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| SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP) PART II: SHIP FUEL OIL CONSUMPTION DATA COLLECTION PLAN |
| NAME OF SHIP: |
| IMO NUMBER: |
| SHIP TYPE: |

|  |
| --- |
| SEEMP Part II Revision 1  7/6/2018 |

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1. Ship particulars

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| --- | --- |
| Ship particulars | |
| **Name of ship** |  |
| **IMO number** |  |
| **Call sign** |  |
| **Port of registry** |  |
| **Flag** |  |
| **Ship type** |  |
| **Gross tonnage** |  |
| **Net tonnage** |  |
| **Deadweight** |  |
| **Energy Efficiency Design Index (if applicable)** |  |
| **Ice class (if applicable)** |  |

1. Record of revision

|  |  |
| --- | --- |
| **Date of revision** | **Revised provision** |
|  |  |
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1. Introduction
2. The SEEMP Part II has been developed in accordance with the standards described in MARPOL Annex VI, as amended by Resolution MEPC.278(70), Chapter 4: Regulations on Energy Efficiency for Ships, Regulations 22.2 and 22A.
3. The SEEMP Part II has been developed taking into account the information contained in Resolution MEPC.282(70) – 2016 Guidelines for the Development of a SEEMP – as identified by the IMO.
4. Data collected for the current calendar year shall be readily accessible for at least one year from the end of the current calendar year and shall be made available to the Administration or any organisation duly authorised by it upon request, as required by MARPOL Annex VI, Chapter 4, Regulation 22A.8.
5. The purpose of the plan is to develop a ship-specific method to collect, aggregate and report ship data with regard to annual fuel oil consumption, distance travelled, hours underway, and other data required by Regulation 22A of MARPOL Annex VI to be reported to the Administration or any organisation duly authorised by it.
6. Pursuant to Regulation 5.4.5 of MARPOL Annex VI, the Administration shall ensure that the ship’s SEEMP complies with Regulation 22.2 of MARPOL Annex VI prior to collecting any data.
7. The plan has been examined by Lloyd’s Register Group on behalf of the Flag Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration or Lloyd’s Register Group.
8. Scope
9. Each ship of 5,000 GT and above shall have on board a ship fuel oil consumption data collection plan describing the methodology that will be used to collect the data required by Regulation 22A.1 of MARPOL Annex VI and the processes that will be used to report the data to the ship’s Administration or any organisation duly authorised by it.
10. A copy of the examined data collection plan shall be provided on board and this shall be done prior to collecting data under Regulation 22A of MARPOL Annex VI in order to ensure the methodology and processes are in place prior to the beginning of the ship’s first reporting period.
11. Objectives

The data collection plan contains the following information:

1. Description of the method used to measure annual fuel oil consumption.
2. Description of the method used to measure distance travelled.
3. Description of the method used to measure hours underway.
4. Description of the method used to aggregate data.
5. Description of the data quality control measures.
6. Description of the processes that will be used to report the data.
7. Methodology for collecting data on fuel oil consumption

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.

Fuel oil consumption shall 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 underway or not.

The types of fuel as defined in Resolution MEPC.245(66), as amended, are shown in Appendix A.

If fuel oils are used that do not fall into one of the categories as described in Resolution MEPC.245(66), as amended, and have no CF (a non-dimensional conversion factor between fuel oil consumption and CO2 emission) assigned, the fuel oil supplier should provide a CF for the respective product supported by documentary evidence.

The annual total amount of CO2 is calculated by multiplying annual fuel oil consumption and CF for the type of fuel.

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Engines or other fuel oil consumers** | | **Power** | **Fuel oil types** |
| 1 | Main Engine  Manufacturer:  Model: | [kW] | [There can be more than one type of fuel] |
| 2 | Auxiliary Engine 1  Manufacturer:  Model: | [kW] |  |
| 3 | Auxiliary Engine 2  Manufacturer:  Model: | [kW] |  |
| 4 | Emergency Auxiliary Engine  Manufacturer:  Model: | [kW] |  |
| 5 | Boiler 1  Manufacturer:  Model: |  |  |
| 6 | Boiler 2  Manufacturer:  Model: |  |  |
| 7 | Inert Gas Generator  Manufacturer:  Model: |  |  |
| 8 | Incinerator  Manufacturer:  Model: |  |  |

The applied method used for measuring annual fuel oil consumption in metric tonnes is described in the following section.

Method using bunker delivery notes (BDNs)

[This section should be used if it is the applied method used by the ship.]

This method determines the annual total amount of fuel oil used based on BDNs, which are a requirement for fuel oil delivered to and used on board a ship for combustion purposes in accordance with Regulation 18 of MARPOL Annex VI.

BDNs are required to be retained on board for three years after the fuel oil has been delivered.

The following table sets out how the ship will operationalise the summation of BDN information and conduct tank readings.

[The ship specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 | [Determining the amount of remaining tank fuel oil at the beginning of the reporting period.  For example: On 1 January, readings for tanks containing each type of fuel oil will be taken through soundings. These readings will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Electronic sounding devices for No 1 HFO tank, No 2 HFO tank, No 1 MDO tank, and No 2 MDO tank. Sounding tapes for No 3 HFO tank, No 4 HFO tank, No 5 HFO tank, and No 6 HFO tank. Level gauges for HFO day tanks, etc.] |
| 2 | [Determining the total number of BDNs received during the reporting period.  For example: From 1 January to 31 December, all BDNs received will be verified by the responsible person and retained on board.] | [Chief Engineer and/or Master, etc.] |  |
| 3 | [Determining the total amount of fuel oil offloaded during the reporting period.  For example: From 1 January to 31 December, all fuel oil that is offloaded will be recorded on the oil record book. The book will be verified by the responsible person and retained on board.] | [Chief Engineer and/or Master, etc.] |  |
| 4 | [Determining the amount of remaining tank fuel oil at the end of the reporting period.  For example: On 31 December, readings for tanks containing each type of fuel oil will be taken through soundings. These readings will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Electronic sounding devices for No 1 HFO tank, No 2 HFO tank, No 1 MDO tank, and No 2 MDO tank. Sounding tapes for No 3 HFO tank, No 4 HFO tank, No 5 HFO tank, and No 6 HFO tank. Level gauges for HFO day tanks, etc.] |
| 5 | [Calculating annual fuel oil consumption for the reporting period.  For example: After 31 December and within three months, the annual fuel oil consumption will be calculated by:  P1 + P2 – P3 – P4  P# stands for the procedure number.  This will be the total mass of fuel oil used on board the vessel in metric tonnes for the calendar year.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 6 | [Any correction, e.g. densities and temperatures used for calculating mass from volume derived from tank readings/soundings, shall be documented.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 7 | [Any supplemental data used for closing an identified difference in bunker quantity shall be supported with documentary evidence.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |

Method using flow meters

[This section should be used if it is the applied method used by the ship.]

This method determines the annual total amount of fuel oil consumption by measuring fuel oil flows on board using flow meters. In case of the breakdown of flow meters, manual tank readings or alternative methods will be conducted instead.

The following table sets out information about the ship’s flow meters and how the data will be collected and summarised, as well as how the necessary tank readings will be conducted.

[The ship-specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Consumer(s) monitored** | **Flow meter details** |
| 1 | [Determining daily fuel oil consumption for each consumer during the reporting period.  For example: From 1 January to 31 December, daily fuel oil consumption by the main engines will be measured by the flow meters. These readings will be recorded and retained on board.] | [Refer to section 2.6.1 for the ship-specific consumers.  For example: Main engines.] | [Type/model of flow meters, locations installed and calibration details.  For example: An ABB electronic flow meter is installed at engine supply. The flow meter will be recalibrated every 12 months.] |
| 2 | [Determining daily fuel oil consumption for each consumer during the reporting period.  For example: From 1 January to 31 December, daily fuel oil consumption by the auxiliary engines will be measured by the flow meters. These readings will be recorded and retained on board.] | [Refer to section 2.6.1 for the ship-specific consumers.  For example: Auxiliary engines.] | [Type/model of flow meters, locations installed and calibration details.  For example: An ABB electronic flow meter is installed at engine supply. The flow meter will be recalibrated every 12 months.] |
| 3 | [Determining daily fuel oil consumption for each consumer during the reporting period.  For example: From 1 January to 31 December, daily fuel oil consumption by the boilers will be measured by the flow meters. These readings will be recorded and retained on board.] | [Refer to section 2.6.1 for the ship-specific consumers.  For example: Boilers.] | [Type/model of flow meters, locations installed and calibration details.  For example: A Gems velocity-sensing flow meter is installed in the supply flow and another Gems velocity-sensing flow meter is installed in the return flow. The flow meters will be recalibrated every 12 months.] |
| 4 | [Calculating total daily fuel oil consumption for all the consumers during the reporting period.  For example: Total daily fuel oil consumption will be calculated by adding up all the daily fuel oil consumption values of each consumer. These calculations will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] |  |
| 5 | [Determining daily fuel oil consumption in the event of the breakdown of flow meters during the reporting period.  For example: For each day that the flow meters are non-operational, readings for tanks containing each type of fuel oil will be taken daily. The readings will be taken at the beginning and at the end of this daily period, before and after fuel is removed from the tanks for non-combustion purposes, and before and after fuel is bunkered. These readings will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Electronic sounding devices for No 1 HFO tank, No 2 HFO tank, No 1 MDO tank, and No 2 MDO tank. Sounding rods for No 3 HFO tank, No 4 HFO tank, No 5 HFO tank, and No 6 HFO tank. Level gauges for HFO day tanks, etc.] |
| 6 | [Calculating daily fuel oil consumption for the reporting period.  For example: Daily fuel oil consumption will be calculated using the tank readings taken daily. These calculations will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] |  |
| 7 | [Calculating annual fuel oil consumption for the reporting period.  For example: After 31 December and within three months, the annual fuel oil consumption will be calculated by adding up all the daily fuel oil consumption values from 1 January to 31 December. This will be the total mass of fuel oil used on board the vessel in metric tonnes for the calendar year.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 8 | [Any correction, e.g. densities and temperatures used for calculating mass from volume derived from tank readings/soundings, shall be documented.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 9 | [Calibration and maintenance records of the flow meters shall be verified by the responsible person and retained on board.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |

Method using bunker fuel oil tank monitoring on board

[This section should be used if it is the applied method used by the ship.]

This method determines the annual total amount of fuel oil consumption by measuring daily fuel oil consumption by taking tank readings and aggregating them. The tank readings will normally be conducted daily when the ship is at sea, and each time the ship is bunkering or de-bunkering.

The following table sets out how the ship will operationalise the summation of daily fuel oil consumption data and conduct tank readings.

[The ship-specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 | [Determining daily fuel oil consumption during the reporting period.  For example: From 1 January to 31 December, readings for tanks containing each type of fuel oil will be taken daily. The readings will be taken at the beginning and at the end of this daily period, before and after fuel is removed from the tanks for non-combustion purposes, and before and after fuel is bunkered. These readings will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Electronic sounding devices for No 1 HFO tank, No 2 HFO tank, No 1 MDO tank, and No 2 MDO tank. Sounding rods for No 3 HFO tank, No 4 HFO tank, No 5 HFO tank, and No 6 HFO tank. Level gauges for HFO day tanks, etc.] |
| 2 | [Calculating daily fuel oil consumption for the reporting period.  For example: Daily fuel oil consumption will be calculated using the tank readings taken daily. These calculations will be verified by the responsible person and recorded and retained on board.] | [Chief Engineer and/or Master, etc.] |  |
| 3 | [Calculating annual fuel oil consumption for the reporting period.  For example: After 31 December and within three months, the annual fuel oil consumption will be calculated by adding up all the daily fuel oil consumption values from 1 January to 31 December. This will be the total mass of fuel oil used on board the vessel in metric tonnes for the calendar year.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 4 | [Any correction, e.g. densities and temperatures used for calculating mass from volume derived from tank readings/soundings, shall be documented.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |

Methodology for collecting data on distance travelled

Appendix IX of MARPOL Annex VI specifies that data on the distance travelled shall be submitted to the Administration.

The following table sets out how the ship will measure distance travelled.

[The ship-specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 | [Determining daily distance travelled over ground during the reporting period.  For example: From 1 January to 31 December, distance travelled over ground in nautical miles will be recorded in the logbook in accordance with SOLAS 1974, as amended, Chapter V, Regulation 28.1. In addition, the distance travelled while the ship is underway under its own propulsion will also be recorded and retained on board.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Speed and distance log device, satellite data, etc.] |
| 2 | [Calculating annual distance travelled for the reporting period.  For example: After 31 December and within three months, the annual distance travelled will be calculated by adding up all the daily distance travelled values from 1 January to 31 December. This will be the total distance travelled over ground in nautical miles for the calendar year.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |
| 3 | [Other methods to measure distance travelled may be applied, provided they are accepted by the Administration.] | [Chief Engineer and/or Master and/or shore office, etc.] |  |

Methodology for collecting data on hours underway

Appendix IX of MARPOL Annex VI specifies that hours underway shall be submitted to the Administration.

Hours underway shall be an aggregated duration while the ship is underway under its own propulsion.

The following table sets out how the ship will measure hours underway.

[The ship-specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 | [Determining total hours underway during the reporting period.] | [Chief Engineer and/or Master, etc.] | [Type/model of measurement equipment involved.  For example: Electronic Chart Display and Information System (ECDIS), GPS etc.] |

Data quality

Data quality control measures should be incorporated into the existing shipboard safety management system.

The following table sets out the data quality control measures of the ship.

[The ship-specific details and procedures are to be added in this table.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 | [The procedure for the identification of data gaps and correction thereof.] |  |  |
| 2 | [The procedure for addressing data gaps if monitoring data is missing.  For example: If a flow meter malfunctions, tank sounding readings for that period will be used to address data gaps.] |  |  |

Processes that will be used to report the data

Regulation 22A.3 of MARPOL Annex VI states that the data specified in Appendix IX of the Annex are to be communicated electronically using a standardised form developed by the IMO.

The collected data shall be reported to the Administration or any organisation duly authorised by it in the standardised format shown in Appendix B.

The Administration should indicate what additional documentation the ship should submit along with the annual data report shown in Appendix B.

Additional documentation required as a minimum is as follows:

[The flag-specific requirements are to be included in this section.]

1. A copy of the ship’s data collection plan.
2. Summaries of BDNs, in sufficient detail to show that all fuel oil consumed by the ship is accounted for (see sample form of BDN summary set out in Appendix C).
3. Summaries of disaggregated data of fuel oil consumption, distance travelled and hours underway, in a format specified by the Administration (see sample form of data summary set out in Appendix C).
4. Information to demonstrate that the ship followed the data collection plan set out in its SEEMP Part II, including information on data gaps and how they were filled, as well as how the event that caused each data gap was resolved.
5. Copies of documents containing information on the amount of fuel oil consumption, distance travelled and hours underway for the ship’s voyages during the reporting period (e.g. the ship’s official log book, oil record book, BDNs, and arrival/noon/departure reports).

[The ship-specific processes that will be used to report the data are to be added in this section.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Procedures** | | **Responsible person(s)** | **Equipment** |
| 1 |  |  |  |

Appendices

Appendix A – Types of fuel

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of fuel** | | **Reference** | **CF = t-CO2 / t-Fuel** |
| 1 | Diesel/gas oil | ISO 8217 Grades DMX through DMB | 3.206 |
| 2 | Light fuel oil (LFO) | ISO 8217 Grades RMA through RMD | 3.151 |
| 3 | Heavy fuel oil (HFO) | ISO 8217 Grades RME through RMK | 3.114 |
| 4 | Liquefied petroleum gas (LPG) | Propane | 3.000 |
| 5 | Liquefied petroleum gas (LPG) | Butane | 3.030 |
| 6 | Liquefied natural gas (LNG) |  | 2.750 |
| 7 | Methanol |  | 1.375 |
| 8 | Ethanol |  | 1.913 |
| 9 | Other |  |  |

Appendix B – Standardised data reporting format for the data collection system

Appendix C – Sample of the BDN summaries and sample of the collected data summaries