

1. GENERAL INSTRUCTIONS

MARPOL VI latest revision ,done by MEPC.328(76), entered in to force on 01st Nov 2022.

Masters and Ch.Engineers are reminded ,to use only references to this Revision and be aware that Revised MARPOL VI is with new definitions, Reg.No when used for Reference .

1.1 The Master shall have final responsibility for implementing of prevention of air pollution resulting from the discharge and emission of any gases to the atmosphere. He has also the final responsibility for the familiarization and training of all crew involve in the operation of equipment containing ozone depleting substances.

1.2 The Chief Engineer shall have the direct responsibility to supervise the operation and maintenance of equipment containing ozone depleting substances (ODS) for the prevention of air pollution. He is also directly responsible in keeping and maintaining the “List of Equipment Containing ODS and its Records”, “Record Book of Engine Parameters” for NO_x Control and “Fuel Oil Change over Procedure Manual” for SO_x Control

1.3 The Chief Engineer shall familiarize all crew involve in the operation of equipment containing ODS and subject SO_x/NO_x emission control to ensure prevention of air pollution.

1.4 Operation procedures for Air pollution prevention equipment are in SMS-DE-06.

OZONE DEPLETING SUBSTANCES (ODS)

2.1 ODS are man-made chemicals which degrade the ozone layer in the upper atmosphere and which are being phased out, both in terms of manufacture and use, in accordance with the requirements of the Montreal Protocol.

Within the marine context, these are essentially the halons, as used in some older fire fighting systems and equipment, and the chlorofluorocarbons (CFC) used as refrigerants and in insulation materials. From the entry into force date of the Annex, 19 May 2005, it is prohibited to install any new system or equipment containing ODS although new systems using hydro-chlorofluorocarbons (HCFC), with a much reduced ozone depleting potential as compared to CFCs) are permitted to be installed up to 1 January 2020.

Existing Halon and CFC systems and equipment can however continue to be used and recharged as necessary. However, the deliberate venting of ODS is prohibited.

2.2 List of Equipment Containing ODS and its Records

The Chief Engineer shall maintain a “List of Equipment Containing ODS” and the “ODS Record” (if equipped with rechargeable systems containing ODS), refer to “Oil Record Book Entry” (SMS-G-07-P1 and P2)

As for ODS Record Book, it is contained in Part III of Panama ORB, 2009 Edition. For vessels which are still using Panama ORB 2008 Edition, after 1 July 2010, the List of Items to be Recorded (Part III-A) shall be changed according to MARPOL VI/Reg. 12-7.

For vessels not under Panamanian flags, the “List of Equipment Containing ODS” & “ODS Records” shall be kept in a separate file, not in ORB.

2.3 Equipment Maintenance and Servicing

Maintenance and servicing of equipment containing ODS shall be dealt with under “Onboard Maintenance Work” SMS-F-01 and in Safe Maintenance work in engine department (SMS-DE-11)

2.4 Disposal Arrangements

The disposal of equipment containing ODS when removed from either ships in service or prior to scrapping shall be to authorized reception facilities and shall be in accordance with “Garbage Management” (SMS-C-05).

NO_x CONTROLS

1. Application of NOx controls

NOx controls are 3 different emission control standards. They are described in MARPOL VI, Reg.13 and in details in NOx technical code.

.1 **“Tier I”** The NOx controls as given within the Annex VI, to Marine Diesel Engines(MDE), (boilers and gas turbines are not covered) over 130 kW which are not used solely for emergency purposes and which are:

* installed on ships built (i.e. keel laid) on or after 1 January 2000, or

* subject to “major conversions”, as defined, on or after 1 January 2000. For the purpose of this regulation a “major conversion” is where an engine:

- built on or after 1 January 2000 is installed onboard
- output power is increased by more than 10 percent
- is “substantially modified”, as defined.

In the case of engines installed on ships built before 1 January 2000, “substantially modified” means any operational or technical modifications which are made after that date which could increase NOx emissions, as defined. Such modifications may include changes to fuel injection timing, fuel injection equipment, the charge/scavenge air systems or combustion chamber profile.

.2 **“Tier II”** NOx emission limits are to apply to all marine diesel engines installed in ships constructed on or after 1 January 2011, or which undergo a major conversion on or after 1 January 2011.

Tier I and II requirements are GLOBAL requirements and are applied for operation of MDE, outside of designated NECA.

Only MDE installed on ships constructed after 01 January 2011 are certified as Tier II.

Reference should be made to International Air Pollution prevention certificate IAPPC-Supplement, where the applicable regulation (Tier I, II or III) are marked by “X”.

.3 **“Tier III”** when the ship is operating in a NOx Tier III Emission Control Area, the Tier III NOx emission limits will apply to all marine diesel engines installed on ships constructed on or after 1 January 2016, or which undergo a major conversion on or after 1 January 2016.

The **NOx Tier III ECA’s** are:

North American ECA, US Caribbean(ships 01 Jan 2016 build), North sea and Baltic sea areas(ships 01 Jan 2021 build)

Vessels with MDE compliant as Tier II and III means vessel can operate her MDE inside and outside NOx Tier III ECA.

It is important Master and Ch.Engineer to know with what type of fuel and

with what additional equipment, MDE is certified as Tier III compliant engine.

For example Dual Fuel Engines, may be certified to be compliant with both type of fuels on condition EGR is used, or certified only with LNG fuel to be Tier III compliant.

These approved data parameters can be found in NOx Engine Technical file and Engine International Air Pollution Prevention Certificate(Supp).

3.2 Marine Diesel Engines installed on ships constructed prior to 1 January 2000:

Marine diesel engines with a power output of more than 5,000 kW and a per cylinder displacement at or above 90 liters installed on ships constructed on or after 1 January 1990 but prior to 1 January 2000 shall comply with the emission limits of Tier I using an Approved Method for the engine. The Approved Method shall be applied no later than the first renewal survey that occurs 12 months or more after the submission of an Approved Method that has been certified by an Administration to IMO. However, in cases where an Approved Method does not yet exist or is not yet commercially available, this regulation is omitted.

The regulation does not apply to Emergency diesel engines, engines installed in lifeboats or for any equipment intended to be used solely in case of emergency.

NB: *An Approved Method is a modification unit designed to make engines without NOx certification compliant with the Tier I regulations that has to be approved by the Administration.*

3.3 Record keeping

Masters are required to check the compliance (Tier I or II) of the vessel's MDE IAPPC-Supplement and:

.1 If the MDE are stated as compliant with Tier I requirements only, than the bellow requirements for NOx record keeping **are NOT applicable** for these vessels

.2 IF MDE is stated as Tier II, must follow the bellow procedures for records.

Note: MDE stated as Tier I and II also can be operated in NECA.

A MDE Tier II operation in NECA is subject to records keeping, while Tier I is not.

. 3 Records are required to be made for status of MDE when:

-Vessels enters or exits NECA

-Status of MDE **within NOx Tier III ECA** is changed(start or stop) ,like at:

Finished with Engines, starting or stopping an additional generator engine(at 1hr notice or Rung up, changing over generators or any other change of status of the MDE from OFF to ON or vice versa.

Important: Outside NECA these records are NOT required.

3.4 Format of records

“Time (dd,mm,yy,hh:min)/**position**/MDE Tier II /status ON or OFF”

Example:

Date-11.01.2018 Time: 13:13LT Possition: Lat: 39-29.0N 59-51.0W

Main Engine-Tier II status:ON No.1 Generator Engine -Tier II status:ON ;No.2 Generator Engine-Tier II status:OFF;No.3 Generator engine-Tier II status:OFF

In order to minimize the paper work, Ch.Engineer can use abbreviations like:

Main Engine=M/E , No.1 Generator Engine =No.1G/E , provided that at the front page of

the record book is pasted a “List of abbreviations used in the Record book”, signed and approved by Master.

Records should be made in the Record book provided by Flag administration, like Panamanian ORB-Part III

Where such book is not provided records must be made in Engine Log book, with each entry endorsed by Chief Engineer **and the Master.**

Panamanian flag vessels

Panama flag administration revised the ORB (2017) edition. The revised PMMC-215 contains the instruction for making the entries in ORB-Part III and for correcting the existing ORB.

3.5 Record books for Engine parameters

Items to be described in the Record Book of Engine Parameters

The following items shall be recorded by the Chief Engineer:

1. Replacement with spare (including new one)

2. Adjustment of timing and pressure (if required) – not to be done without maker's advise
3. Record of engine maker parts modification

3.6 Certification Requirements under MARPOL

The Master shall maintain following documents under “Control of Certificate” (SMS-G-01).

1. IAPP Certificate – required for all vessels
2. IAPP Supplement – required for all vessels
3. EIAPP Certificate for Main Engine – for vessel keel laid on or after 1 January 2000
4. EIAPP Certificate for each DG – for vessel keel laid on or after 1 January 2000
5. NOx Technical File and Maintenance Record of Engine Parameters for Main Engine– for vessel keel laid on or after 1 January 2000
6. NOx Technical File and Maintenance Record of Engine Parameters for Generator Engine– for vessel keel laid on or after 1 January 2000
7. International Energy Efficiency certificate
8. Statement of Compliance related to fuel oil consumption report(SEEMP Part-II)-not later than 5 months from beginning of the calendar year, starting from 01st Jan 2019-to be issued by flag administration(NKK)

Worldwide limit of 0.50% of Sulphur content in Marine Fuels by

MARPOL VI revisions from 01st Jan 2020.

Amendments of MARPOL VI, entering in force on 01st January 2020, will implement stringent controls on Sulphur content on marine fuels and will require all marine fuels on board in use in all internal combustion engines , including DG, Main Engine, Boilers , EDG ,Life boats engines , to be with max Sulphur content of 0.50% .

MEPC.320(74) is outlining Guidelines for Consistent implementation of 0.50% Sulphur limit, worldwide(Global Sulphur cap of 0.50%).

From 01st March 2020 another MARPOL VI revision enters in force ,prohibiting **carriage on board** of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship - unless the ship has an equivalent compliance method(EGCS) under MARPOL VI/Reg.4.1

Vessels with EGCS(scrubbers) are exempted for the 0.50% and still can continue to use 3.5 % , provided the EGCS is certified to output exhausts, equivalent of usage of 0.5%/0.1%

ULSFO.

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1. Definitions newly introduced

1. Used in the Guidelines for implementation of 0.50% Sulphur limit-MEPC.320(74)

- 1 Distillate marine fuels (DM) are as specified in ISO 8217:20171 (e.g. DMA, DMB, DMX, DMZ);
- 2 Residual marine fuels (RM) are as specified in ISO 8217:20171 (e.g. RMD 80, RMG 380);
- 3 Ultra-low Sulphur fuel oil (ULSFO) are as specified in ISO 8217:20171 (e.g. maximum 0.10% S

ULSFO-DM, maximum 0.10% S ULSFO-RM);

- 4 Very low Sulphur fuel oil (VLSFO) (e.g. maximum 0.50% S VLSFO-DM, maximum 0.50% S

VLSFO-RM); and

- 5 High Sulphur heavy fuel oil (HSHFO) exceeding 0.50% S (to be used or carried on board only if vessel is fit with EGCS)

1. Used in MARPOL amendments-MEPC.1/Circ.882 and MEPC 324(75) and MEPC.328(76)

Sulphur content of fuel oil means the concentration of sulphur in a fuel oil, measured in % m/m as tested in accordance with a standard acceptable to the Organization.(ISO 8574:2003)

Low-flashpoint fuel means gaseous or liquid fuel oil having a flashpoint lower than otherwise permitted under paragraph 2.1.1 of Reg.4 of Chapter-II-2 of SOLAS,1974 as amended.

MARPOL delivered sample means the sample of fuel oil delivered in accordance with regulation 18.8.1 of MARPOL Annex VI.

In-use sample means the sample of fuel oil in use on a ship.

On board sample means the sample of fuel oil intended to be used or carried for use on board that ship.

MEPC.328(76) resolution introduced significant numbers of new Definitions.

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1. Sampling Procedures and Compliance

Refer to SMS-C-06-P7

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1. Potential safety implications with implementation of VLSFO/ULSFO

Maritime Industry has experience with implementation of ULSF/VLSF in ECA's.

All known issues are listed in the DE-06-R4.

Master's Ch/Eng are required to report any malfunction to the Company , for analysis and counter measures.

When, the malfunction is affecting safety of the vessel, Master should switch immediately to alternative fuels if available, or stop using Scrubber and change over to non-compliant fuel(HSF), in order to ensure safety of the vessel.

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1. Survey and Certification

MARPOL VI, provides 2 ways for compliance with Reg.14 for Sulphur limit emission control.

1. Vessel to use Compliant fuel 0.50%(or 0.10% in ECA)

Meaning ,all marine fuels on board must be ULSFO(0.50%) and/or 0.10% ULSFO

or

1. Vessel to use EGCS(Scrubber)

Meaning, vessel may have HSFO(non compliant>0.50%) to be used with EGCS and may have Compliant fuel(ULSFO)

Any of these compliance ways, intended for use must be certified by RO and stated in IAPC Supplement.

Vessels with IAPC Supp, stating use only compliant fuel and equipped with Scrubber, can not use the scrubber, until this is stated in the IAPC Supplement.

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1. Control and verification of the Compliance

Control of the implementation, generally lies with PSC, with some differences in USCA, where control of Air pollution(sampling) lies with CARB.

PSC/CARB further exams , after a compliance is confirmed , may include sampling of the fuels on board -Marpol sample, in-use Fuel and on board sample.

Requirements for MARPOL samples are outlined in C-06-P7(MARPOL VI-Apx.VI)

Masters are required to request a receipt from PSC officer , if a sample will be requested for testing to shore laboratory. Receipt Form is attached in C-06-F2 and this should be reported to the Company/Operator immediately.

All IMO resolutions related to MARPOL VI sampling are located in C-06-Instructions

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1. Non-Compliance/Fuel Oil Non-Availability Report-FONAR (Ref. also to 6.7)

In case when the vessel did all necessary to supply compliant fuel, but the local suppliers were not able to supply it, Master is required immediately to produce a FONAR, after reporting to the Company with Deficiency reporting form.

FONAR report is in the C-06-F1

INCINERATORS

Requirements and Certification

As with NOx controls, the incinerator design requirements of MARPOL Annex VI are independent of the entry into force date. MARPOL Annex VI requires that all incinerators installed on, or after 1 January 2000 are to be certified. The original of such certificate shall be kept by the Master with copy to Chief Engineer for his information and guidance.

Type Approved Incinerator must be provided with certificate of Type approval, according (MEPC.59(33)/MEPC.92(45)/MEPC.76(40)/MEPC.93(45)/MEPC244(66)

Operation and training requirements are outlined in DE-06.

IMO designated SOx EMISSION CONTROL AREAS (SECA)

SECAs designated by MARPOL-VI-Reg14.3 are:

Baltic sea, North Sea ,Mediterranean sea, North America area and US Caribbean.

Any other sea area, including any port area, designated by the organization in accordance with the criteria and procedures set forth in MARPOL Annex VI Appendix III

6.1 Sulfur Limit Regulations of North American Area (USA and Canada): not exceeding 0.1% after 01St Jan 2015

The following documents should be prepared prior to entering US and Canada's ports for inspection by the PSC:

- IAPP Certificate
- EIAPP Certificate
- Diesel Engine Technical File
- Bunker Delivery Note
- Representative Fuel Oil Sample
- Written Fuel Oil Change-over procedure
- Fuel Oil Change-over log book
- Deck Log Book, Engine Log Book, Oil Record Book
- Also, the Inspector may take fuel sample from a ship's fuel oil tanks and lines to verify compliance if necessary.

6.2 The area of the U.S. Caribbean ECA includes waters adjacent to coasts of the Commonwealth of Puerto Rico and the U.S. Virgin Islands, up to roughly 50 nautical miles from the territorial sea baselines of the included islands.

6.3 The operation section of Operator shall supply Low Sulfur Fuel (LSFO: sulfur contents not exceeding 0.1 %) to the fleet trading within ECA in the North Sea, Baltic Sea and North American /Caribbean ECA.

6.4 FO availability and Reporting Non compliant fuels.(FONAR, see 4.6)

MARPOL VI-Reg 18 imposes reporting requirements for a vessel intended to operate in ECA without having on board compliant fuel.

Due to specific organization of FO supply, in case when required FO is not delivered or is delivered with off specifications, Master should:

- 1. Report to Company immediately for the non-compliance and enough before entry into ECA.
- 2. Company will Report (or instruct the Master to) to Flag Administration and to Competent Authority in port of Destination.(in case of North American Area - to USCG COTP-FONAR).
- 3. All evidences (BDN, exchange emails with Charterers, Non availability report to Flag and Local administrations) must be copied to Company/Vessel and retained on board in a separate folder
- 4. Before entry into ECA, Master must ensure appropriate entries in the ORB and Deck log are made, Stating the vessels enters into ECA with non-compliant fuel and reporting was done according MARPOL VI/Reg.18.

Sulfur Limit Regulations History of MARPOL Annex VI

| | |
|--|-----------------------|
| | Jan 1,2020 |
| | VLSFO 0.5% |
| All Ocean Region (Outside Emission Control Areas, ECA) | Or scrubber with HSFO |
| | ULSFO 0.1% |
| Emission Control Area (SECA is contained in ECA) | Or scrubber with HSFO |

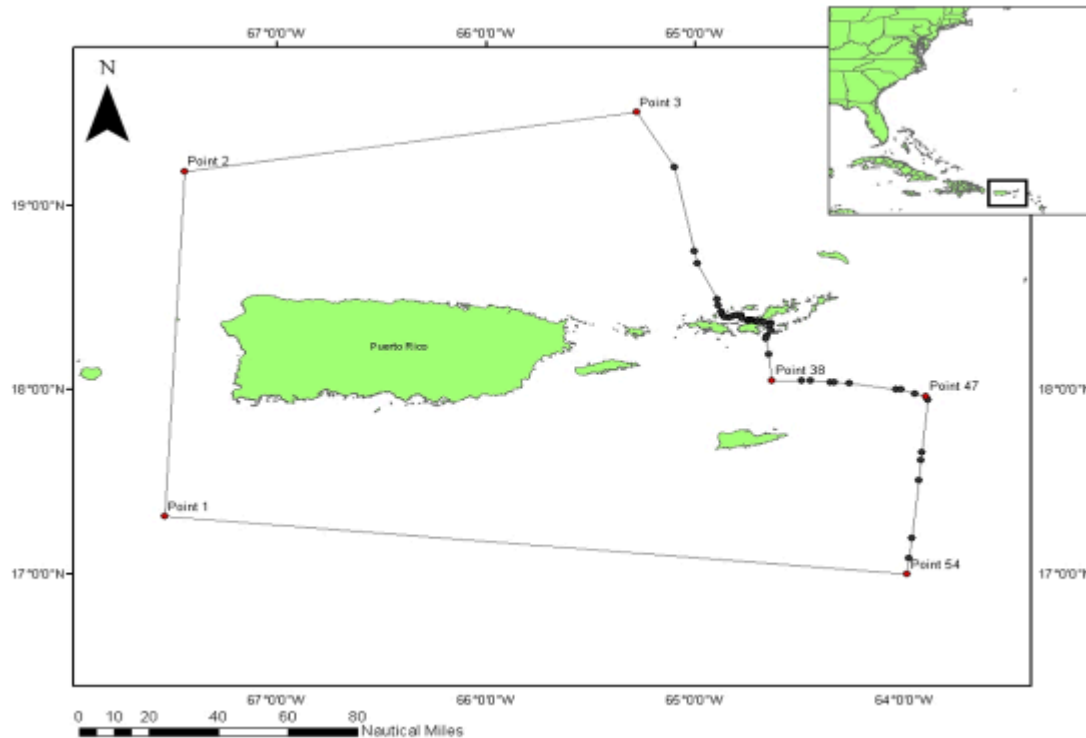


North of 48°30’N

<Coverage Map of Baltic Sea and North Sea ECA>



<Coverage Map of North American ECA>



<Coverage Map of United States Caribbean Sea ECA>

1. LOCAL AIR POLLUTION PREVENTION REGULATIONS

7.1 MARINE FUEL OIL IN USE WHILE IN PORT OF EU

(Alongside, at Anchor or in Inland waterways)

See P3

7.2 MARINE FUEL OIL IN USE CHINA, INCLUDING HONG KONG

AND TAIWAN See P1

7.3 CALIFORNIA AIR RESOURCES BOARD RULE OF CALIFORNIA

See P4

7.4 PANAMA CANAL OPERATIONAL FUELS

See P5

7.5 KOREAN AIR POLLUTION PREVENTION

See P2

8. Procedure of operation and record of fuel oil change over when entering ECA

Refer to SMS-DE-06-P1 for Written Changeover Procedures and for Risk Assessment to SMS-DE-06-F1

8.1 Before entering ECA

(a) In case of the vessel using the standard fuel oils, the Chief Engineer shall clean the following pipelines by flushing before using Low Sulfur Fuel Oil (LSFO) to prevent contamination:

- * Transfer fuel oil pipeline from storage tank to fuel oil settling tank.
- * Purifying pipeline from fuel oil settling tank to fuel oil service tank.

* Supply and Circulation pipeline of main engine and generator engine.

(b) In case of the vessel using the standard fuel oils, standard fuel oils shall be replaced to low sulfur fuel oils in advance.
Required quantity of Low Sulfur Fuel Oil for replacement

<Note>: **Quantity** and **Time** required for changeover to ULSFO/DO - as per calculation sheets in SMS-DE-06-P1

Enter ECA

Finish FO change & consume ULSFO/DO only

Start FO change using ULSFO/DO.

Change to ULSFO/DO in the pipe line

Spare time

Consume **Quantity** calculated(SMS-DE-06-P1

Time required as calculated in SMS-DE-06-P1 + Spare time

(c) The Master shall confirm the company Superintendent's acceptance of starting (date/time) of fuel oil change for adjustment of Sulfur content according to the above formula value and an appropriate procedures of "Flow chart for Fuel Oil Change" (DE-06-P2) that the calculated period of fuel oil replacement in the system for the adjustment of Sulfur content not exceeding 0.1 %".

(d) It is prohibited to conduct F.O. transfer works (e.g. Transfer work for F.O. overflow tank & waste oil tank) during the use of LSFO onboard.

8.2 After leaving ECA

Ultra Low sulfur fuel oils may be replaced to standard fuel oils after cleared out ECA.

8.3 Record Keeping of FO Changeover in ECA

The changeover operations of fuel oil in ECA are to be recorded in the Deck logbook, Engine logbook and Oil Record Book as follows:

(1) Entry into ECA: commencement & completion of changeover to Low Sulfur FO (ULFSO)

(a) Date / time and ship's position (latitude and longitude)

(b) Volume of VLSFO in each fuel storage tank condition including FO Serv / Sett. tank (identity of tank, type including sulfur content (%) & quantity of FO)

(c) FO line confirmation: time/position & FOT condition to be indicated in ORB

(2) Sailing out from ECA: commencement of changeover to Standard FO

(a) Date / time and ship's position (latitude and longitude)

(b) Volume of ULSFO in each fuel storage tank condition including FO Serv / Sett. tank (identity of tank, type including sulfur content (%) and quantity of FO)

(3) The Chief Engineer of Japanese flag vessels shall use Code I of Oil Record Book as additional operational procedures for this recording and clarify the consumption details of LSFO during stay in ECA according to the "Oil Record Book Entry", (SMS-G-07). For Panama flag vessels, entries shall be in accordance with Part III-B.3 of Panama Oil Record Book and Code I shall not be used. (The Deck and Engine Logbook entries must be synchronized with the entries in Oil Record Book)

9. Operation of Exhaust Gas Cleaning System (scrubbers)

- 1. Definitions and required documents

| | |
|--------------------------|--|
| Fuel oil combustion unit | Any engine, boiler, gas turbine, or other fuel oil fired equipment, excluding shipboard incinerators |
| EGC | Exhaust gas cleaning |
| SOX | Sulphur oxides |
| SO2 | Sulphur dioxide |
| CO2 | Carbon dioxide |
| UTC | Universal Time Co-ordinated |
| Certified Value | The SO2/CO2 ratio specified by the manufacturer that the EGC unit is certified as meeting when operating on a continuous basis on the manufacturers specified maximum fuel sulphur content |
| In situ | Sampling directly within an exhaust gas stream |
| MCR | Maximum Continuous Rating |
| Load range | Maximum rated power of diesel engine or maximum steaming rate of the boiler |
| SECP | SOX Emissions Compliance Plan |
| SECC | SOX Emissions Compliance Certificate |
| ETM-A | EGC system – Technical Manual for Scheme A |
| ETM-B | EGC system – Technical Manual for Scheme B |
| OMM | Onboard Monitoring Manual |
| EGC Record Book | A record of the EGC unit in-service operating parameters, component adjustments, maintenance and service records as appropriate |

9.2 Certification –MEPC-259(68) and SSEC(Sox Emission Compliance Certificate)

Every unit must be certified prior to or after the installation.

There are 2 system methods for verification of the compliance: **Scheme A and Scheme B**

SCHEME A – USING PARAMETER AND EMISSION CHECKS

Scheme A demands and initial certification of performance followed by only a recommendation that a daily spot check on the exhaust gas quality, in terms of SO2 (ppm)/ CO2 (%) ratio, is used to verify compliance

SCHEME B – USING CONTINUOUS MONITORING OF SOX EMISSIONS

Scheme B recommends performance confirmation by constant monitoring of emissions with daily operating parameter checks

Every unit must be certified ,as meeting the Certified Value specified by the manufacturer (e.g. the emission level the unit is capable of achieving on a continuous

basis) under the operating conditions and restrictions as given by the *EGC Technical Manual (ETM-A)* as approved by the Administration

9.3 Required EGCS Documents to be present on board

| Document | Scheme A | Scheme |
|---|----------|--------|
| | | B |
| 1. SECP (Master) | X | X |
| 1. SECC (Master) | X | |
| 1. ETM Scheme A (Ch.Eng) or | X | |
| 3. ETM Scheme B (Ch.Eng) | X | |
| 1. OMM (Ch.Eng) | X | X |
| 1. EGC Record Book or Electronic Logging System(Ch.Eng) | X | X |

The Recognized Organization, after examining above documents ,will issue a Statement/Certificate for compliance which must be kept under Masters custody.

All above documents are required to be kept under **Custody of Master/Ch.engineer in a dedicated Folder,clearly marked “EGCS compliance Documents”**.

Note: SECP- is very important document, stating the ships machinery included in EGCS and limitations of its usage .

Normally the Incinerator ,Aux boiler, EDG are not included in the EGCS

9.4 General procedures for operation of EGCS

1. Jurisdiction of compliance for operation of EGCS

EGCS operation as alternative means of compliance is allowed by MARPOL VI/Reg.4.1, instead of using compliant Fuel, which is the primary rule.

Generally, the Flag state is the Party, declaring the Compliance of the Vessel with MARPOL VI Regs in the open sea, beyond Territorial sea of the coastal state -12nm and 24-nm for State of California under CARB Rule.

In the territorial sea, ports and inland waters, coastal state is the responsible Party for Compliance with MARPOL VI. Therefore any malfunction of the EGCS must be reported immediately to the coastal state as well.(See 14.6)

2 . Presently Company is managing vessels with 2 types of EGCS:

- 1. Hybrid- (Open and closed loop type) –under present regulations can be operated in deep sea(open loop) and in the ports(closed loop) , where there are no local port restrictions.
- 2. Open Loop Type only

Operation of EGCS must be according Manufacturer’s manual, OMM, and ETM-A or B.

Guidelines as sample for operation of Hybrid type EGCS are outlined in **SMS-C-06-I3**

Hybrid system in Open loop type mode can produce SOx emissions , when using FO with max Sulphur content 3.5% or less , equivalent to usage of compliant **FO with max 0.50%** Sulphur content and in **Closed loop type**-equivalent of **0.1% for SECA areas**.

Master and Ch. Engineer and all officers are required to know the ETM parameters and **areas of utilization of EGCS**. All must pass specific Familiarization training on joining the vessel.

When the system can not produce the required compliance due to its limitations or due to malfunction, a compliant FO must be used for operating in the global/SDECA areas(0.50% or 0.10%) .

Additionally, it is important to notice that some local regulations are **banning open loop EGCS operation and /or discharge of washwater in port**, which is same as ban on the operation of the open Loop EGCS.

In such cases Master has to obtain information from local agent and confirm the EGCS operation with Company and the Operator, in order to confirm whether the operation is permitted.

In addition Master can check the local regulations on the following web map:

<https://www.egcsa.com/map-regulations/>

Voyage planning should be coordinated with the MSI and Operator and points of Start/Stop of EGCS must be confirmed in advance.

9.5 Recording

Normally EGCS is performing automatic recording and monitoring. When this is not possible, due to malfunction, the EGC Record book must be used.

Weekly report generated by the system must be kept on board , stored in ER PC for period of 3 years.

Change of operation mode of Scrubber must also be recorded

9.6 Reporting and malfunction of EGCS

Every malfunction of EGCS, apart of the System Electronic log ,must be reported to the Company , using Deficiency reporting Form –G-03-F3.

Attached to the Report must be Weekly report printout from system log.

IMO has developed guidelines for this malfunctions, [MEPC.1/Circ.883](#)(Reg4Ships).

A malfunction which can't be rectified is considered an accidental breakdown.

The ship should then switch to compliant fuel if the scrubber **can't be repaired within one hour**.

In case the vessel doesn't have compliant fuel or sufficient amount of compliant fuel on board, a proposed course of action, in order to bunker compliant fuel, or carry out repair works, should be communicated to relevant authorities including the ship's administration, for their agreement. The Company , the Flag and Port States will determine the appropriate action to be taken.

9.7 Procedures for EGCS Washwater management

Washwater generated from operation of open loop EGCS in ports, rivers, estuaries, where allowed by Coastal state ,**must be continuously monitored**.

In USA waters, washwater discharge is regulated by VGP(VIDA). Requirements of VGP(VIDA) for pH are more stringent than the IMO MARPOL.

Also some states are prohibiting washwater discharge in the ports. VGP area of coverage is 3 nm from the shoreline.

If the EGCS is to be used in VGP/VIDA waters, a sampling analysis of the discharged water is required.

Washwater residues generated by the system operation shall be discharged ashore , to shore reception facilities . These residues shall be appropriately packed .

Record shall be made in EGC Log(14.3.5) to include Date/Time/Location of the discharge

9.8 Risk Assessment

EGCS due to its purpose ,Location and type of operation, can generate multiple risks for the vessel and crew. Malfunctions/failures may result in flooding of ER, water in exhaust piping of the machinery and High temperatures ,back pressure and use of chemicals can present significant risk to human safety and health.

Assessment is generated in DE-06-R2

The EGCS failure, can also create additional Risks and damages to the Environment, if the vessel is not prepared for proper actions in such cases.

DE-06-R3 must be used for reference during Voyage Planning by Master , for preparation in advance, to a cases of EGCS failure throughout the Voyage.

9.9 Training

All engine officers are required to pass Shipboard specific familiarization on joining the vessel.

All engine crew members are required to be briefed on Risk assessment before any maintenance work on EGCS.

All deck officers are required to be familiar with area of operation limitations of the EGCS.

EGCS troubleshooter charts must be posted in ECR for quick reference and decision making.

10. Attached:

| Title | Ref.No. | Rev.No | Date | Details of Revision |
|--|---------|--------|---------------|--|
| P1 China, Hong Kong, Taiwan | C-06-P1 | 5.00 | 01-Oct-2020 | |
| P2 Korean Air pollution | C-06-P2 | 5.00 | 01-Oct-2020 | |
| P3 European port pollution regulations | C-06-P3 | 5.00 | 01-Oct-2020 | |
| P4 CARB Regulations | C-06-P4 | 5.00 | 01-Oct-2020 | |
| | | 5.01 | 11-March-2021 | Newly created Inserted 2.1 |
| | | 5.02 | 01-Aug-2023 | Corrected Footer |
| P5 Panama canal operational fuels | C-06-P5 | 5.00 | 01-Oct-2020 | |
| | | 5.01 | 01-June-2021 | Corrected footer |
| P6 ECA Reference guide | C-06-P6 | 5.00 | 01-Oct-2020 | |
| | | 5.01 | May 1,2021 | Added China Coastal,Inland ECA,Hainan, |
| | | 5.02 | Dec 1, 2024 | Renamed to ECA,add MEPC 1 Circ 778R4 |
| | | 5.03 | Jan 31, 2025 | Add Mediterranean sea |
| P7 FO Sampling procedures | C-06-P7 | 5.01 | 01-March-2023 | Newly created |
| P8 EU Regulations | C-06-P8 | 5.01 | 01-Dec-2024 | Newly added |
| P9 Mediterranean Sea SECA | C-06-P9 | 5.01 | 31 Jan 2025 | MEPC.361(79) |

Procedure(P)

Risk Assessment(R) See 14.8 and In SMS-DE-06

NIL

Forms(F)

| Title | Ref.No. | Rev.No | Date | Details of Revision |
|--------------------------------|---------|--------|-------------|---------------------|
| F1 FONAR | C-06-F1 | 5.00 | 01-Oct-2020 | |
| | | 5.01 | 01-Dec-2024 | Corrected footer |
| F2 Receipt for retained sample | C-06-F2 | 5.00 | 01-Oct-2020 | |

Instructions(I)

| Subject(a-z) | Title | Number |
|---------------------|---|-----------------|
| CARB | Present and Future | INF-20-007 |
| CARB | ECM Circular on CARB and EGCS in California | ECM-2-2020 |
| CARB | Fuel regulations | INF-14-052 |
| CARB | Establishment of CARB regulations | TNKC-09-038 |
| CHINA ECA | New boundaries | KRBS-18-034 |
| CHINA ECA | ECA updates | KRBS-18-030 |
| CHINA ECA | Earlier implementation | KRBS-18-025 |
| Domestic | Domestic Regs as of 2023(by KL) | |
| IMO new ECA | Canadian Arctic and Norwegian sea-2026-NK TEC -1344 | 2026 |
| Singapore | MPA Spore- GPP | |
| EGCS | Australia- MN12 | |
| EGCS | Ban in ports worldwide NORTH circular | 11-11-2021 |
| EGCS | IMO Guidelines on EGCS | MEPC-259-68 |
| EGCS | Japan MLIT on open loop EGCS | 19/2-2019 |
| EU LSF | EU regulations for ships at Berth and anchor revised | TNKC-17-023 |
| EU MRV | IMO DCS | KRBS-21-013 |
| FO Sample | MARPOL VI-MEPC 1./Circ.864-Representative sample | KRBS-19-032 |
| FO Sample | Guidelines for FO sampling- FO intended to be used sampling | MEPC.1/Circ 889 |
| FO sample | Guidelines for FO sampling procedures Part 1 and II | MEPC.324(75) |
| FO Sample | USCG Voluntary FO sampling | INF-16-008 |
| MARPOL VI | North America ECA | TNKC-11-010 |
| MARPOL VI | Revision entry into force | TNKC-10-011 |
| KOREA | SOx emissions | KRBS-20-023 |
| Singapore | Black Smoke | INF-18-014 |