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TECHNICAL PUBLICATION

CII & SEEMP Part III

Explanatory guidance

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BACKGROUND

The International Maritime Organization (IMO) has agreed on a set of guidelines to support mandatory measures to cut the carbon intensity of all ships. These have been approved by IMO's Marine Environment Protection Committee (MEPC) and have been adopted on the MEPC 78th session on 1 July 2022.

The amendments to the MARPOL Convention require ships to combine a technical and operational approach to reduce their carbon intensity. This is in line with the ambition of the Initial IMO GHG Strategy, which aims to reduce the carbon intensity of international shipping and was agreed upon in 2018. IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, aims to phase them out as soon as possible in this century.

Two of the targets set in the Initial Strategy were:

1. **Carbon intensity** of the **ship** to decline through implementation of further phases of the energy efficiency design index (**EEDI**) for new ships to review with the aim to strengthen the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate; and
2. **Carbon intensity of international shipping** to decline to reduce CO₂ emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008.

To meet these targets, the following measures have been introduced:

1. The **Energy Efficiency Existing Ship Index (EEXI)**, applicable from the first annual, intermediate, or renewal IAPP survey **after 1 January 2023**. The attained Energy Efficiency Existing Ship Index (EEXI) is required to be calculated for ships of 400 GT and above, in accordance with the different values set for ship types and size categories.
2. The operational **Carbon Intensity Indicator (CII)** rating scheme, taking effect **from 1 January 2023**.
3. The enhanced Ship Energy Efficiency Management Plan (**SEEMP**), whereby an approved SEEMP needs to be kept onboard from 1 January 2023. The performance level (CII Rating) would be recorded in the ship's Ship Energy Efficiency Management Plan (SEEMP).

The above approach aims to address both technical (how the ship is equipped and retrofitted) and operational measures (how the ship operates).

In simple terms, the short-term term measures are aimed at achieving the carbon intensity reduction aims of the IMO initial GHG Strategy.

They do this by requiring all ships to calculate their Energy Efficiency Existing Ship Index (EEXI) and to establish their annual operational carbon intensity indicator (CII) and CII rating.

In other words, ships get a rating of their energy efficiency (A, B, C, D, E – where A is the best). A ship running on a low carbon fuel clearly gets a higher rating than one running on fossil fuel.

However, there are many ways a ship can do to improve its rating through various measures, such as:

- hull cleaning to reduce drag;
- speed and routeing optimization;
- installation of low energy light bulbs;
- installation of solar/wind auxiliary power for accommodation services; etc

The amendments require IMO to review the effectiveness of the implementation of the CII requirements, by 1 January 2025 at the latest, and, if necessary, develop and adopt further.

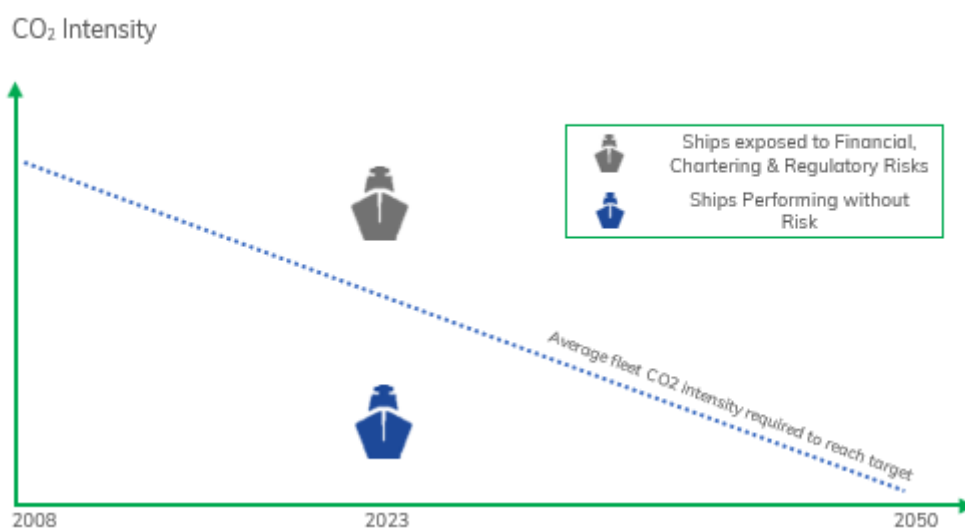


Figure 1 – Difference in risk between compliant and non-compliant ships

CII REDUCTION FACTOR (CII)

Under the MARPOL amendments, ships of 5,000 GT and above have to determine their required annual operational carbon intensity indicator (CII). The ship's CII determines the annual reduction factor needed to ensure continuous improvement of the ship's operational carbon intensity within a specific rating level.

The actual annual operational CII achieved (attained annual operational CII) would be required to be documented and verified against the required annual operational CII. This would enable the operational

carbon intensity rating to be determined.

These ships will be required to determine their required annual operational CII and will then get a rating of their energy efficiency (A, B, C, D, E - where A is the best), which will be incorporated in their mandatory Statement of Compliance to be issued by Dromon on an annual basis.

The 2022 Guidelines on the operational Carbon Intensity rating of ships set the method to determine the rating boundaries. These are:

- Calculation Guidelines (G1);
- Reference line guidelines (G2);
- Reduction factor guidelines (G3);
- Rating guidelines (G4); and
- New correction factor guidelines (G5)

The rating would be given on a scale - operational carbon intensity rating A, B, C, D or E - indicating a major superior, minor superior, moderate, minor inferior, or inferior performance level. The performance level would be recorded in the ship's Ship Energy Efficiency Management Plan (SEEMP).

Under the MARPOL amendments, cargo, ro-pax and cruise ships above 5000 GT shall need every year from 2023 to annually calculate and report CII and their rating A to E. A ship rated C or D or E for three consecutive years would have to submit a corrective action plan, to show how the required index (C or above) would be achieved. This needs to be included and submitted within one (1) month after reporting the CII.

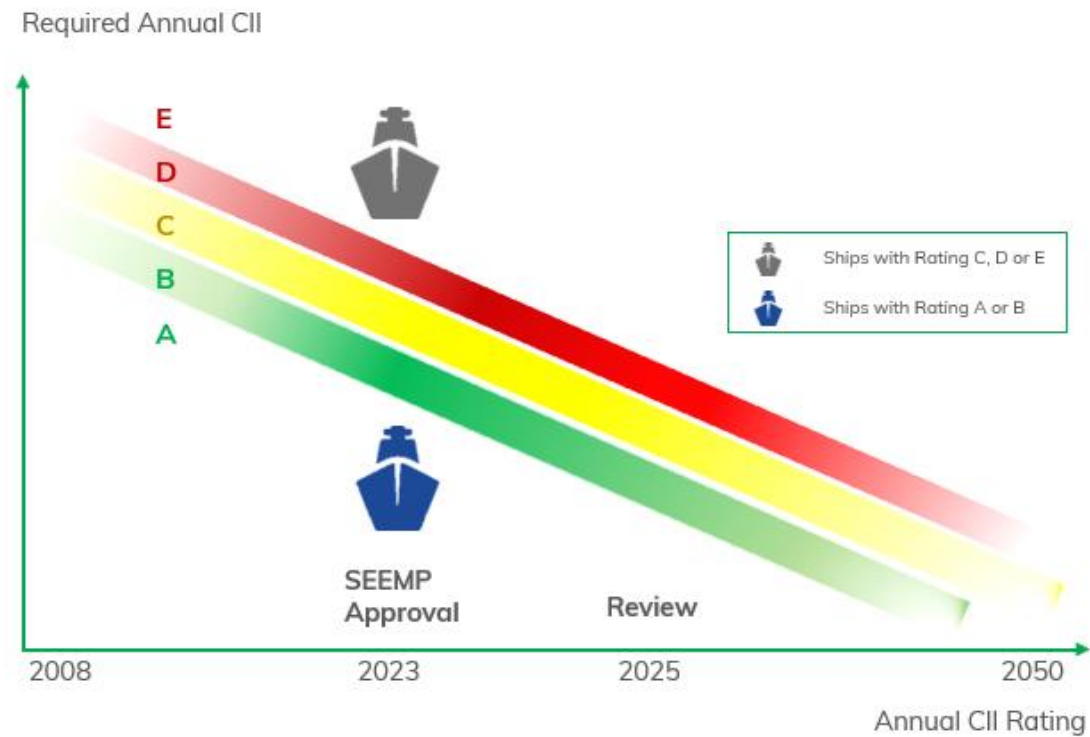


Figure 2 – CII Rating

APPLICATION

CII shall be calculated for the following ships of 5000GT and above:

1. Bulk Carriers
2. Combination Carriers
3. General Cargo
4. Container Ships
5. Cruise ships
6. Tankers
7. Gas Carriers
8. LNG Carriers
9. RoRo cargo ships
10. RoRo cargo – vehicle carriers
11. RoRo cargo – passenger carriers

CII CALCULATION (G1)

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:

$$\text{Attained CII Ship} = \frac{M}{W} \quad (1)$$

MASS OF CO2 EMISSIONS (M)

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

$$M = \sum_j FC_j \times CF_j$$

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
- CF_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.

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 traveled in a given calendar year, as follows:

$$W_s = C \times Dt$$

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.

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.

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,

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

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

ATTAINED ANNUAL OPERATIONAL CII

After the end of calendar year 2023 and after the end of each following calendar year, each ship of 5,000 gross tonnage and above which falls into one or more of the categories listed below shall calculate the attained annual operational CII over a 12-month period from 1 January to 31 December for the preceding calendar year, using the data collected in accordance with regulation 27 of this Annex, taking into account the guidelines to be developed by the Organization.

Within three months after the end of each calendar year, the ship shall report to its Administration, or any organization duly authorized by it, the attained annual operational CII via electronic communication and using a standardized format to be developed by the Organization.

CII REFERENCE LINE (G2)

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.

For a defined group of ships, the reference line is formulated as follows:

$$\text{CII ref} = a \times \text{Capacity}^{-c} \quad (2)$$

Where,

CIIref is the reference value of the 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 the year 2019 as the sample.

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:

Ship type	Capacity	a	c	
Bulk carrier	279,000 DWT and above	279,000	4754	0.622
	less than 279,000 DWT	DWT	4745	0.622
Gas carrier	65,000 and above	DWT	14405e7	2.071
	less than 65,000 DWT	DWT	8104	0.639
Tanker	DWT	5247	0.610	
Container ship	DWT	1984	0.489	
General cargo ship	20,000 DWT and above	DWT	31948	0.792
	less than 20,000 DWT	DWT	588	0.3885

Refrigerated cargo carrier		DWT	4600	0.557
Combination carrier		DWT	5119	0.622
LNG carrier	100,000 DWT and above	DWT	9.827	0.000
	65,000 DWT and above, but less than 100,000 DWT	DWT	14479E10	2.673
	less than 65,000 DWT	65,000	14779E10	2.673
Ro-ro cargo ship (vehicle carrier)	57,700 GT and above	57,700	3627	0.590
	30,000 GT and above, but less than 57,700 GT	GT	3627	0.590
	Less than 30,000 GT	GT	330	0.329
Ro-ro cargo ship		GT	1967	0.485
Ro-ro passenger ship	Ro-ro passenger ship	GT	2023	0.460
	High-speed craft designed to SOLAS chapter X	GT	4196	0.460
Cruise passenger ship		GT	930	0.383

Table 1: Parameters for determining the 2019 ship type specific reference lines

REQUIRED ANNUAL OPERATIONAL CII (G3)

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

$$\text{Required annual operational CII} = \left(1 - \frac{Z}{100}\right) \times \text{CII ref} \quad (3)$$

Where,

- Z is the annual reduction factor to ensure continuous improvement of the ship's operational carbon intensity within a specific rating level; and
- CII ref is the reference value.

The annual reduction factor Z and the reference value CII ref shall be the values defined taking into account the guidelines to be developed by the Organization.

CII ref 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 the year 2023 to 2030, as specified in table 2.

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

Table 2 – Reduction factor (Z%) for the CII relative to the 2019 reference line

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.

OPERATIONAL CARBON INTENSITY RATING (G4)

The attained annual operational CII shall be documented and verified against the required annual operational CII to determine operational carbon intensity rating A, B, C, D or E, indicating a major superior, minor superior, moderate, minor inferior, or inferior performance level, either by the Administration or by any organization duly authorized by it, taking into account the guidelines developed by the Organization. The middle point of rating level C shall be the value equivalent to the required annual operational CII set out in paragraph 4 of this regulation. Corrective actions and incentives.

A ship rated as D for three consecutive years or rated as E shall develop a plan of corrective actions to achieve the required annual operational CII.

The SEEMP shall be reviewed to include the plan of corrective actions accordingly, taking into account the guidelines to be developed by the Organization. The revised SEEMP shall be submitted to the Administration or any organization duly authorized by it for verification, preferably together with, but in no case later than 1 month after reporting the attained annual

A ship rated as D for three consecutive years or rated as E shall duly undertake the planned corrective actions in accordance with the revised SEEMP.

Administrations, port authorities and other stakeholders as appropriate, are encouraged to provide incentives to ships rated as A or B.

Review

A review shall be completed by 1 January 2026 by the Organization to assess:

- the effectiveness of this regulation in reducing the carbon intensity of international shipping;
- the need for reinforced corrective actions or other means of remedy, including possible additional EEXI requirements;
- the need for enhancement of the enforcement mechanism;

- the need for enhancement of the data collection system; and
- the revision of the Z factor and CII_R values.

FRAMEWORK OF THE OPERATIONAL ENERGY EFFICIENCY PERFORMANCE RATING

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.

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 by comparing a ship's attained annual operational CII with the boundary values.

The boundaries are set based on the distribution of CII 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 CII, 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 3.

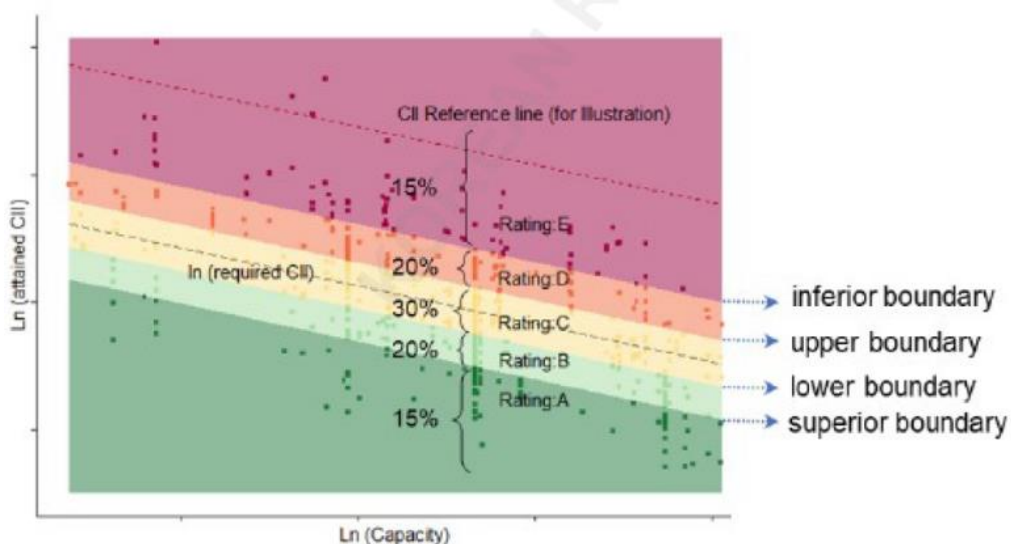


Figure 3- Operational energy efficiency performance rating scale

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.

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 4.

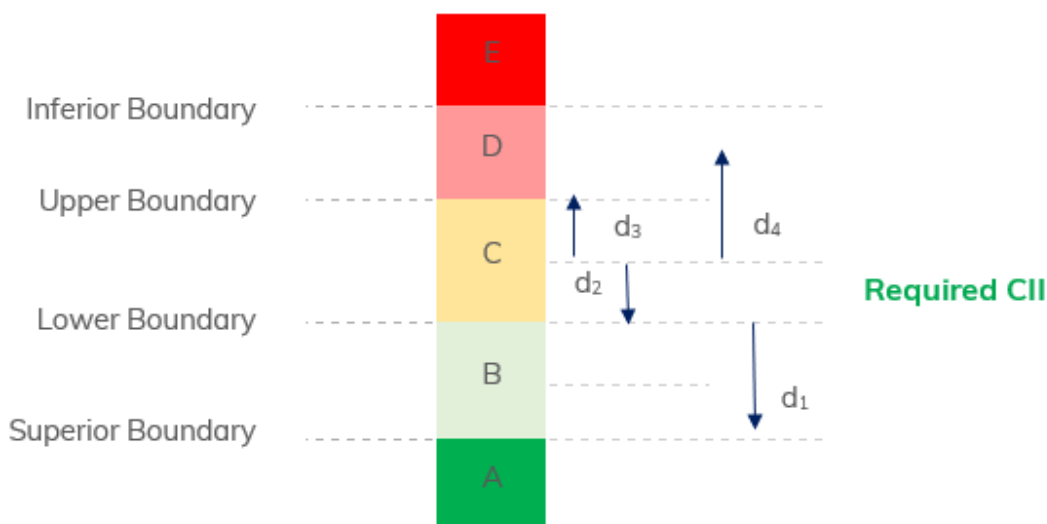


Figure 4 – dd vectors and rating bands

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 IMO DCS in year 2019 as the sample.

The quantile regression model for a specific ship type can be developed as follows:

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

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.

The quantile regression lines in logarithm form are illustrated in Figure 5.

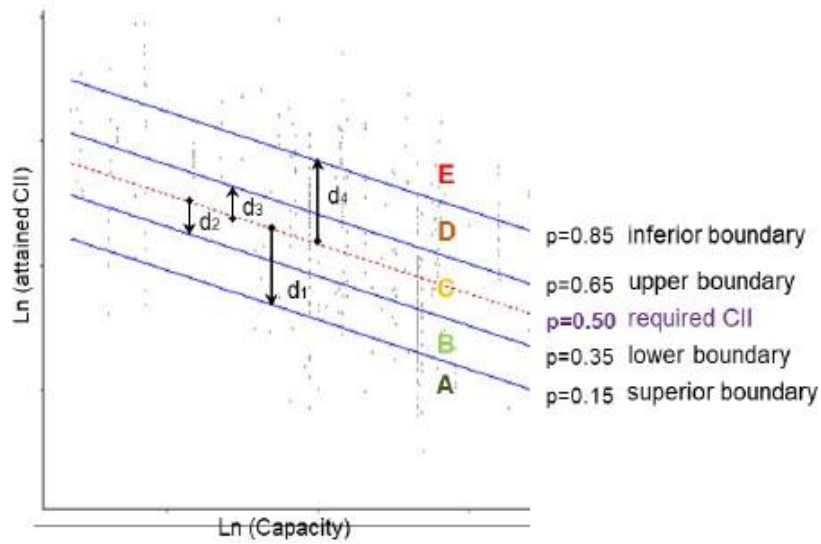


Figure 5 – Quantile regression lines in logarithm form

Then, the dd vectors can be calculated based on the estimates of the intercept ($\hat{\delta}^{(p)}$), in accordance with Eq.(2) as follows:

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

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:

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

Rating boundaries of ship types

The estimated dd vectors after exponential transformation for determining the rating boundaries of ship types are as follows:

Ship type		Capacity in CII calculation	dd vectors (After exponential transformation)			
			exp(d1)	exp(d2)	exp(d3)	exp(d4)
Bulk carrier		DWT	0.86	0.94	1.06	1.18
Gas carrier	65,000 DWT and above	DWT	0.81	0.91	1.12	1.44
	less than 65,000 DWT	DWT	0.85	0.95	1.06	1.25
Tanker		DWT	0.82	0.93	1.08	1.28
Container ship		DWT	0.83	0.94	1.07	1.19
General cargo ship		DWT	0.83	0.94	1.06	1.19
Refrigerated cargo carrier		DWT	0.78	0.91	1.07	1.20
Combination carrier		DWT	0.87	0.96	1.06	1.14
LNG carrier	100,000 DWT and above	DWT	0.89	0.98	1.06	1.13
	less than 100,000 DWT		0.78	0.92	1.10	1.37
Ro-ro cargo ship (vehicle carrier)		GT	0.86	0.94	1.06	1.16
Ro-ro cargo ship		DWT	0.76	0.89	1.08	1.27
Ro-ro passenger ship		GT	0.76	0.92	1.14	1.30
Cruise passenger ship		GT	0.87	0.95	1.06	1.16

Table 3: dd vectors for determining the rating boundaries of ship types

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.

CORRECTION FACTOR & VOYAGE ADJUSTMENT (G5)

These Guidelines address the corrections factors and voyage adjustments which may be applied to the calculation of the attained annual operational carbon intensity indicator (CII_{ship}) of regulation 28 of MARPOL Annex VI, and as defined by the 2022 Guidelines on operational carbon intensity indicators and the calculation methods (CII Guidelines, G1) (resolution MEPC.352 (78)). It should be noted that the use of correction factors and voyage adjustments should in no way undermine the goal of reducing the carbon intensity of international shipping as set out in regulation 20 of MARPOL Annex VI.

ATTAINED ANNUAL OPERATIONAL CII (CII_{SHIP}) FORMULA FOR VOYAGE ADJUSTMENTS AND CORRECTION FACTORS

Use of voyage adjustments and correction factors require changes to be made to the overall attained annual operational CII (CII_{ship}) formula as follows:

$$\frac{\sum j \times CF_j \times \{FC_j - (FC_{voyage,j} + TF_j + (0.75 - 0.03y_i) \times (FC_{electrical,j} + FC_{boiler,j} + FC_{others,j}))\}}{f_i \times f_m \times f_c \times f_{iVSE} \times Capacity \times (D_t - D_x)}$$

Which can be translated as:

$$\frac{DCS \text{ Reported Annual CO}_2 \text{ Emission} - (\text{deductible CO}_2 \text{ Emission or deductible CO}_2 \text{ Emission})}{EEDI \text{ correction factor} \times Capacity \times (DCS \text{ Reported Distance Travelled} - \text{deductible Distance travelled})}$$

Where,

Equation Item	Definition
j	Fuel type
C _{Fj}	The fuel mass to CO ₂ mass conversion factor for fuel type j
FC _j	DCS Reported Annual CO ₂ Emission
FC _{voyage,j}	Voyage Adjustment <ul style="list-style-type: none"> ▪ Endanger safe navigation ▪ Sailing in ice conditions
TF _j	Tanker Corrections <ul style="list-style-type: none"> ▪ Dynamic Positioning (Shuttle Tankers) ▪ STS Voyage (Tankers)
FC _{electrical,j}	Electrical Consumption <ul style="list-style-type: none"> ▪ Reefer Container ▪ Cargo Cooling (Gas Carrier) ▪ Discharge Pumps (Tanker)
FC _{boiler,j} + FC _{others,j}	Cargo Heating/ Discharge <ul style="list-style-type: none"> ▪ Boiler Usage (Tanker)

	▪ Other devices (Tanker)
$f_i \times f_c \times f_m \times f_{iVSE}$	EEDI Correction Factor
D_t	DCS Reported Distance Traveled
D_x	DCS Distance Travelled

Table 4: Equation Parameters

ENHANCED SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)

BACKGROUND

There are three parts to a Ship Energy Efficiency Management Plan (SEEMP).

- SEEMP **Part I** provides a possible approach for monitoring ship and fleet efficiency performance over time and some options to be considered when seeking to optimize the performance of the ship. SEEMP Part I is required by Regulation 26.1 of Annex VI to MARPOL 73/78 and applies to all ships above 400 GT. The plan has been implemented on board as of January 1, 2013. The purpose of Part I of a SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency of a ship's operation. Preferably, the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates, or controls the ship, recognizing that no two shipping companies are the same and that ships operate under a wide range of different conditions.
- SEEMP Part II provides the methodologies ships of 5,000 gross tonnage and above should use to collect the data required under regulation 27 of MARPOL Annex VI and the processes that the ship should use to report the data to the ship's Administration. Fuel oil consumption should include all the fuel oil consumed on board including but not limited to the fuel oil consumed by the main engines, auxiliary engines, gas turbines, boilers and inert gas generator, for each type of fuel oil consumed, regardless of whether a ship is under way or not. Methods for collecting data on annual fuel oil consumption in metric tonnes include (in no particular order):
 - I. method using bunker delivery notes (BDNs)
 - II. method using flow meters
 - III. method using bunker fuel oil tank monitoring on board
 - IV. method using LNG cargo tank monitoring on board
 - V. method using cargo tank monitoring on board for ships using cargo other than LNG
- SEEMP **Part III**, shall be applicable for cargo, cruise, and ro-pax ships above 5,000 GT. By January 01, 2023, this shall additionally include:

- I. A description of the methodology that will be used to calculate a ship's attained annual operational CII
- II. The process to be used to report this value to the ship's flag Administration;
- III. The required annual operational CII for the next three (3) years;
- IV. An implementation plan documenting how the required annual operational CII will be achieved during the next three (3) years; and
- V. A procedure for self-evaluation and improvement.

SEEMP	Description	Verification
SEEMP I	Ship management plan to improve energy efficiency, applying to all ships of 400 GT or above. Content is not subject to verification.	No
SEEMP II	Ship fuel oil consumption data collection plan (DCS), applying to all ships of 5,000 GT and above.	Yes
SEEMP III	Ship Operational Carbon Intensity Plan, applying to ships of 5,000 GT and above	Yes

Table 4 – Need for Verification on SEEMP

SEEMP PART III SHIP OPERATIONAL CARBON INTENSITY PLAN

The SEEMP Part III will serve as the implementation plan for achieving the required CII and will be subject to verification and company audits.

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

- a description of the methodology that will be used to calculate the ship's attained annual operational CII required by regulation 28 of MARPOL Annex VI and the processes that will be used to report this value to the ship's Administration;
- the required annual operational CII, as specified in regulation 28 of MARPOL Annex VI, for the next three years;
- an implementation plan documenting how the required annual operational CII will be achieved during the next three years; and
- a procedure for self-evaluation and improvement.

The below Guidelines provide guidance for ships to which regulation 26.3 of MARPOL Annex VI applies for the following purposes:

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

2. to describe the methodology that will be used to calculate the ship's attained annual operational CII value and report this to the ship's Administration;
3. to determine the ship's required annual operational CII for the next three years;
4. to develop and apply an implementation plan documenting how the required annual operational CII will be achieved during the next three years;
5. to define a procedure for self-evaluation and improvement; and
6. to develop corrective actions, as applicable.

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

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

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

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

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

In case of transfer of the ship from one company to another according to regulation 27.5 or 27.6 of MARPOL Annex VI, all relevant data necessary for the calculation of the attained annual operational CII should be submitted by the former company to the receiving company within one month after the date of transfer.

The data should have been verified by the Administration or any organization duly authorized by it according to regulation 6.7 of MARPOL Annex VI before they are transferred to the receiving company. The format of the transfer should be consistent with appendix 3 and such that the receiving company can use it in the calculations of the attained annual operational CII for the whole year in which the transfer takes place.

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

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

REQUIRED ANNUAL OPERATIONAL CII FOR NEXT THREE YEARS

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

THREE-YEAR IMPLEMENTATION PLAN

The three-year implementation plan describes the measures the ship plans to take to continue to achieve the required annual operational CII over the next three-year period.

1. The three-year implementation plan is ship-specific.
2. The three-year implementation plan should be **SMART** (Specific, Measurable, Achievable, Realistic, and Time-bound) to the extent envisaged and feasible. It should include:
 - a list of measures that improve the energy efficiency and reduce the carbon intensity of the ship, with time and method of implementation necessary for achieving the required operational CII;
 - a description of how, when the listed measures are implemented, the required operational CII will be achieved, taking into consideration the combined effect of the measures on operational carbon intensity;
 - the company personnel responsible for the three-year implementation plan, and for monitoring and recording performance throughout the year for the reviewing of the effectiveness of the three-year implementation plan; and
 - identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible contingency measures put in place to overcome these impediments.

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

PLAN OF CORRECTIVE ACTIONS

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

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

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

DEVELOPING THE PLAN OF CORRECTIVE ACTIONS

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

The plan of corrective actions is ship-specific.

The plan for corrective action should describe the actions that the ship plans to take, the timeline in which those actions will be applied, and the expected impact their application will have on the ship's CII rating.

It should be demonstrated how the corrective actions will contribute to achieving the required annual operational CII, so as to ascertain the effectiveness of the corrective actions. Experience gained from previously taken corrective actions and their degree of effectiveness should be taken into account when selecting the proper corrective actions.

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

- an analysis of the cause of the inferior CII rating;

- an analysis of the performance of implemented measures;
- a list of additional measures and revised measures to be added to the implementation plan with time and method of implementation necessary for achieving the required operational CII;
- designation of a company person to be responsible for the added and revised measures in the implementation plan, monitoring and recording performance throughout and reviewing of the effectiveness of the corrective actions; and
- identification of possible impediments to the effectiveness of the measures for improving the energy efficiency and reducing the carbon intensity of the ship, including possible additional contingency measures put in place to overcome and how these impediments will be overcome.

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

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

THE CII AND SEEMP III TIMELINE IN SHORT

YEAR	DATE	ACTION
2022	31/DEC	Initial Verification: Issuance of the Confirmation of Compliance (CoC)
2023	01/JAN	Start of CII Year 2023 (Updated SEEMP in place; Confirmation of Compliance (CoC) in place)
	30/NOV	Deadline for Company audits, if conducted
	31/DEC	End of CII Year 2023
2024	01/JAN	Start of CII Year 2024
	31/MAR	Deadline for submission of 2023 CII for verification
	30/APR	For ships rated E in 2023, only Deadline for submission of Corrective Action Plan to be implemented in 2024 and 2025
	31/MAY	Additional verification, if applicable Deadline for issuance of SoC for 2023 (valid until 31 May 2025)
	30/JUN	Deadline for transfer of 2023 data to DCS
	30/NOV	Deadline for Company audits, if conducted
	31/DEC	End of CII Year 2024
2025	01/JAN	Start of CII Year 2025
	31/MAR	Deadline for submission of 2024 CII for verification
	30/APR	For ships rated E in 2024, only Deadline for submission of Corrective Action Plan to be implemented in 2025 and 2026 (at the discretion of the Administration to require a new Corrective Action Plan or previous one can be continuously implemented)

	31/MAY	Deadline for issuance of Statement of Compliance for 2024 (valid until 31 May 2026)
	30/JUN	Deadline for transfer of 2024 data to DCS
	30/NOV	Deadline for Company audits, if conducted
	31/DEC	Periodical verification: Issuance of the Confirmation of Compliance (CoC) for updated SEEMP related to upcoming three-year period. End of CII Year 2025
2026	01/JAN	Start of CII Year 2026 (Updated SEEMP in place; Confirmation of Compliance (CoC) in place)
	31/MAR	Deadline for submission of 2025 CII for verification
	30/APR	For ships rated D in 2023-2025 or E in 2025, only Deadline for submission of Corrective Action Plan to be implemented in 2026 and 2027 (at the discretion of the Administration whether a new Corrective Action Plan is required or the previous one can be continuously implemented)
	31/MAY	Deadline for issuance of SoC for 2025 (valid until 31 May 2027)
	30/JUN	Deadline for transfer of 2025 data to DCS
	30/NOV	Deadline for Company audits, if conducted
	31/DEC	Periodical verification: Issuance of the Confirmation of Compliance (CoC) for updated SEEMP related to upcoming three-year period End of CII Year 2026

SEEMP PART III TEMPLATE

PART III of the SEEMP (Sample Form of Ship Operational Carbon Intensity)

Review and update log

Date/ Timeline	Updated Parts	Developed by	Implemented by
1st time			
2nd time			
Etc.			

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

Name of the ship		IMO number	
Company		Year of delivery	
Flag		Ship type	
Gross tonnage		DWT	
Applicable CII		<input type="checkbox"/> AER <input type="checkbox"/> cgDIST	

Year	Required annual operational CII	Attained annual operational CII (before any correction)	Attained annual operational CII	Operational carbon intensity rating (A, B, C, D or E):
<year -1>				
<year -2>				
<year -3>				
	Required annual operational CII			
<year>:				
<year + 1>				
<year + 2>				

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

Description

Three-year implementation plan

Description

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

List of measures to be considered and implemented

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

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

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

Self-evaluation and improvement

Description

Plan of corrective actions (if applicable)

Description

Analysis of causes for inferior CII Rating

Cause	Analysis of effect	Actions

Analysis of measures in the implementation plan

Measure	Analysis of effect	Actions

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

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

Appendix A - Standardized data reporting format for the data collection system and operational carbon intensity to the Administration

Name of the ship		IMO number	
Company		Year of delivery	
Flag		Ship type	
Gross tonnage		DWT	
Applicable CII		<input type="checkbox"/> AER <input type="checkbox"/> cgDIST	
Operational carbon intensity rating		<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	
CII for trial purpose (none, one or more on voluntary basis)		<input type="checkbox"/> EEPI <input type="checkbox"/> cbDIST <input type="checkbox"/> cDIST <input type="checkbox"/> EEOI	
Attained annual operational CII before any correction (AER in g CO ₂ /dwt.nm or cgDIST in g CO ₂ /gt.nm)			
Attained annual operational CII (AER in g CO ₂ /dwt.nm or cgDIST in g CO ₂ /gt.nm)			
End date for annual CII (dd/mm/yy)*			
Start date for annual CII (dd/mm/yy)*			
Attained EEDI (if applicable)			
Attained EEXI (if applicable)			
EEPI (gCO ₂ /dwt.nm)			
cbDIST (gCO ₂ /berth.nm)			
cDIST (gCO ₂ /m.nm)			
EEOI (gCO ₂ /t.nm or others)			
.....			
.....			
IMO number			
End date for DCS (dd/mm/yy)			
Start date for DCS (dd/mm/yy)			

Appendix B – Standardized data reporting format for the parameters to calculate the trial carbon intensity indicators on a voluntary basis

Attained annual EEOI	
Metric of Cargo Mass Carried or Work Done in EEOI calculation (gCO ₂ /t.nm or others) ^{*****}	
Transport work ^{*****}	
Attained annual EEPI (gCO ₂ /dwt.nm)	
Laden distance travelled (n.m)	
Attained annual cDIST (gCO ₂ /m.nm) ^{****}	
Length of lanes (metre) ^{****}	
Attained annual cbDIST(gCO ₂ /berth.nm) ^{***}	
Available lower berths ^{***}	
End date for trial CII (dd/mm/yy) ^{**}	
Start date for trial CII (dd/mm/yy) ^{**}	
IMO number ^{**}	
End date for DCS (dd/mm/yy) ^{**}	
Start date for DCS (dd/mm/yy) ^{**}	

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

REFERENCES

1. International Maritime Organization (IMO) (www.imo.org)
2. MARPOL Annex VI Chapter 4, Regulation 28.
3. IMO 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, 2021 Revised MARPOL Annex VI.
4. IMO Resolution MEPC.352(78), 2022 Guidelines on Operational Carbon Intensity Indicators and The Calculation Methods (CII Guidelines, G1).
5. IMO Resolution MEPC.353(78), 2022 Guidelines on The Reference Lines for Use with Operational Carbon Intensity Indicators (CII Reference Line Guidelines, G2).
6. IMO Resolution MEPC.338(76), 2021 Guidelines on Operational Carbon Intensity Reduction Factors Relative to The Reference Lines (CII Reduction Factors Guidelines, G3).
7. IMO Resolution MEPC.354(78), 2022 Guidelines on Operational Carbon Intensity Rating of Ships (CII Rating Guidelines, G4).
8. IMO Resolution MEPC.355(78), 2022 Interim Guidelines on Correction Factors and Voyage Adjustments for CII Calculations (CII Guidelines, G5).
9. IMO Resolution MEPC.346(78), 2022 Guidelines For The Development Of A Ship Energy Efficiency Management Plan (SEEMP)

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