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Guidelines for the development of ship's Data Collection Plan (SEEMP Part II) /

March 2018

content /

Introduction

Amendments to MARPOL Annex VI

The timeline

SEEMP Part II requirements

SEEMP Part II template

Introduction /

The IMO Marine Environment Protection Committee (MEPC) has approved mandatory requirements for ships to record and report their fuel consumption.

The mandatory data collection system is intended to be the first in a three-step process in which analysis of the data collected would provide the basis for an objective, transparent and inclusive policy debate in the MEPC. This would allow a decision to be made on whether any further measures are needed to enhance energy efficiency and address greenhouse gas emissions from international shipping.

Under the system, ships of 5,000 gross tonnage and above will be required to collect consumption data for each type of fuel they use, as well as other, additional, specified data including proxies for transport work. The aggregated data will be reported to the flag Administration after the end of each calendar year and the flag Administration, having determined that the data has been reported in accordance with the requirements, will issue a Statement of Compliance to the ship. Flag Administrations will be required to subsequently transfer this data to the IMO Ship Fuel Consumption Database.

IMO would be required to produce an annual report to the MEPC, summarizing the data collected. Data would be anonymized so individual ship data would not be recognized.

Amendments to MARPOL Annex VI /

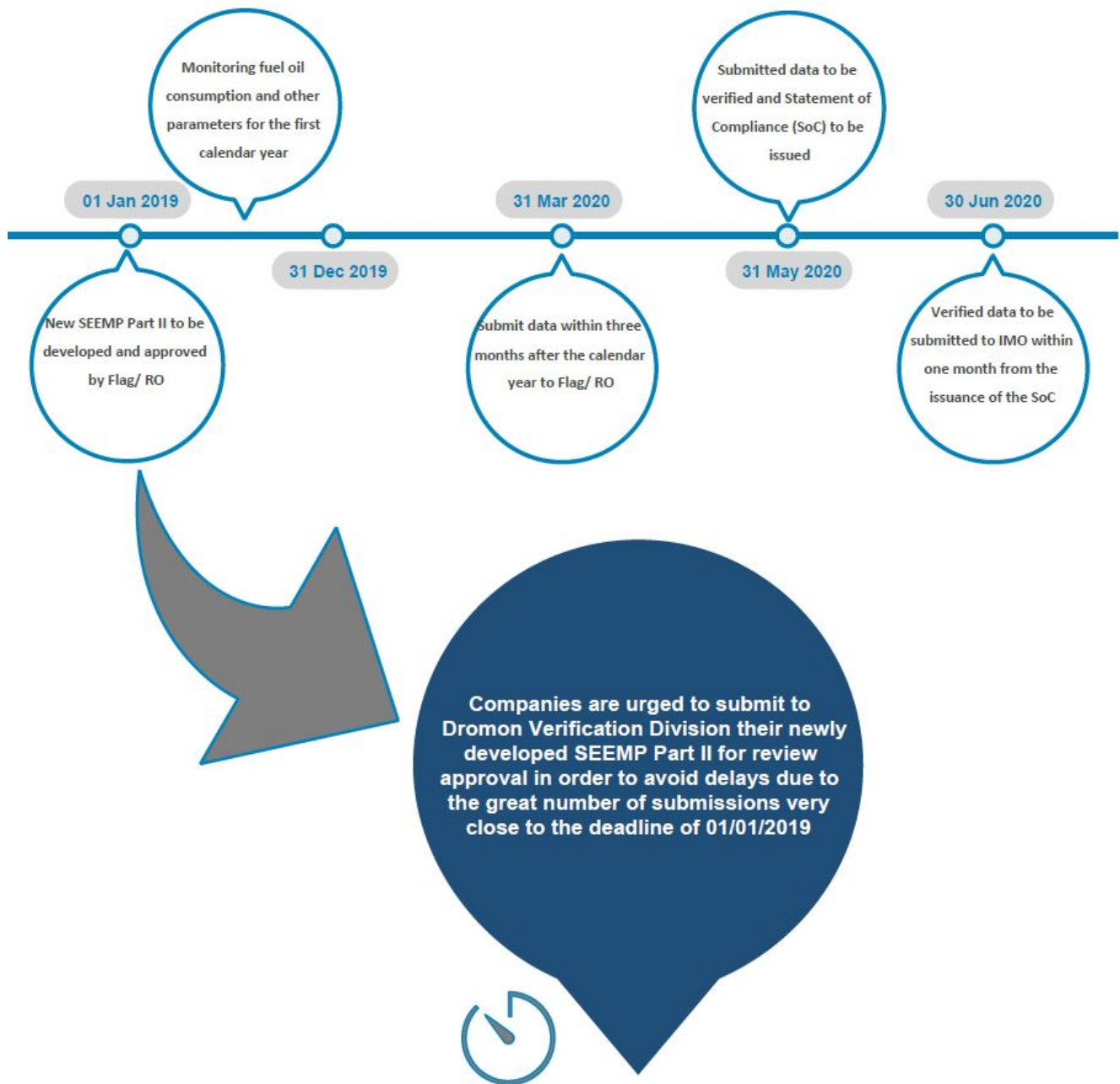
In January 2013, a new Chapter 4 was added to MARPOL Annex VI, providing regulations on energy efficiency for ships. Regulation 22 requires that a Ship Energy Efficiency Management Plan (SEEMP) be kept on board each ship. Further amendments to MARPOL Annex VI, adopted at MEPC 70, establish a mandatory IMO Data Collection System (DCS) for the collection and reporting of fuel oil consumption data for each type of fuel used by a ship (resolution MEPC.278(70)). As such, the SEEMP must be developed in two parts, as described below:

- Part I – ship management plan that provides a possible approach for monitoring ship and fleet energy-efficiency performance over time, applicable to ships of 400 gross tonnage and above engaged on international voyages.
- Part II – methodologies used to collect fuel oil consumption data, applicable to ships of 5,000 gross tonnage and above engaged on international voyages.

For further information on the amendments to MARPOL Annex VI please visit our designated website: <http://www.dromon.com/imodcs/>



the timeline /



SEEMP Part II requirements /

From the allowable data collection methods, the IMO DCS requires the collection of data on the total annual fuel oil consumption. Apart from berthing and travelling at sea, this data consists of fuel consumption due to activities including but not limited to anchoring, drifting, bunkering/de-bunkering, supply stops, maintenance, cargo loading/offloading, and ballast and commercial purposes.

To collect the required data a new SEEMP Part II must be developed to outline the methodology used to collect fuel oil consumption data. The SEEMP Part II shall include information of fuel oil consumption 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 underway or not as well as on the methods to measure distance travelled, hours underway and other information.

SEEMP Part II template /

SEEMP Part II must be developed following the IMO [MEPC.282\(70\)](#) that includes guidelines for the development of a data collection plan.

This Publication presents a SEEMP Part II template that shall assist ship Managers to the development of this plan.

SHIP FUEL OIL CONSUMPTION DATA
COLLECTION PLAN
(SEEMP PART II)

[SHIP NAME]
[IMO NUMBER]

Table of Contents

Definitions & Abbreviations.....	3
1. Ships particulars	4
2. Record of revision of Fuel Oil Consumption Data Collection Plan	4
3. Ship engines and other fuel oil consumers and fuel oil types used.....	4
4. Emission factor	5
5. Method to measure fuel oil consumption	5
5.1 Method using Bunker Delivery Notes (BDNs)	6
5.2 Method using Flow meters.....	7
5.3 Method using bunker fuel oil-tank monitoring on board	8
6. Method to measure distance travelled	8
7. Method to measure hours underway.....	9
8. Direct CO2 Emissions Measurement.....	9
9. Processes that will be used to report the data to the Administration.....	10
10. Data quality	10
11. Further information.....	10
12. Appendices	10
12.1 Appendix 1 - Data Reporting Format for the Data Collection System	11
12.2 Appendix 2 - Information to be submitted to the IMO Ship Fuel Oil Consumption Database	12

Definitions & Abbreviations

<i>BDN</i>	Bunkered Delivery Note
<i>CO2 emission</i>	Means the release of CO2 into the atmosphere by ships
<i>Company</i>	Means the shipowner or any other organization or person, such as manager or the bareboat charterer, which has assumed the responsibility of the ship from the shipowner
<i>EEDI</i>	Energy Efficiency Design Index
<i>emission factor</i>	Means the average emission rate of a greenhouse gas relative to the activity data of a source stream, assuming complete oxidation for combustion and complete conversion for all other chemical reactions;
<i>Ice class</i>	Means the notation assigned to the ship by the competent national authorities of the flag State or an organisation recognised by that State, showing that the ship has been designed for navigation in sea-ice conditions.
<i>reporting period</i>	Means one calendar year during which CO2 emissions have to be monitored and reported. For voyages starting and ending in two different calendar years, the monitoring and reporting data shall be accounted under the first calendar year concerned;
<i>time spend at sea</i>	Means the vessel is underway

1. Ships particulars

Name of Ship
IMO Number
Company
Flag
Ship type
Gross tonnage
NT
DWT (if applicable)
Ice class

2. Record of revision of Fuel Oil Consumption Data Collection Plan

Date of revision	Revised provision

3. Ship engines and other fuel oil consumers and fuel oil types used

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

4. Emission factor

CF is a non-dimensional conversion factor between fuel oil consumption and CO₂ emission in the 2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships (resolution MEPC.245(66)), as amended. The annual total amount of CO₂ is calculated by multiplying annual fuel oil consumption and CF for the type of fuel.

Fuel oil Type	CF (t-CO ₂ / t-Fuel)
Diesel/Gas oil (e.g. ISO 8217 grades DMX through DMB)	3.206
Light fuel oil (LFO) (e.g. ISO 8217 grades RMA through RMD)	3.151
Heavy fuel oil (HFO) (e.g. ISO 8217 grades RME through RMK)	3.114
Liquefied petroleum gas (LPG) (Propane)	3.000
Liquefied petroleum gas (LPG) (Butane)	3.030
Liquefied natural gas (LNG)	2.750
Methanol	1.375
Ethanol	1.913
Other (.....)	

If fuel oils are used that do not fall into one of the categories as described in the 2014 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships (resolution MEPC.245(66)), as amended, and have no CF-factor assigned (e.g. some "hybrid fuel oils"), the fuel oil supplier should provide a CF-factor for the respective product supported by documentary evidence.

5. Method to measure fuel oil consumption

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

5.1 Method using Bunker Delivery Notes (BDNs)

[delete as applicable]

Description	
<p>The procedure shall describe steps that must be followed to determine the fuel consumption based on BDNs over the reporting period:</p> <ol style="list-style-type: none"> 1. annual fuel oil consumption would be the total mass of fuel oil used on board the vessel as reflected in the BDNs. In this method, the BDN fuel oil quantities would be used to determine the annual total mass of fuel oil consumption, plus the amount of fuel oil left over from the last calendar year period and less the amount of fuel oil carried over to the next calendar year period; 2. to determine the difference between the amount of remaining tank oil before and after the period, the tank reading should be carried out at the beginning and the end of the period; 3. in the case of a voyage that extends across the data reporting period, the tank reading should occur by tank monitoring at the ports of departure and arrival of the voyage and by statistical methods such as rolling average using voyage days; 4. fuel oil tank readings should be carried out by appropriate methods such as automated systems, soundings and dip tapes. The method for tank readings should be specified this procedure; 5. the amount of any fuel oil offloaded should be subtracted from the fuel oil consumption of that reporting period. This amount should be based on the records of the ship's oil record book; and 6. any supplemental data used for closing identified difference in bunker quantity should be supported with documentary evidence; <p>Any corrections, e.g. density, temperature, if applied, should be documented.</p> <p>Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.</p>	

Summary								
Total fuel oil mass as reflected on the BDNs occurred over the period of 01/01 – 31/12	+	The fuel oil mass at the beginning of the period on 01/01 – 31/12	-	The fuel oil mass available at the end of the period on 31/12	-	The fuel oil mass debunked during the period of 01/01 – 31/12	=	Annual fuel oil consumption

Measurement instruments involved					
No.	Measurement Equipment	Type	Elements applied to	Fuel type used	Technical Description / Maintenance Intervals
1					
2					
3					

5.2 Method using Flow meters

[delete as applicable]

Description
<p>The procedure shall describe steps that must be followed to determine the fuel consumption using flow meters:</p> <ol style="list-style-type: none"> 1. annual fuel oil consumption may be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters; 2. the flow meters applied to monitoring should be located so as to measure all fuel oil consumption on board. The flow meters and their link to specific fuel oil consumers should be described in the procedure; 3. note that it should not be necessary to correct this fuel oil measurement method for sludge if the flow meter is installed after the daily tank as sludge will be removed from the fuel oil prior to the daily tank; 4. the flow meters applied to monitoring fuel oil flow should be identified in the Data Collection Plan. Any consumer not monitored with a flow meter should be clearly identified, and an alternative fuel oil consumption measurement method should be included; and 5. calibration of the flow meters should be specified. Calibration and maintenance records should be available on board; <p>Any corrections, e.g. density, temperature, if applied, should be documented.</p> <p>Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.</p>

Summary
<p style="text-align: center;"> Total fuel oil mass as reflected daily by the flow meters from the emission sources over the period of 01/01 – 31/12 + Total fuel oil mass consumed by an emission source which is not monitor by flowmeters over the period of 01/01– 31/12 = Annual fuel oil consumption </p>

Measurement instruments involved:					
No.	Measurement Equipment	Type	Elements applied to	Fuel type used	Technical Description / Maintenance Intervals
1					
2					
3					

5.3 Method using bunker fuel oil-tank monitoring on board

[delete as applicable]

Description	
The procedure shall describe steps that must be followed to determine the fuel consumption using periodic stock takes of fuel tanks:	
<ol style="list-style-type: none"> to determine the annual fuel oil consumption, the amount of daily fuel oil consumption data measured by tank readings which are carried out by appropriate methods such as automated systems, soundings and dip tapes will be aggregated. The tank readings will normally occur daily when the ship is at sea and each time the ship is bunkering or de-bunkering; and the summary of monitoring data containing records of measured fuel oil consumption should be available on board 	
Any corrections, e.g. density, temperature, if applied, should be documented.	
Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.	

Summary	
Total fuel oil mass as recorded daily by the measurement equipment over the period of 01/01 – 31/12	= Annual fuel oil consumption

Measurement instruments involved					
No.	Measurement Equipment	Type	Elements applied to	Fuel type used	Technical Description / Maintenance Intervals
1					
2					
3					

6. Method to measure distance travelled

Description	
The procedure shall describe steps that must be followed to determine the distance travelled:	
<ol style="list-style-type: none"> distance travelled over ground in nautical miles should be recorded in the log-book in accordance with SOLAS regulation V/28.13 the distance travelled while the ship is underway under its own propulsion should be included into the aggregated data of distance travelled for the calendar year; and other methods to measure distance travelled accepted by the Administration may be applied. In any case, the method applied should be described in detail in the Data Collection Plan. 	
Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.	

Summary	
Total amount of distance travelled over ground in NM over the period of 01 January – 31 December	= Annual Distance Traveled

Measurement instruments involved:		
No.	Measurement Equipment	Type
1		
2		
3		

7. Method to measure hours underway

Description		
The procedure shall describe steps that must be followed to determine the hours underway:		
Hours underway should be an aggregated duration while the ship is underway under its own propulsion.		
Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.		
Summary		
Total amount of time spent at sea over the period of 01/01– 31/12	=	Annual Aggregated hours underway
Measurement instruments involved:		
No.	Measurement Equipment	Type
1		
2		
3		

8. Direct CO2 Emissions Measurement

[delete as applicable]

Description		
The procedure shall describe steps that must be followed to determine the CO2 emissions using direct measurements:		
<ol style="list-style-type: none"> 1. this method is based on the determination of CO2 emission flows in exhaust gas stacks by multiplying the CO2 concentration of the exhaust gas with the exhaust gas flow. In case of the absence or/and breakdown of direct CO2 emissions measurement equipment, manual tank readings will be conducted instead; 2. the direct CO2 emissions measurement equipment applied to monitoring is located exhaustively so as to measure all CO2 emissions in the ship. The locations of all equipment applied are described in this monitoring plan; and 3. calibration of the CO2 emissions measurement equipment should be specified. Calibration and maintenance records should be available on board. 		
Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.		
Summary		
CO2 concentration of the exhaust gas over the period of 01/01– 31/12	X	Exhaust gas flow over the period of 01/01 – 31/12 = Annual CO2 Emissions

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

Description
<p>The procedure shall describe steps that must be followed to report the data to the Administration:</p> <p>Within three months after the end of each calendar year, the ship shall report to DBS, the aggregated value for each datum specified in appendix 2, via electronic communication and using a standardized format.</p> <p>Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.</p> <p>In addition, DBS shall receive the supporting information outlined in our Pre-verification Information Booklet. Please contact DBS through mrv@dromon.com for further information on documents to be submitted for verification.</p>

10. Data quality

Description
<p>The Data Collection Plan shall include data quality control measures which should be incorporated into the existing shipboard safety management system. Additional measures to be considered could include:</p> <ol style="list-style-type: none">1. the procedure for identification of data gaps and correction thereof; and2. the procedure to address data gaps if monitoring data is missing, for example, flow meter malfunctions. <p>Responsible person: the person responsible (both onboard and shore) for this procedure shall be defined.</p>

11. Further information

Additional information

12. Appendices

12.2 Appendix 2 - Information to be submitted to the IMO Ship Fuel Oil Consumption Database

Identity of the ship

IMO number

Period of calendar year for which the data is submitted

Start date (dd/mm/yyyy)

End date (dd/mm/yyyy)

Technical characteristics of the ship

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

Gross tonnage (GT)ⁱ

Net tonnage (NT)ⁱⁱ

Deadweight tonnage (DWT)ⁱⁱⁱ

Power output (rated power^{iv}) of main and auxiliary reciprocating internal combustion engines over 130 kW (to be stated in kW)

EEDI (if applicable)

Ice class^v

Fuel oil consumption, by fuel oil type^{vi} in metric tonnes and methods used for collecting fuel oil consumption data

Distance travelled

Hours underway

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

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

ⁱⁱⁱ DWT means the difference in tonnes between the displacement of a ship in water of relative density of 1025 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 an organization recognized by it.

^{iv} Rated power means the maximum continuous rated power as specified on the nameplate of the engine.

^v Ice class should be consistent with the definition set out in the International Code for ships operating in polar waters (Polar Code), (resolutions MEPC.264(68) and MSC.385(94)). If not applicable, note "N/A".

^{vi} As defined in the 2014 Guidelines on the method of calculation of the Attained Energy Efficiency Design Index (EEDI) for new ships (resolution MEPC.245(66), as amended) or other (to be stated).

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