

Chapter: Shipboard operations - Engine
Topic: MARPOL Annex VI Compliance - Air Pollution Prevention**Management System**

1. Objective

The objective is to ensure compliance with MARPOL Annex VI regarding prevention of air pollution from ships, which entails obtaining and maintaining the statutory certificate; International Air Pollution Prevention, in short IAPP.

2. Responsibilities

The Master and the Chief Engineer are responsible for compliance with this procedure.

3. Instruction**3.1 General**

The provisions of this Annex apply to all vessels, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, and 18.

MARPOL Annex VI was adopted by the International Conference of Parties to MARPOL 73/78 in September 1997. The Protocol entered into force on 19 May 2005.

The Revised MARPOL Annex VI was adopted at MEPC 58 in October 2008 and entered into force on 01 July 2010

3.2 Definitions

Low-sulphur Fuel:

Fuel oil with sulphur content below 1.0%

Tankers:

Oil-tankers as defined in MARPOL Annex I, and chemical tankers as defined in MARPOL Annex II

Ozone-depleting substances:

Substance controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer that Deplete the Ozone Layer as amended, i.e.:

All CFC's

Tetrachloromethane

Trichloroethane

All halons

All HBFC's

All HCFC's

Methylbromide

Technical File:

Supplement to the EIAPP Certificate which describes the engine specific parameters and parts which are necessary to meet the NOx emission target

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IMO NOx Engine Record Book:

"Engine Record Book of Engine Parameters" Logbook containing entries for all adjustments of parameters and exchange of NOx related parts mentioned in the "Technical File"

ECA:

Area designated by IMO in which restriction on the emission of Sulphur and NOx are in force. For further detailed guidance pls rely on procedure 07.02.xx 'IMO List of Special Areas under MARPOL' /MEPC.1-Circ.778-Rev.1 for list of IMO Special Areas under Marpol and attached 'ECA Map 2012' covering the latest assigned ECA Areas.

Abbreviations:

IAPP	International Air Pollution Prevention
EIAPP	Engine International Air Pollution Prevention
ECA	Emission Control Area
F-Gas	Regulation (EU) No 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases
VOC	Volatile Organic Compound
VECS	Vapour Emission Control System
PCB	Polychlorinated biphenyls
PVC	Polyvinyl Chlorides
SOx	Sulphur Oxides
NOx	Nitrogen Oxides
MEPC	Marine Environment Protection Committee
HELCOM	Helsinki Commission on the protection of the environment in the Baltic Sea

3.3 Description**Regulation 12, Ozone-depleting substances:**

- Does not apply to permanently sealed equipment having no refrigerant charging connections or removable components containing ODS
- Any deliberate emission of ozone-depleting substances is prohibited;
- Including, but not limited to, emissions occurring while maintaining, servicing, repair or disposing of systems or equipment.
- New installations containing Ozone-depleting substances are prohibited
- Substances and equipment containing Ozone-depleting substances shall be delivered to appropriate reception facilities when removed from ships.

A receipt shall be obtained in such case referring to this regulation and be kept onboard for verification by authorities.



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Documentation required:

- List of equipment containing Ozone-depleting substances in the Supplement to IAPP certificate
- An ODS record/log book is required for ships that have rechargeable systems onboard containing ODS. This record/log book can form part of an existing log book or electronic recording system as approved by the Administration.
- Entries to be made in the record book (in Kg's) include:
 - Recharge, full or partial
 - Repair or maintenance
 - Deliberate or Non deliberate discharge of ODS to the atmosphere
 - Discharge of ODS to land based reception facilities
 - Supply of ODS to ship
- Receipt of proper disposal of equipment and substances to appropriate reception facilities

From Regulation (EU) No 517/2014

- The intentional release of F-Gases into the atmosphere is prohibited where the release is not technically necessary for the intended use.
- Operators of equipment that contains F-Gases shall take precautions to prevent the unintentional release ('leakage') of those gases and to take all measures which are technically and economically feasible to minimise leakage of fluorinated greenhouse gases.

Regulation 13, NO_x - applies to Diesel Engines on vessels with keel laid date on or after 1 January 2000:

- All non-emergency engines above 130 KW must have an EIAPP certificate and a Technical File
- The type of parts installed in the engine shall match the type of parts listed in the Technical File for the engine
- The type of spare parts in stock onboard shall match the type of parts listed in the Technical Files for the engines
- Substitution of identical parts with other marking than those listed in the Technical Files is not allowed
- Adjustment of any engine parameter listed in the Technical File shall be kept within the stated limits
- Exchange of any parts or adjustment of any engine parameter listed in the Technical File must be recorded in the IMO NO_x Engine Record Book of Engine Parameters.
This is only valid if a new IMO NO_x marked part type/model /parameter are offered from the maker and hence replacing the presently listed part/parameter.

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It is not to cover standard IMO NOx marked planned maintenance parts. These related parts/jobs are strictly to be recorded only in the vessels respective Planned Maintenance System.

Documentation required:

- EIAPP certificate for each non-emergency engine above 130 KW onboard
- IMO NOx Engine Record Book of Engine Parameters
- Technical File for each non-emergency engine above 130 KW onboard

Verification onboard:

- Check of engine parts and adjustments of engine parameters for compliance with Technical File will be done at initial IAPP survey and subsequent renewal IAPP surveys
- Random check of parts and adjustments may be done at annual and intermediate IAPP surveys
- Check of IMO NOx Engine Record Book of Engine Parameters at annual, intermediate and renewal IAPP surveys
- Check of IAPP certificate at Port State Control

Regulation 14, SOx - applies to all vessels:

- The sulphur content of any fuel used onboard shall not exceed 3.50% m/m
- Emission Control Areas in force limits usage of fuels to maximum 1.0 % m/m Sulphur

Requirements within emission control areas

IMO has approved following ECA areas:

The Baltic Sea, as defined in MARPOL Annex 1, Reg.1.11.2 as from 19 May 2005 with a one year grace period for preparation. i.e. all vessels entering this area must comply as from 19 May 2006.

The North Sea and the British Channel, defined by MARPOL Annex V, Reg. 5(1)(f), as from 22 November 2006 with a grace period of 1 year for preparation, i.e. all vessels entering this area must comply as from 22. November 2007.

The North American Emission Control Area (ECA) entered into force on 01 August 2011, with a one year grace period for preparation i.e. all vessels entering this area must comply as from 01 August 2012. In the case of the NAM ECA this extends to 200 nm from the coastline of the United States & Canada.

EU has in the Directive 32/1999 revised as Directive 33/2005 also designated the Baltic Sea as well as the North Sea as ECA's but with slightly different dates of entry into force.

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All passenger vessels (those carrying more than 12 passengers) in regular service to and from European Community Ports are to utilize fuel oil with less than 1.0 % Sulphur while they are in the EU territorial seas, exclusive zones and pollution control areas, including the North Sea and Channel.

While ships are operating within an emission control area, the sulphur content of the fuel oil used on board ships shall not exceed the following limits:

.1 1.00 % m/m on and after 01 July 2012; and

.2 0.10 % m/m on and after 01 January 2015.

Documentation required:

- The sulphur content of any fuel oil onboard shall be documented by the Supplier in the Bunker Delivery Note (see Regulation 18)
- A written vessel specific fuel oil change over procedure which allows for fully flushing of all high sulphur oil from the fuel oil service system
- ECA areas clearly marked on all relevant sea charts
- Change over of fuel oil to low-sulphur prior entering and after leaving a SECA -area shall be documented in the engine log book or other appropriate log book as follows:
 - When entering an ECA
 - Volume of low-sulphur fuel oil in each tank
 - Date, time and ships position on **completion** of change over. Completion of change over is; when all high sulphur oil has been fully flushed from the fuel oil service system **before** entering the ECA.

When leaving an ECA

- Volume of low-sulphur fuel oil in each tank
- Date, time and ships position on **initiation** of change over. Initiation of change over is; when first admitting high sulphur oil to the fuel oil service system **after** leaving the ECA.

Verification onboard:

- Implementation of proper vessel specific change over procedure may be verified at initial, annual, intermediate and renewal IAPP surveys
- Sampling of fuel oil used may be performed by Port State Control according to IMO Resolution MEPC.96(47) for verification of sulphur content
- Verification of proper documentation for compliance with this regulation

Regulation 15, VOC – applies to all tankers:

- Vapour Emission Collecting System shall be approved by the Administration.
- VECS shall be used during loading such cargoes on terminals where Vapour Emission Control is in effect.

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Documentation required:

- Certificate of conformity issued by the Administration for the equipment if fitted
- All tankers carrying crude oil are to have a ship specific VOC management plan onboard that has been approved by the administration. This plan must be implemented onboard. As a minimum this should include written procedures for minimizing of VOC emissions during:
 - Loading
 - Sea Passage
 - Discharge

VOC emissions during crude oil washing are also to be considered.

Verification onboard:

- Confirmation of installation of VECS and approval by the Administration may be conducted during Port State Control Regulation 16, shipboard incineration - All Vessels
- Shipboard incineration is only allowed in a shipboard incinerator
- Except, sewage sludge and sludge oil may be incinerated in main or auxiliary engines or boilers. **Such incineration in main or auxiliary engines or boilers shall not take place in ports, harbors and estuaries.**
- Shipboard incineration of the following substances are prohibited:
 - Annex I, II and III cargo residues incl. contaminated packaging materials
 - PCB's
 - Annex V garbage containing more than traces of heavy metals
 - Refined petroleum products containing halogen compounds
 - Non ship generated sewage sludge and sludge oil
 - Residues from exhaust gas cleaning systems
- Shipboard incineration of PVC's are only allowed in incinerators with IMO type approval certificate

Regulation 16, shipboard incineration - Incinerators installed on or after 1 Jan 2000:

- Personnel responsible for operating a shipboard incinerator shall be trained and capable of implementing the guidance provided in the manufacturer's operating manual - as stated in Guidelines for Engineers
- Monitoring of combustion flue gas outlet temperature is required at all times
- Continuous feed of waste is not allowed when the combustion flue gas outlet temperature is below 850 deg. C

Documentation required:

- IMO type approval certificate in accordance with MEPC.76(40) for incinerators installed onboard on or after 1 January 2000 if applicable
- IMO type approval certificate in accordance with MEPC.59(33) if applicable

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- Manufacturer's operating manual
- Signed Chief Engineers Standing Orders documenting training of personnel to operate the incinerator according to the operating manual
- Garbage log book
- Oil Record Book

Exemptions:

- Operation of incinerators in Danish waters and waters covered by the HELCOM treaty is not allowed
- Operation of incinerators within 3 nm of the California coastline as from 1st, January 2006 is not allowed
- Incinerators onboard Danish flagged vessels shall have an IMO type approval certificate

Regulation 18, Fuel oil quality – applies to **all vessels:**

- Fuel oil delivered to and used onboard shall meet these requirements
 - be blends of hydrocarbons derived by petroleum refining
 - may contain small amounts of additives to improve performance
 - be free from inorganic acid
 - shall not include added substances or chemical waste which:
 - jeopardizes the safety of ships or adversely affects performance of machinery
 - is harmful to personnel
 - contributes overall to additional air pollution
- Details of delivered fuel shall be recorded by means of a bunker delivery note containing at least:
 - Name and IMO number of receiving ship
 - Port
 - Date of commencement of delivery
 - Name, address, and telephone number of fuel supplier
 - Product name(s)
 - Quantity (metric tons)
 - Density at 15 deg. C (kg/m³)
 - Sulphur content (% m/m) (with two decimals)
 - declaration signed and certified by the fuel supplier's representative that the fuel oil supplied is in conformity with regulation 14.1 or 14.4 and regulation 18.3 of MARPOL Annex VI
- If the Bunker Delivery Note is incompliant with the requirements, the vessels Flag State Administration shall be notified by submitting details of the bunkering such as:
 - Name and IMO number of receiving ship
 - Port
 - Date of commencement of delivery
 - Name, address, and telephone number of fuel supplier

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- Product name(s)
- Quantity (metric tons)
- Density at 15 deg. C (kg/m³) - if stated
- Sulphur content (% m/m) - if stated
- Whether a declaration signed and certified by the fuel supplier's representative that the fuel oil supplied is in conformity with regulation 14.1 or 14.4 and regulation 18.3 of MARPOL Annex VI has been obtained
- Additional information such as copies of commercial documents
- Result of fuel oil analysis if carried out
- Copies of any notification to the Flag State Administration shall be kept in the Bunker Delivery Note File
- The vessel is responsible of documenting the sulphur content in the event it is not documented by the Bunker Delivery Note
- The bunker delivery note shall be kept onboard for 3 years after the fuel oil has been delivered onboard
- A representative sample of the fuel oil delivered shall accompany the bunker delivery note
- The sample shall be sealed and signed by the Supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations
- The sample shall be kept onboard until the fuel is consumed, but not less than 12 months from the delivery
- The bunkered amounts including grade (sulphur content) shall be recorded in the Oil Record Book as per MARPOL Annex I

Documentation required:

- Bunker delivery note file
- MARPOL Annex VI Bunker samples stored in a designated, ventilated, sample storage location onboard
- Oil Record Book

Regulation 22 – Ship Energy Efficiency Management Plan – applies to all MSS vessels:

- Each ship shall keep on board a ship specific Ship Energy Efficiency Management Plan (SEEMP). This is a part of our safety management system. To comply with It is a requirement that all vessels
 - Print the SEEMP template from AMOS2 and fill in vessel specific details
 - Discuss energy efficiency measures onboard weekly management meetings taking energy saving measures mentioned in SEEMP template into consideration
 - Continue using Maersk Ship Performance System as instructed
 - At all times at least having 1 open environmental target as part of ISO14001 certification related to energy efficiency

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- *For existing ships, the verification of the requirement to have a SEEMP on board shall take place at the first intermediate or renewal survey identified in paragraph 1 of this regulation, whichever is the first, on or after 1 January 2013*
- *An International Energy Efficiency Certificate (IEEC) for the ship shall be issued after a survey in accordance with the provisions of regulation 5.4 to any ship of 400 gross tonnage and above before that ship may engage in voyages to ports or offshore terminals under the jurisdiction of other Parties.*
- For existing ships a Ship Energy Efficiency Management Plan (SEEMP) shall be verified onboard according to Regulation 5.4.4, and an IEEC shall be issued, not later than the first Intermediate or Renewal MARPOL Annex VI Chapter 2 survey, whichever is the sooner, on or after 1 January 2013, i.e. a survey connected to a intermediate/renewal survey of the IAPP Certificate.
- The Intermediate or Renewal survey referenced above relates solely to the timing for the verification of the SEEMP onboard, i.e. these IAPPC survey windows will also become the IEEC initial survey date for existing ships. The SEEMP is however a survey item solely under the new MARPOL Annex VI Chapter 4, and is not a survey item relating to IAPPC surveys.

3.4 Compliance and verification

Compliance is verified at annual IAPP survey, intermediate IAPP survey and renewal IAPP survey and the IAPP certificate may be verified at Port State Control.

3.5 Survey cycles

All vessels shall have an IAPP certificate.

Initial survey

Existing vessels, i.e. vessels delivered before 19 May 2005, shall be subject to an initial survey and issuance of the IAPP certificate no later than the first dry-docking after 19 May 2005, but in no case later than 19 May 2008.

New vessels, i.e. vessels delivered on or after 19 May 2005 shall be subject to an initial survey and issuance of the IAPP certificate before the ship is put into service.

Periodical surveys

All vessels will undergo periodical surveys at 5 years intervals to ensure that equipment, systems, fittings, arrangements and material fully comply with the requirements of Annex VI.

MARPOL Annex VI was adopted by the International Conference of Parties to MARPOL 73/78 in September 1997. The Protocol will enter into force twelve months after the date on which not less than fifteen States, constituting not less than 50 % of the world's Merchant fleet, have ratified the annex.

This happened on 19 May 2004 wherefore the annex will enter into force on 19 May 2005.

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Intermediate surveys

At least one intermediate survey shall be performed in the period of the validity of the certificate to ensure compliance as above.

Harmonized surveys

The IMO Resolution on harmonization of surveys has been amended to include MARPOL Annex VI. This implies that all surveys in connection with this Annex will take place in concordance with all other statutory surveys.

4. References

Vessel specific change over procedure - produced onboard
Technical File
Bunker Delivery Note file
Guidelines for determining off specification limits for low sulphur fuel oil
Bunkering: Forwarding Procedure for Fuel Samples
Chief Engineer's Standing Orders
IMO NOx Engine Record Book (Logbook containing entries for all adjustments of parameters and exchange of NOx related parts mentioned in the Technical File)
Ozone-depleting Substances log
Ozone-depleting Substances Report
The Montreal Protocol on Substances that Deplete the Ozone Layer
MARPOL 73/78 Annex VI
IMO List of Special Areas under MARPOL, MEPC.1-Circ.778-Rev.1
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