes after start-up and will thereafter stabilize at a temperature not less than 850°C."

Interpretation:

11.1 For the application of this regulation, the term "waste shall not be fed into the unit" should be interpreted as follows:

For continuous-feed incinerators solid waste shall not be fed into the unit when the combustion chamber flue gas outlet temperature is below 850°C. Sludge oil generated during normal operation of a ship should not be regarded as waste in connection with this regulation, and can be fed into the unit when the required preheat temperature of 650°C in the combustion chamber is achieved.

11.2 For the application of this regulation, the term "the unit shall be designed so that the combustion chamber gas outlet temperature shall reach 600°C within five minutes after start up" should be interpreted as follows:

Batch loaded incinerators should be designed so that the temperature in the actual combustion space where the solid waste is combusted should reach 600°C within five minutes after start up.

12 Applicability of the requirements for a bunker delivery note

Regulation 18

Fuel oil availability and quality

Regulation 18.5 reads as follows:

"For each ship subject to regulations 5 and 6 of this Annex, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note that shall contain at least the information specified in appendix V to this Annex."

Regulation 18.6 reads as follows:

"The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board."

Interpretation:

12.1 For the application of these regulations, they should be interpreted as being applicable to all ships of 400 gross tonnage or above and, at the Administration's discretion, to ships of less than 400 gross tonnage.

13 Confirmation of compliance for new ships

Regulation 5

Surveys

Regulation 5.4.5 reads as follows:

"The Administration shall ensure that for each ship to which regulation 22A applies, the SEEMP complies with regulation 22.2 of this Annex. This shall be done prior to collecting data under regulation 22A of this Annex in order to ensure the methodology and processes are in place prior to the beginning of the ship's first reporting period. Confirmation of compliance shall be provided to and retained on board the ship."

Regulation 22

Ship Energy Efficiency Management Plan (SEEMP)

Regulation 22.2 reads as follows:

"On or before 31 December 2018, 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 22A.1 of this Annex and the processes that will be used to report the data to the ship's Administration."

Regulation 22.3 reads as follows:

"The SEEMP shall be developed taking into account guidelines adopted by the Organization."

Interpretation:

13.1 For Ships that are delivered on or after 1 January 2019 should keep on board both a SEEMP that is in compliance with regulation 22.2 and confirmation of compliance as required by regulation 5.4.5.

14 Boil-off gas consumed on board ships

Regulation 2

Definitions

Regulation 2.9 reads as follows:

"*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."

Regulation 22A

Collection and reporting of ship fuel oil consumption data

Regulation 22A.1 reads as follows:

"From calendar year 2019, each ship of 5,000 gross tonnage and above shall collect the data specified in appendix IX to this Annex, for that and each subsequent calendar year or portion thereof, as appropriate, according to the methodology included in the SEEMP."

Appendix IX

Collection and reporting of ship fuel oil consumption data

Appendix IX reads as follows:

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

Interpretation:

14.1 For Data relating to Boil-off Gas (BOG) consumed on board the ship for propulsion or operation is required to be collected and reported as fuel as part of the Data Collection System for fuel oil consumption of ships.

15 Access to the disaggregated data

Regulation 22A

Collection and reporting of ship fuel oil consumption data

Regulation 22A.8 reads as follows:

"Except as provided for in paragraphs 4, 5 and 6 of this regulation, the disaggregated data that underlies the reported data noted in appendix IX to this Annex for the previous calendar year shall be readily accessible for a period of not less than 12 months from the end of that calendar year and be made available to the Administration upon request."

Interpretation:

15.1 The disaggregated data is not required to be kept onboard the ship provided that the disaggregated data can be made available by the Company.