



# Technical Information

Code: **TI-20-08**

Date: **05.04.2020**

## Subject: Amendment to Data Collection System (DCS) by MEPC. 278 (70)

### ❖ Introduction: (SEEMP Part II)

The Marine Environment Protection Committee (MEPC) at its 70th session adopted amendments to MARPOL Annex VI vide MEPC Resolution 278(70), regarding a data collection system for fuel consumption of ships. A new regulation 22A is inserted in MARPOL Annex VI Ch.4 on “Collection and reporting of ship fuel oil consumption data”.

### ❖ Application:

Part II (ship fuel oil consumption data collection plan) is applicable to ships of 5000 gross tonnage and above, to contain the methodologies that the ship should use to collect the data required pursuant to regulation 22A of MARPOL Annex VI and the processes that the ship should use to report the data to the ship's Administration or any organization duly authorized by it (i.e. RO).

### Notes:

1. Regulation does not apply to ships not propelled by mechanical means, and platforms including FPSOs and FSUs and drilling rigs, regardless of their propulsion.
2. Administrations will decide for ships solely engaged in voyages within waters under their jurisdiction.

### SEEMP Content:

SEEMP		
Part I *		Part II
Step	Content	Content
<ul style="list-style-type: none"> <li>• Planning</li> <li>• Implementation</li> <li>• Monitoring</li> <li>• Self-evaluation &amp; improvement</li> </ul>	<ul style="list-style-type: none"> <li>• Ship particulars</li> <li>• Energy efficiency measures</li> <li>• Description of monitoring tools</li> <li>• Measurable goals</li> <li>• Procedures of evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Ship particulars</li> <li>• Record of revision of Fuel Oil Consumption Data Collection Plan</li> <li>• Ship energies &amp; other fuel oil consumers &amp; fuel oil types used</li> <li>• Emission factor of fuels used (Conversion factor <math>C_F</math>)</li> <li>• Method to measure fuel oil consumption</li> <li>• Method to measure distance travelled</li> <li>• Method to measure hours underway</li> <li>• Processes that will be used to report the data to the Administration</li> <li>• Data quality</li> </ul>

\* This part mostly remains unchanged. Part I of the SEEMP should be developed as a ship-specific plan by the company, and should reflect efforts to improve a ship's energy efficiency.

### ❖ Important dates:

Date	Activity	Responsibility	Reference
31 <sup>st</sup> DEC 2018	SEEMP part II to be approved. Confirmation of Compliance (CoC) to be issued. <ul style="list-style-type: none"> <li>SEEMP and CoC made available onboard</li> <li>It shall include methodology that will be used to collect the data and the processes to report the data to the Administration.</li> </ul>	Submission of SEEMP by: Ship owner / Manager  Approval by: Administration / RO	Appendix II, MEPC 282(70)
1 <sup>st</sup> Jan 2019 Up to 31 <sup>st</sup> Dec 2019	Collect fuel oil consumption data for each type of fuel oil, as well as the distance travelled and the hours underway.	Ship owner / Manager	MEPC 278(70)
31 <sup>st</sup> March 2020	Aggregated annual data to be reported to the Administration / RO	Ship owner / Manager	Appendix III, MEPC 282(70)
31 <sup>st</sup> May 2020	The data will be verified according to IMO Guidelines and a Statement of Compliance (SoC) will be issued by Administration / RO	Administration / RO	MEPC 292(71) MEPC 278(70)
Within 1 month of issuing SoC	Administration or RO will transfer this data to IMO Ship Fuel Oil Consumption Database	Administration / RO	MEPC 278(70) MEPC 282(70) (App.3) Annex VI Reg. 22A, Par 9

❖ **IMO's Data Collection System (DCS) will follow three step approach:**

1. Data Collection
2. Data analysis
3. Decision Making On Further Measures

❖ **Data to be collected as per Appendix IX of MEPC 278(70) for Ship's Fuel Oil Consumption:**

- a. IMO number
- b. Period of calendar year covered
  - ✓ Start date(dd/mm/yyyy)
  - ✓ End date(dd/mm/yyyy)
- c. Technical characteristics of the ship:
  - ✓ Ship type
  - ✓ Gross tonnage (GT)
  - ✓ Net tonnage (NT)
  - ✓ Deadweight tonnage (DWT)
  - ✓ Power output (rated power in KW) of main and auxiliary engines (reciprocating internal combustion over 130 kW)
  - ✓ EEDI (if applicable)
  - ✓ ICE class (if applicable)
- d. Fuel oil consumption:
  - ✓ By fuel oil type in metric tonnes.
  - ✓ Methods used for collecting fuel oil consumption data
- e. Distance travelled.
- f. Hours underway.

The aggregated value of above data for each calendar year will have to be reported before 31st March 2020 and each year thereafter, to ship's Administration or RO. This reporting would be via electronic communication and using a standardized format developed by IMO (Appendix 3 of MEPC 282(70)) and given in Appendix II of this guidelines.

Upon receipt of reported data, the Administration or RO will verify that it is in compliance with regulation 22A and issue a Statement of Compliance (SoC) (Appendix X of MEPC 278(70)). This SoC is to be issued before 31st May of each calendar year. **The SoC will be valid for the calendar year in which it is issued and till 31st May of following calendar year.** It is to be kept on board for at least the period of its validity. Administration will be required to subsequently transfer this data to the IMO Ship Fuel Consumption Database within one month of issuance of SoC. The database will be anonymized such that identification of a specific ship will not be possible as described by MEPC.293 (71) "2017 Guidelines for the Development and Management of the IMO Ship Fuel Oil Consumption Database".

**Note:** Requirements are also added in regulation 22A to address instances where a change of ownership and/or change of flag takes place. In case of vessel Changes Company or flag or both then the company shall on the day of completion of the transfer / change or as close as practical thereto report the corresponding data for that portion of calendar year to the losing Administration or any organization duly authorized by it, in accordance with MARPOL Annex VI Reg. 22A

❖ **Methods to monitor fuel consumption:**

- Method 1: Using Bunker Delivery Notes (BDN)
- Method 2: Using Flow meters
- Method 3: Using bunker fuel oil tank monitoring on board

**Note:** Direct CO<sub>2</sub> emission measurement is not required by regulation 22A of MARPOL Annex VI. However, if it is used, should be carried out as follows:

- This method is based on the determination of CO<sub>2</sub> emission flows in exhaust gas stacks by multiplying the CO<sub>2</sub> concentration of the exhaust gas with the exhaust gas flow. In case of the absence or/and breakdown of direct CO<sub>2</sub> emissions measurement equipment, manual tank readings will be conducted instead;
- The direct CO<sub>2</sub> emissions measurement equipment applied to monitoring is located exhaustively so as to measure all CO<sub>2</sub> emissions in the ship. The locations of all equipment applied are described in this monitoring plan; and
- Calibration of the CO<sub>2</sub> emissions measurement equipment should be specified. Calibration and maintenance records should be available on board.

# GUIDANCE ON METHODOLOGY FOR COLLECTING DATA ON FUEL OIL CONSUMPTION, DISTANCE TRAVELLED AND HOURS UNDERWAY

## **1. Fuel oil consumption**

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 underway or not. Methods for collecting data on annual fuel oil consumption in metric tonnes include (in no particular order):

### **1.1 Method using bunker delivery notes (BDNs):**

This method determines the annual total amount of fuel oil used based on BDNs, which are required for fuel oil for combustion purposes delivered to and used on board a ship 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 Data Collection Plan should set out how the ship will operationalize the summation of BDN information and conduct tank readings. The main components of this approach are as follows:

- i. 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;
- ii. 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;
- iii. 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;
- iv. 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 in the Data Collection Plan;
- v. 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
- vi. Any supplemental data used for closing identified difference in bunker quantity should be supported with documentary evidence.

### **1.2 Method using flow meters:**

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

set out information about the ship's flow meters and how the data will be collected and summarized, as well as how necessary tank readings should be conducted:

- i. 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;
- ii. 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 Data Collection Plan;
- iii. 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;
- iv. 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
- v. Calibration of the flow meters should be specified. Calibration and maintenance records should be available on board.

### **1.3 Method using bunker fuel oil tank monitoring on board:**

- 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.

**Note:** Monitoring of fuel used by LNG ships / Boil-Off-Gas (BoG) consumption:

- a) For calculating the BoG quantity by CTMS (custody transfer measurement system), cargo consumed on the passage is calculated by using the “CTMS closing” (final volume on board at the loading terminal upon completion of loading) and “CTMS opening” (total volume upon arrival at the discharge terminal just before commencement of discharging) figures. Cargo discharge at several locations in a port of call and new cargo added is to be considered.
- b) Alternatively, flow meters may be used to measure BoG instead of measuring through the CTMS. The BoG is measured either in volume (is to be converted to mass using appropriate density, pressure and temperature corrections) or measured directly in mass (Coriolis type flow meters).
- c) For the consumption in ports, the CTMS (opening and closing) method might not give the BoG consumption. Therefore, flow meters should be used as alternative for port consumption.

## **2 Emission factor / Conversion factor $C_f$**

$C_f$  is a non-dimensional conversion factor between fuel oil consumption and CO<sub>2</sub> 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. 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  $C_f$  factor assigned (e.g. some "hybrid fuel oils"), the fuel oil supplier should provide a  $C_f$ -factor for the respective product supported by documentary evidence.

## **3 Distance travelled**

Appendix IX of MARPOL Annex VI specifies that distance travelled should be submitted to the Administration and:

- i. Distance travelled over ground in nautical miles should be recorded in the log-book in accordance with SOLAS regulation V/28.13;
- ii. 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
- iii. 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.

## **4 Hours underway**

Appendix IX of MARPOL Annex VI specifies that hours underway should be submitted to the Administration. Hours underway should be an aggregated duration while the ship is underway under its own propulsion.

## **5 Data quality**

The Data Collection Plan should include data quality control measures which should be incorporated into the existing shipboard safety management system. Additional measures to be considered could include:

- i. The procedure for identification of data gaps and correction thereof; and
- ii. The procedure to address data gaps if monitoring data is missing, for example, flow meter malfunctions.

❖ **Verification of the reported annual data:**

To facilitate data verification, the Administration or RO may seek following documents:

1. A copy of the approved ship's Data Collection Plan (SEEMP Part II)
2. Summaries of bunker delivery notes (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 III);
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 IV);
4. Information to demonstrate that the ship followed the Data Collection Plan set out in its SEEMP, including information on data gaps and how they were filled as well as how the event that caused the data gap was resolved; and
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 logbook, oil record book, BDNs, arrival/noon/departure reports, etc.).
6. Any other document as deemed necessary for verification of data pertaining to ship's annual fuel oil consumption, distance travelled, and hours underway.

The above documentation will be used by Administration or RO to verify whether the ship followed the methodology specified in its Data Collection Plan, with a view to confirming:

- i. Consistency of reported data and calculated values, including with previous reporting periods (if applicable), through recalculating the annual reported values using the underlying data, etc.
- ii. Completeness of data (e.g. perform substantive testing based on reconciliation, recalculations, and document cross-check, for example with official logbook and/or arrival/noon/departure reports, recalculate hours underway and total quantities of fuel oil used and distance travelled); and
- iii. Reliability and accuracy of the data (e.g. test that the data quality procedures as described in the Data Collection Plan (see section 9 of sample form of Data Collection Plan, as set out in appendix 2 of the 2016 Guidelines for the development of a ship energy efficiency management plan (SEEMP)) have been properly implemented, carry out site visits (typically to the Company's offices rather to the ship) to test the systems, processes and the control activities) through corroborating fuel oil consumption data with distance travelled and hours underway, comparing reported fuel oil consumption with that which is expected for the ship size, operational profile, and technical characteristics, and/or comparing reported fuel oil consumption total fuel bunkered, etc.

❖ **Salient points for ship owners to note**

The focus of the verifiers will be on the following:

- i. Consistency of reported data and calculated values
- ii. Completeness of data
- iii. Reliability and accuracy of the data
  1. Ship owners need to ensure that the quality of data reported is free of omission, misrepresentation or error.
  2. Ship's crew is the primary source of data collection. Training of ship's crew is important to ensure SEEMP is implemented as documented.
  3. Diligent review of the submitted data at shore office is required to ensure consistency and avoid misreporting.
  4. Implement data quality control measures which could include:
    - i. The procedure for identification of data gaps and correction thereof; and
    - ii. The procedure to address data gaps if monitoring data is missing, for example, flow meter malfunctions.

Data Gaps are to be addressed by having procedures for dealing with possible mistakes or omissions due to data loss and lay down control measures that are to be taken by the company to minimize this risk for incorrect or incomplete data. If the data submitted and supporting documents give confidence to the verifiers about its reliability, then the verification risk is less. If not, then the verifiers will try to reduce the verification risk by carrying out additional site visits, seek more information through documents or interview.

For any questions about this Technical Information, please contact:

Iranian Classification Society (ICS)  
Convention & Legislation Department  
Phone: +98-21-42186210  
Fax: +98-21-88837744  
E-Mail: [cld@ics.org.ir](mailto:cld@ics.org.ir)  
Person in charge: Ehsan Ghoreifi

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