SHIP FUEL OIL CONSUMPTION DATA COLLECTION PLAN

(PART II OF THE SEEMP)

1 Review and update log

Date/timeline	Updated parts	Developed by	Implemented by
yyyy/mm/dd	Newly developed	Technical Dept.	Technical Dept.
yyyy/mm/dd	Revised to update for IMO MEPC Res.395(82)	Technical Dept.	Technical Dept.

2 Ship Particulars

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

defined by MARPOL Annex VI Reg.2
same as IEE Certificate

To enter in accordacnce with the item 3.1 of Supplement to IEE Certificate

3 Record of revision of Fuel Oil Consumption Data Collection Plan

Date of revision	Revised Provision
yyyy/mm/dd	Newly developed
yyyy/mm/dd	Revised to update for IMO MEPC Res.395(82)

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

No.	Engines or other fuel oil consumers	Power	Fuel oil types
1	Main Engine (maker type)	XXXX (kW)	HFO, LFO, MGO, Bio fuel
2	Aux. Engine No.1 (maker type)	XXX (kW)	HFO, LFO, MGO, Bio fuel
3	Aux. Engine No.2 (maker type)	XXX (kW)	HFO, LFO, MGO, Bio fuel
4	Aux. Engine No.3 (maker type)	XXX (kW)	HFO, LFO, MGO, Bio fuel
5	Fired Boiler (maker type)	Evaporation of Fire side：X ton/h	HFO, LFO, MGO, Bio fuel
6	Inert Gas Generator (maker type)	Capacity　　X Nm3/h	MGO
7	Gas Combustion Unit (maker type)	Capacity　　X kg/h	LNG

5 Emission factors:

Fuel oil Type	C_F (t-CO_2 / t- Fuel)
Diesel/Gas Oil (Reference: ISO 8217 Grades DMX through DMB)	3.206
Light Fuel Oil (Reference: ISO 8217 Grades RMA through RMD)	3.151
Heavy Fuel Oil (Reference: ISO 8217 Grades RME through RMK)	3.114
Liquefied Petroleum Gas (Propane)	3.000
Liquefied Petroleum Gas (Butane)	3.030
Liquefied Natural Gas	2.750
Methanol	1.375
Ethanol	1.913
Bio fuel	*1
Other fuel	*2

CF is a non-dimensional conversion factor between fuel oil consumption and CO2 emission in the 2022 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships (resolution MEPC.364(79)), as amended. The annual total amount of CO2 is calculated by multiplying annual fuel oil consumption and CF for the type of fuel.

*1) Cf of bio fuel shall be determined in accordace with MEPC.1/Circ.905 INTERIM GUIDANCE ON THE USE OF BIOFUELS UNDER REGULATIONS 26, 27 AND 28 OF MARPOL ANNEX VI (DCS AND CII)

*2) A CF-factor for the respective product supported by documentary evidence should be provided.

6 Methods to measure fuel oil consumption

6.1 Measurement procedure, aggregation and calculation method of annual value in calender year

No.	Engines or other fuel oil consumers	Method	Description
	Total fuel consumption	Method 1: method using bunker delivery notes (BDNs)	1) BDN data is totaled up annual fuel consumption according to each fuel type on January every year. 2) The fuel oil tank reading is carried out at the end of the last calendar year period and at the beginning of the next calendar year period. The fuel oil left over from the last calendar year period should be added to the amount and the fuel oil carried over to the next calendar year period will be subtracted from the amount. 3) In the case of offloading fuel oil, the amount of offloaded fuel oil based on the documentary evidence should be subtracted from the fuel oil consumption of that reporting period. 4) The amount of fuel oil tanks should be measured in accordance with bunkering procedure. 5) 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.
1	Main Engine (maker type)	Method 2: method using flow meters	Annual fuel oil consumption is to be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters. Amount for each type of fuel consumed from previous daily report for each navigation condition (at sea, at berth, at anchoring) is to be recorded. The amount is to be calculated based on fuel flow meter as per; The following formula is to be used: (FOC measured by flow meter) [KL] × (density) [g/cm3] × (volume conversion factor) = FOC (MT) - The density [unit : g/cm3] is to be confirmed by the fuel supplier (described in BDN). - FOC is to be corrected as measured at 15 °C. Volume conversion factor at 15 °C is to be obtained in accordance with "ISO 91:2017 Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions".
2	Aux. Engine No.1 (maker type)	Method 2: method using flow meters	Annual fuel oil consumption is to be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters. Amount for each type of fuel consumed from previous daily report for each navigation condition (at sea, at berth, at anchoring) is to be recorded. The amount is to be calculated based on fuel flow meter as per; The following formula is to be used: (FOC measured by flow meter) [KL] × (density) [g/cm3] × (volume conversion factor) = FOC (MT) - The density [unit : g/cm3] is to be confirmed by the fuel supplier (described in BDN). - FOC is to be corrected as measured at 15 °C. Volume conversion factor at 15 °C is to be obtained in accordance with "ISO 91:2017 Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions".
3	Aux. Engine No.2 (maker type)	Method 2: method using flow meters	Annual fuel oil consumption is to be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters. Amount for each type of fuel consumed from previous daily report for each navigation condition (at sea, at berth, at anchoring) is to be recorded. The amount is to be calculated based on fuel flow meter as per; The following formula is to be used: (FOC measured by flow meter) [KL] × (density) [g/cm3] × (volume conversion factor) = FOC (MT) - The density [unit : g/cm3] is to be confirmed by the fuel supplier (described in BDN). - FOC is to be corrected as measured at 15 °C. Volume conversion factor at 15 °C is to be obtained in accordance with "ISO 91:2017 Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions".
4	Aux. Engine No.3 (maker type)	Method 2: method using flow meters	Annual fuel oil consumption is to be the sum of daily fuel oil consumption data of all relevant fuel oil consuming processes on board measured by flow meters. Amount for each type of fuel consumed from previous daily report for each navigation condition (at sea, at berth, at anchoring) is to be recorded. The amount is to be calculated based on fuel flow meter as per; The following formula is to be used: (FOC measured by flow meter) [KL] × (density) [g/cm3] × (volume conversion factor) = FOC (MT) - The density [unit : g/cm3] is to be confirmed by the fuel supplier (described in BDN). - FOC is to be corrected as measured at 15 °C. Volume conversion factor at 15 °C is to be obtained in accordance with "ISO 91:2017 Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions".

5	Fired Boiler	Method 6: method using subtraction	The fuel consumption of this consumer type will be derived by subtracting the fuel consumption of the other consumer types from the total annual fuel oil consumption measured
6	Inert Gas Generator	Method 8: method using estimated fuel oil consumption for Boiler or other	Following calculation method is used for FOC; "SFOC (kg/hour)" x "Running hours"x 10^3 (ton)
7	Gas Combustion Unit	Method 8: method using estimated fuel oil consumption for Boiler or other	Following calculation method is used for FOC; "SFOC (kg/hour)" x "Running hours"x 10^3 (ton)

6.2 Flow meters identification/specification and their link to fuel oil consumers

Elements applied to fuel consumers	Flow meter's Specification
Main Engine	Maker: Type:
Aux. Engines (FO line inlet)	Maker: Type:
Aux. Engines (FO line outlet)	Maker: Type:
Aux. Engines (MGO line)	Maker: Type:
Fired Boiler	Maker: Type:
Inert gas Generator	Maker: Type:
Gas Combustion Unit	Maker: Type:

6.3 Calibration of the flow meter

Chief engineer checks the soundness of measurement device regularly according to the following method.
- Compare the data of Fuel Oil Consumption and Remaining On Board for each voyage.
- In addition to the above procedure, measure the fuel oil tank level (tank sounding) and fuel temperature and calculate the actual volume and record it in the engine logbook or tank sounding report. Compare this actual volume with the remaining volume in the engine logbook or tank sounding report as calculated from the flow meter value and check if for any major discrepancy.

7 Method to measure distance travelled including laden distance

Description
Data source is recorded in deck log book obtained from GPS or ECDIS or Paper chart. Annual value of distance travelled, over ground, to be integrated from daily records in noon reports. Laden distance should be calculated as the distance sailed when the ship is loaded. Each noon reports shall include cargo carried mass (MT) and/or No of TEU and/or No of Passengers then total laden distance and total transport work can be

8 Method to measure hours under way

Description
Data source is recorded in deck log book. Annual value of hours underway to be integrated from daily records in noon reports. Under way is defined as the period between full ahead on passage (FAOP) and end of sea passage (EOSP). Not under way is therefore the period between EOSP and FAOP. Note that canal passage, that is the period between begin canal passage and end canal passage should be considered not under way due to frequent manoeuvring, acceleration and deceleration.

9 Method to measure total amount of onshore power supplied

Description
Total amount of onshore power supplied should be calculated as the sum of amount of onshore power supplied in kWh. The amount of onshore power supplied should be recorded based on relevant document by power supplier. The document should be stored. This information as shown on the bill from the port or electricity provider could be included in the electronic record.

10 Method to measure transport work

Description
Each noon reports shall include cargo carried mass (MT) and/or No of TEU and/or No of Passengers then total laden distance and total transport work can be aggregated. Definition of transport work per voyage is; containerships: cargo mass (MT) x distance (nm) and No of Containers x distance (nm) Cruise Passenger: No of Passengers x distance (nm) Ro-Ro Passenger: cargo mass (MT) x distance (nm) and No of Passengers x distance (nm)

11 Data quality

Description	
Data quality control measures: Internal reviews and validation of relevant data	Companies should assess the quality of the information in the aggregated report before submitting the report for verification. .1. Responsibility of Internal reviews and validation Company shall assign a person who has enough knowledge and experience on the ship data management as responsible person for internal review and validation (hereafter Internal Reviewer). .2. Contents of internal review and validation Internal Reviewer shall review whether the reported data is complying with Regulation and show a brief description identifying that the review and validation process includes a check on whether; - data is complete - comparison with data over previous years - comparison of fuel consumption reported with purchase records - comparison of factors obtained for fuel suppliers with international reference factors - and, criteria for rejecting data, if applicable
Additional measures to be considered: Data gap	(1) Data gap on FOC In case where the fuel consumption cannot be confirmed due to missing of the engine logbook, flow meter malfunction etc., Internal Reviewer shall take countermeasures for deciding the value of fuel consumption by means of checking BDN and measurement record of fuel consumption which has been done before and after bunkering and at the time of departure and arrival. (2) Data gap on distance travelled and/or hours underway In case where the distance travelled/hours underway cannot be confirmed due to missing of the deck logbook etc., Internal Reviewer shall take countermeasures for deciding distance travelled by ECDIS or Paper Chart and etc. In certain circumstances, Internal Reviewer may calculate based on port departure time and port arrival time.

Please modify in accordance with the company's procedure.

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

Description
The vessel prepares electronic "Abstract Log" based respectively on the Deck log book and Engine log book every day at noon. Fuel consumption and other relevant data is recorded manually on board. The vessel is reporting the data in electronic form daily to the office in the standardized reporting format; the data is then stored, processed, and analyzed ashore. After the end of calender year, Company aggregates the data into annual value and reports the data to the Administration or RO for verification. In addition, the relevant underlying data will be exported to IT System established by Administration / RO for verification according to requirements. (Overview)

Vessel Send Noon report	>>>	Data is processed on IT system (ABLOG system)	>>>	Company (Department) Data quality control	>>>	Company Reporting for veriification

Please modify in accordance with the company's procedure.