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Ships and marine technology — Marine environment protection — Specification for collecting data on ship's fuel oil consumption

Navires et technologie maritime — Protection de l'environnement marin — Spécifications relatives à la collecte de données sur la consommation de mazout des navires

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Foreword

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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The International Maritime Organization (IMO) Marine Environment Protection Committee, at its seventieth session (MEPC 70), adopted resolution MEPC.278(70) on Amendments to MARPOL, Annex VI, on data collection systems for fuel oil consumption of ships, which entered into force on 1 March 2018.

In accordance with regulation 22.2 of MARPOL, Annex VI, on or before 31 December 2018, the ship energy efficiency management plan (SEEMP) for ships of 5 000 gross tonnage (GT) and above is required to include a description of the methodology used to collect the data required by regulation 22A of MARPOL, Annex VI, including the process used to report the data to the ship's administration.

In addition, in accordance with regulation 5.4.5 of MARPOL, Annex VI, administrations are required to ensure that for each ship to which regulation 22A applies, the SEEMP complies with regulation 22.2. This is required to be done prior to collection of data under regulation 22A to ensure the methodology and the process are in place prior to the beginning of the ship's first reporting period.

Resolution IMO MEPC.282(70) 2016, *Guidelines for the development of a ship energy efficiency management plan (SEEMP)*[3], already provides detailed guidelines for the IMO data collection system. Additionally, Part 2 of the SEEMP, *Ship fuel oil consumption data collection plan*, is expected to be verified by the administrations or recognized organizations (RO). However, some portions needed to be clarified to prevent controversy between the administrations to improve data quality. This especially pertains to the methods to measure fuel oil consumption. Three methods for measuring fuel oil consumption (by bunker delivery note [BDN], flow meter, and sounding) are needed to specify the density calculation and calibration of each of the measuring devices.

Ships and marine technology — Marine environment protection — Specification for collecting data on ship's fuel oil consumption

1 Scope

This document provides a method for ships of 5 000 gross tonnage (GT) and above to collect data on fuel oil consumption, as required by regulation 22A of MARPOL, Annex VI. It specifies practical methods to measure the fuel oil consumption, the distance travelled and the hours underway. Annex A provides an example of a ship fuel oil consumption data collection plan.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IMO MARPOL Convention Annex VI, *Regulations for the prevention of air pollution from ships*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
ship fuel oil consumption data
data required to be collected on an annual basis and reported as specified in Appendix IX of MARPOL, Annex VI

3.2
emission
release of substances, subject to control by MARPOL, Annex VI, from ships into the atmosphere or sea

3.3
fuel oil
fuel delivered to and intended for combustion purposes for propulsion or operation on board a ship, including distillate and residual fuels

3.4
conversion factor
non-dimensional conversion factor between *fuel oil* (3.3) consumption and CO_2 *emission* (3.2)

Note 1 to entry: It is 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[4].

3.5
voyage
movement of a ship between a *departure from a berth* (3.6) to the *arrival at the next berth* (3.7)

3.6
departure from a berth
departure
starting point when a ship leaves a *berth* (3.11) at one single *port boundary* (3.12)

3.7
arrival at the next berth
arrival
starting point when a ship is berthed (moored, anchored and/or adrift) at one single *port boundary* (3.12)

3.8
calendar year
period from 1 January until 31 December of a year

3.9
hours underway
duration the ship is in operation under its own propulsion

3.10
distance travelled
actual distance travelled over the ground, in nautical miles

3.11
berth
named or numbered place where a vessel is moored at a wharf

3.12
port boundary
geographic area defined by the designated authority of the states, encompassing the individual port facilities within a port

4 Information on the ship and fuel oil consumers

4.1 Ship particulars

The following basic vessel information shall be collected:

a) name of the ship;

b) IMO number;

c) company;

d) flag;

e) ship type;

f) gross tonnage;

g) net tonnage (NT);

h) deadweight tonnage (DWT);

i) energy efficiency design index (EEDI) (if applicable);

j) ice class (if applicable).

4.2 Ship fuel oil consumers

For collecting fuel oil consumption data, the following information shall be obtained (see Table 1):

a) fuel oil consumers;

b) type/model;

c) number (if a ship has two or more machineries in one fuel oil consumer);

d) power (kW);

e) fuel oil type (conversion factor, C_F).

Table 1 — Example of fuel oil consumer data information format

	Fuel oil consumers	Type/model	Number	Power kW	Fuel oil types (C_F) Primary/secondary
1	Main engine				
2	Auxiliary engine				
3	Boilers				
4	Inert gas generator				
5	Gas turbines				

5 Methods to measure the fuel oil consumption

5.1 General

The 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. The method for collecting data for annual fuel oil consumption used on a ship can be chosen from three methods as described in 5.2, 5.3 and 5.4. Except for the case of using a mass flow meter (see 5.3), when using an annual fuel oil consumption measurement method, the density shall be obtained by one of the following methods to calculate the volume correction factor and the weight correction factor for converting the measured fuel oil consumption value into metric tonnes units:

a) on board measurement systems;

b) bunker delivery notes (BDNs) from the fuel supplier at the bunkering port;

c) laboratory testing.

NOTE Data relating to boil-off gas (BOG) consumed on board the ship for propulsion or operation is collected and reported as fuel as part of the data collection system for fuel oil consumption of ships[1].

5.2 Use of bunker delivery notes (BDNs)

5.2.1 Annual fuel oil consumption

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. Annual fuel oil consumption (Q) should be calculated as follows:

$$Q = T_1 + R - S - T_2$$

where

Q is the annual fuel oil consumption;

T_1 is the remaining fuel oil in tank at the beginning of the year;

R is the total fuel oil bunkered for the calendar year;

S is the total fuel oil offloaded for the calendar year;

T_2 is the remaining fuel oil in tank at the end of the year.

Each value should be rounded off to two decimal places.

The amount of any fuel oil loaded or offloaded should be based on the records from the ship's oil record book. Any supplemental data used for closing identified differences in bunker quantity should be supported with documented evidence. In the case of a voyage that extends over a 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.

5.2.2 Information from the bunker delivery note

The BDN includes at least the following information in accordance with Appendix V of MARPOL, Annex VI:

a) name and IMO number of receiving ship;

b) port of bunkering;

c) date of commencement of delivery;

d) name, address and telephone number of fuel oil supplier;

e) delivered product name;

f) quantity in metric tonnes;

g) density at 15 °C, kg/m^3;

h) sulfur content, % mass fraction;

i) a declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 18.3 of MARPOL, Annex VI and that the sulfur content of the fuel oil supplied does not exceed:

   — □ the limit value given by regulation 14.1 of MARPOL, Annex VI;

   — □ the limit value given by regulation 14.4 of MARPOL, Annex VI;

   — □ the purchaser's specified limit value (% mass fraction), as completed by the fuel oil supplier's representative and on the basis of the purchaser's notification that the fuel oil is intended to be used:

      .1 □ in combination with an equivalent means of compliance in accordance with regulation 4 of MARPOL, Annex VI; or