



GUIDE FOR

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**THE ENVIRONMENTAL PROTECTION NOTATIONS FOR  
VESSELS  
JANUARY 2021**

American Bureau of Shipping  
Incorporated by Act of Legislature of  
the State of New York 1862

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## Foreword (2021)

This Guide supersedes the *ABS Guide for the Class Notation Environmental Safety (ES)*, March 2001 (Updated January 2019). Those vessels which currently have an **ES Notation** will continue to be eligible to maintain the **ES Notation**, provided the requirements contained within the *ES Guide* continue to be satisfied.

The **ENVIRO** or the **ENVIRO+ Notations** are available to vessels contracted for construction after the effective date of this Guide and those existing vessels which currently maintain the **ES Notation** provided the requirements contained in this Guide are satisfied.

The June 2020 update introduces the Low Emissions Vessel (**LEV**) **Notation** and the **Notation** is available to vessels contracted for construction after the effective date of this Guide and existing vessels provided that the requirements contained in Section 4 of this guide are satisfied.

The June 2020 update also introduces the **NOx-Tier III Notation** that may be assigned to vessels that have marine diesel engines installed that comply with the requirements of MARPOL Annex VI Regulation 13 and the **Notation** is available to vessels provided the requirements contained in Section 2/37 of this guide are satisfied.

The January 2021 update introduces **EEDI-Ph3** **Notation** that may be assigned to ships that comply with the requirements in Section 5 of this Guide.

The “**LEV**”, “**NOx Tier III**” and “**EEDI-Ph3**” **Notations** are stand-alone **Notations** and do not require compliance with any other “**Enviro Notations**”.

The effective date of this Guide is the first day of the month of publication.

Users are advised to check periodically on the ABS website [www.eagle.org](http://www.eagle.org) to verify that this version of this Guide is the most current.

*We welcome your feedback. Comments or suggestions can be sent electronically by email to [rsd@eagle.org](mailto:rsd@eagle.org).*



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## SECTION 1 General

### 1 Introduction (2021)

Since the introduction of the ABS Guide for the Class Notation Environmental Safety (ES) in March 2001, technological advancements have occurred that help to diminish the impact of environmental discharges. Also, international treaties and conventions, aimed at further protecting the environment, have introduced more stringent requirements towards the prevention of environmental pollution.

This Guide has been developed with the objective of promoting an environmentally focused design, construction, and operation of ABS-classed vessels. The requirements specified in this Guide are additional to all other relevant requirements of ABS Rules and Guides. This Guide identifies a foundational level which establishes that a vessel complies with international environmental regulations and associated ABS Rules or Guides which are aimed at enhancing environmental protection. In addition, it establishes standards for a higher level of environmental protection that can be achieved through compliance with more stringent criteria related to design characteristics, management and support systems, sea discharges, and air discharges.

This Guide is for the use of designers, builders, Owners, and Operators in the marine industry and specifies the ABS requirements and criteria for obtaining the optional notations Environmental Protection (**ENVIRO**) in Section 2, Environmental Protection Plus (**ENVIRO+**) in Sections 3, Low Emissions Vessel (**LEV**) in Section 4, **NOx-Tier III** Notation in Subsection 2/37 and **EEDI-Ph3** Notation in Section 5 of this Guide.

The **ENVIRO** Notation identifies the level of compliance with international environmental protection requirements and integrates associated ABS requirements which influence environmental protection. For the **ENVIRO+** Notation, this Guide invokes compliance with more stringent criteria for environmental protection related to design characteristics, management and support systems, sea discharges, and air discharges.

The optional Notation **LEV** recognizes that the specified marine diesel engines on the vessel meet stricter gaseous and particulate emissions limits than those regulated by MARPOL Annex VI.

The **NOx-Tier III** Notation identifies that all marine diesel engines on the vessel are in compliance with the Tier III NO<sub>x</sub> limits of Regulation 13 of Annex VI of MARPOL 73/78, as outlined in Subsection 2/37 of this Guide.

The **EEDI-Ph3** Notation indicates that the verified attained EEDI of a ship is less than or equal to the required EEDI value for EEDI Phase 3 determined in accordance with MARPOL Annex VI, Regulation 21 as amended by MEPC.324(75).

### 3 Basis of Notations

In general, the requirements of this Guide are based on applicable international regulations and standards. If an international regulation or standard has been adopted by its oversight authority (regardless of the status of the ratification process), it is applicable to the appropriate notations of this Guide.

Where a flag or port Administration or local governmental authority has additional requirements related to environmental protection that are not addressed by this Guide, it is the responsibility of the Owner or Operator to comply with such regulations.

### 3.1 ENVIRO Notation (1 June 2020)

Compliance with the applicable requirements of Annexes I, II, IV, V, and VI to the International Convention for the Prevention of Pollution from Ships, MARPOL 73/78, as amended, is a prerequisite for receiving the class notation **ENVIRO**. See Section 2 of this Guide for additional requirements.

### 3.3 ENVIRO+ Notation (1 June 2020)

Compliance with applicable requirements of the **ENVIRO** notation is a prerequisite for receiving the class notation **ENVIRO+**. See Section 3 of this Guide for additional requirements.

### 3.5 LEV Notation (1 June 2020)

The optional notation **LEV** recognizes that the specified internal combustion engines installed on a vessel meet stricter gaseous and particulate pollutant limits than regulated by MARPOL Annex VI. The **LEV** notation recognizes that engine emissions meet the corresponding levels for engine size, power and application regulated by other regional, national or local regulatory instruments, for example EU, for equivalent marine, heavy duty or non-road mobile machinery applications. The benchmark emissions limits for **LEV** notation are EU Tier V, for example EU Regulation 2016/1628. Assignment of the **LEV** notation is strictly voluntary and does not confer compliance, certification, Type Approval or any other form of formal documentation of regulatory compliance with other regulatory instruments. See Section 4 of this Guide for detailed requirements.

### 3.7 NOx -Tier III Notation (1 June 2020)

The notation **NOx-Tier III** indicates that all marine diesel engines with power output greater than 130 kW, other than those exempted as per Para 1.2 of Regulation 13 of Annex VI of the MARPOL 73/78 Regulations, as applicable, have been certified for compliance with Para 5.1 of Regulation 13 of Annex VI of MARPOL 73/78, and provided with an approved NOx Technical File and Engine International Air Pollution (EIAPP) certification. Engines using Selective Catalytic Reduction (SCR) or Exhaust Gas Recirculation (EGR) equipment to meet the Tier III NOx limits, and which have not applied the applicable optional notations of the *ABS Guide for Exhaust Emissions Abatement (ABS EEA Guide)*, are to comply with the minimum requirements of that guide, as prescribed in Subsection 1/15 Table 1 of the *ABS EEA Guide*, for assignment of the NOx-Tier III notation. See also Subsection 2/37 of this Guide.

### 3.9 EEDI-Ph3 Notation (2021)

The optional class Notation **EEDI-Ph3** indicates that a ship whose verified attained EEDI value is less than or equal to the required value for EEDI Phase 3 in MARPOL Annex VI, Regulation 21 as amended by IMO Resolution MEPC.324(75).

## 5 Definitions (1 June 2020)

*Active Substance* – a substance or organism, including a virus or a fungus, that has a general or specific action on or against harmful aquatic organisms and pathogens.

*Anti-Fouling System* – a coating, paint, surface treatment, surface, or device used to control or prevent attachment of unwanted organisms.

*Approved Method* – an engine retrofit kit released by the engine designer, which is restricted to large marine engines at or above 90 liters/cylinder with a total engine power of more than 5,000kW and installed on vessels with a keel laying between 1 January 1990 and 31 December 1999, and which is certified by an Administration to regulation 13.7 of MARPOL Annex VI.

*Ballast Water* – water, with its suspended matter, taken onboard to control trim, list, draft, stability, or stresses.

*Ballast Water Management* – mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments.

*Domestic Wastewater (Grey Water)* – non-industrial drainage from dish washing, laundry or bathing, or any waste water generated in the living spaces that does not contain sewage.

*ECA* -Emission control areas as defined in Regulations 13 & 14 of Annex VI of the MARPOL 73/78

*Food Wastes* – any spoiled or unspoiled victual substances such as fruits, vegetables, dairy products, poultry, meat products, food scraps, food particles, and all other materials contaminated by such wastes, generated onboard, principally in the galley and dining areas.

*Garbage* – all kinds of victual, domestic and operational waste, excluding fresh fish and parts thereof, generated during the normal operation of a vessel and liable to be disposed of continuously or periodically. Excluding Annex V, garbage does not consist of those substances which are defined or listed in other MARPOL Annexes.

*Gaseous pollutants* – the following pollutants in their gaseous state emitted by an engine: carbon monoxide (CO), total hydrocarbons (HC or THC), and oxides of nitrogen (NO<sub>x</sub>); NO<sub>x</sub> being nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>), expressed as NO<sub>2</sub> equivalent.

*Particulate Matter* – the mass of any material in the exhaust gas emitted by an engine that is collected on a specified filter medium after diluting the gas with clean filtered air so that the temperature does not exceed 325 K (52°C).

*Particle Number* – the number of solid particles emitted by an engine with a diameter greater than 23 nm.

*Refrigerant Systems* – includes cargo refrigeration plants and systems, non-cargo refrigeration plants and systems, and centralized air conditioning systems.

*Sediments* – matter settled out of onboard ballast water.

*Sewage (Black Water)* –

- i) Drainage and other wastes from any form of toilets and urinals
- ii) Drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs, and scuppers located in such premises
- iii) Drainage from spaces containing living animals
- iv) Other waste waters when mixed with the drainages defined in i) through iii)

## 7 Abbreviations (2021)

ACC: Automatic Centralized Control (ABS notation)

ACCU: Automatic Centralized Control Unmanned (ABS notation)

AFS: Anti-Fouling System

BMEP: Brake Mean Effective Pressure

BWM: Ballast Water Management

CFC: Chlorofluorocarbons

CFR: Code of Federal Regulations (USA)

CO: Carbon Monoxide

COW: Crude Oil Washing



DPF: Diesel Particulate Filter

ECA: Emission Control Area

**EEDI: Energy Efficiency Design Index**

EGR: Exhaust Gas Recirculation

EIAPP: Engine International Air Pollution Prevention

FONAR: Fuel Oil Non-Availability Reporting

GWP: Global Warming Potential (based on a 100-year time horizon)

HC: Hydrocarbon

HCFC: Hydro-chlorofluorocarbons

IACS: International Association of Classification Societies

IAPPC: International Air Pollution Prevention Certificate

IHM: Inventory of Hazardous Materials (ABS notation)

IMO: International Maritime Organization

IOPPC: International Oil Pollution Prevention Certificate

ISM Code: International Safety Management Code

MARPOL: International Convention for the Prevention of Pollution from Ships

MEPC: Marine Environmental Protection Committee (IMO)

MSC: Maritime Safety Committee (IMO)

NBLES: Navigational Bridge Layout and Equipment/Systems (ABS notation)

NLS: Noxious liquid substances

NO: Nitric Oxide

NO<sub>2</sub>: Nitrogen Dioxide

NO<sub>x</sub>: Nitrogen Oxides

ODS: Ozone Depleting Substances

PM: Particulate Matter

PN: Particle Number

POT: Protection of Fuel and Lubricating Oil Tanks (ABS notation)

ppm: Parts per Million

SCR: Selective Catalytic Reduction

SOx: Sulfur Oxides

THC Total Hydrocarbon

UNEP: United Nations Environment Program

USCG: United States Coast Guard

VEC: Vapor Emission Control (ABS notation)

VOCs: Volatile Organic Compounds

## 9 References

The following international standards, guidelines, and recommendations were considered in developing this Guide:

### 9.1 IMO Resolutions and other Regulations (2021)

- *IMO MARPOL 73/78 Annex I – Regulations for the Prevention of Pollution by Oil*
- *IMO MARPOL 73/78 Annex II – Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk*
- *IMO MARPOL 73/78 Annex IV – Regulations for the Prevention of Pollution by Sewage from Ships*
- *IMO MARPOL 73/78 Annex V – Regulations for the Prevention of Pollution by Garbage from Ships*
- *IMO MARPOL 73/78 Annex VI – Regulations for the Prevention of Air Pollution from Ships, IMO Resolution MEPC. 176(58)*
- *Ammendments to MARPOL Annex VI (Procedures for Sampling and Verification of the Sulphur Content of Fuel Oil and the EEDI – IMO Resolution MEPC. 324(75))*
- *Regulation (EU) 2016/1628 of the European Parliament and of the council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road type machinery (the Regulation 2016/1628)*
- *Commission Delegated Regulation (EU) 2017/654 of 19 December 2016 supplementing Regulation (EU) 2016/1628 of the European Parliament and of the Council with regard to technical and general requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery (the Regulation 2017/654)*
- *Commission Implementing Regulation (EU) 2017/656 of 19 December 2016 laying down the administrative requirements relating to emission limits and type-approval of internal combustion engines for non-road mobile machinery in accordance with Regulation (EU) 2016/1628 of the European Parliament and of the Council (the Regulation 2017/656)*

### 9.3 Other Conventions and Guidelines (1 June 2020)

*Anti-Fouling Systems* – IMO International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 (AFS Convention) and associated Conference resolutions

*Ballast Water* – International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention), IMO BWM/CONF/36 and associated Guidelines

*Cargo Vapor Emission Control* – IMO MSC/Circ. 585 Standard for Vapor Emission Control Systems or USCG Title 46 CFR Part 39 Vapor Control System (See 5C-1-7/21 of the *ABS Rules for Building and Classing Marine Vessels*)

*Diesel Engine Exhaust NO<sub>x</sub> Content* – Technical Code on Control Emission of Nitrogen Oxides from Marine Diesel Engines (NO<sub>x</sub> Technical Code, 2008), IMO Resolution MEPC.177(58) as amended

*Exhaust Gas Cleaning Systems* – IMO Resolution MEPC.184(59) and 259(68) as amended, Guidelines for Exhaust Gas Cleaning Systems

*EGR*-IMO Resolution MEPC.307(73), 2018 Guidelines for the Discharge of Exhaust Gas Recirculation (EGR) Bleed-Off Water

*Fuel Oil Management* - IMO Circular MEPC.1/Circ.878 “Guidance on the Development of a Ship Implementation Plan for the Consistent Implementation of the 0.5% Sulphur limit under MARPOL Annex VI”

*Garbage Management* – IMO MEPC Circular 317 Guidelines for the Development of Garbage Management Plans

*Refrigerants and Fire-fighting Gases* – UNEP The Montreal Protocol on Substances that Deplete the Ozone Layer

*Safety Management* – IMO Resolution A.741(18) International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code)

*Selective Catalytic Reduction* – 2017 Guidelines Addressing Additional Aspects of the NO<sub>x</sub> Technical Code 2008 with Regard to Particular Requirements Related to Marine Diesel Engines Fitted with Selective Catalytic Reduction (SCR) Systems, as amended by MEPC.313(74)

*Sewage Treatment Plants* – IMO Resolution MEPC.159(55) Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants

*Shipboard Incinerators* – IMO Resolution MEPC 244(66) as amended, Standard Specification for Shipboard Incinerators



## SECTION 2 **ENVIRO and NOx Tier III Notations** (1 June 2020)

### 1 **Scope and Application** (1 June 2020)

Vessels designed, constructed, and operated in compliance with the foundational requirements of this Section may be assigned the class notation **ENVIRO**, Environmental Protection. Vessels in compliance with higher level requirements of Section 3 may be assigned the class notation **ENVIRO+**, Environmental Protection Plus.

### 3 **Certification and Documentation** (1 June 2020)

The following certification and documentation are required, as applicable, to receive the Environmental Protection, **ENVIRO**, notation:

- i) Documentation verifying compliance with the ABS requirements for the class notation **ACC** or **ACCU** (See 2/9.1)
- ii) Safety Management Certificate in accordance with the International Safety Management Code (ISM Code)
- iii) Documentation verifying a contract with the ABS Rapid Response Damage Assessment (RRDA) program, or with a similar program of another IACS Member Society
- iv) International Oil Pollution Prevention Certificate (IOPPC)
- v) International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate)
- vi) Certification for the sewage system, and where fitted, sewage treatment plant, in accordance with MARPOL 73/78 Annex IV or equivalent marine sanitation device of USCG regulations Title 33 CFR Part 159
- vii) Documentation verifying compliance with the requirements in Annex V of MARPOL 73/78, Regulations for the prevention of pollution by garbage from ships.
- viii) Documentation verifying compliance with the requirements in the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004
- ix) International Anti-Fouling System Certificate
- x) Declaration on Anti-Fouling System
- xi) International Air Pollution Prevention Certificate (IAPPC), or a statement indicating equivalent compliance by responsible organization in accordance with the Annex VI of MARPOL 73/78
- xii) Incinerator type approval certificate in accordance with IMO Resolution MEPC.244(66), Amendments to the Standard Specification for Shipboard Incinerators.

### 5 **Operational Procedures**

#### 5.1 **Documents to be Submitted for Review** (1 June 2020)

The following documents are to be submitted for review:

- i) Bilge water management plan
- ii) Sewage management plan

- iii) Garbage management plan
- iv) Ballast water management plan
- v) Fuel oil management for control of the SO<sub>x</sub> emission, including fueling management plan and procedure
- vi) Refrigerant systems management plan

### 5.3 Documents to be Furnished Onboard (1 June 2020)

The following documents are to be furnished onboard:

- i) Instructions and procedures addressing operation and control of NO<sub>x</sub> exhaust gas cleaning systems
- ii) Instructions and procedures addressing operation and control of SO<sub>x</sub> exhaust gas cleaning systems

## 7 Plans and Additional Information (1 June 2020)

One set of the stamped copies of the following plans and information is to be placed onboard the vessel for the Operator's use and for presentation to the ABS Surveyor at appropriate surveys.

### 7.1 ENVIRO Notation

The following plans or information are to be submitted for approval, review or reference, as appropriate:

- i) Fuel oil storage, settling and service tanks arrangement, including overfilling prevention arrangement
- ii) Arrangement for cargo and non-cargo loading and discharge facilities, including connections, spill trays and drainage systems
- iii) For tank vessels, cargo and ballast tanks arrangement, including piping systems and cargo overfilling prevention
- iv) Details and diagrams of sewage system, including processing equipment
- v) List of equipment and arrangements for the handling/stowage of garbage
- vi) For all vessels, diagrammatic details of ballast system, including details of water treatment, if applicable
- vii) Details of hull coating system, including anti-fouling coating specification
- viii) Details of NO<sub>x</sub> control and measurement procedures
- ix) Diagrammatic details of fuel oil system, including details of SO<sub>x</sub> control
- x) Diagrammatic details of permanent refrigerant system
- xi) Details of fire extinguishing media used in vessel's fixed fire fighting systems and extinguishers

## 9 Design Characteristics (1 June 2020)

This Subsection addresses the fundamental design characteristics and shipboard operations which are aimed at reducing the potential adverse effects on the environment.

Vessels are to comply with the following fundamental characteristics, as applicable:

### 9.1 Propulsion Plant Automation (1 June 2020)

The monitoring and control of a propulsion plant is to comply with the ABS requirements for the class notation **ACC** or **ACCU**.

The requirements for the **ACC** or **ACCU** notation are specified in 4-9-1/3.1 and 4-9-1/3.3 of the *Maine Vessel Rules*, respectively.

## 11 Management and Support Systems (1 June 2020)

The management practices and systems required to receive the **ENVIRO** notation are presented in this Subsection.

### 11.1 Environmental Officer

An Environmental Officer is to be assigned onboard any vessel receiving the **ENVIRO** notation. This individual is responsible for the administration of the onboard environmental program which includes, but is not limited to:

- i) Compliance with current IMO environmental regulations
- ii) Implementation of relevant procedures associated with this Guide and the IMO environmental regulations
- iii) Upkeep of relevant logs and records
- iv) Training of personnel in relevant environmental practices

### 11.3 Safety and Environmental Management

Vessels are to comply with the requirements of the International Safety Management Code (ISM Code).

### 11.5 Support Systems - Rapid Response Damage Assessment Program

For vessels 500 gross tons and over, an approved contract is to be implemented with the ABS RRDA program, or with a similar program of another IACS Member Society.

For offshore support vessels in length 100 m (328 feet) and below, the ABS RRDA program or a similar program of another IACS Member Society is not required.

## 13 Sea Discharge - Oil (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects on the sea environment by oil discharges from vessels.

### 13.1 Machinery Spaces

Vessels are to hold and maintain a valid IOPP Certificate with Form A in accordance with the requirements of MARPOL Annex I.

In addition, vessels are to comply with the requirements of 2/13.1.1 through 2/13.1.5.

#### 13.1.1 Protection of Fuel Oil Tanks (1 June 2020)

Arrangements of fuel oil tanks are to comply with 4-6-4/17.1 and 4-6-4/17.3 of the *Marine Vessel Rules*.

#### 13.1.2 High Level Alarms

All fuel oil tanks are to be fitted with an alarm to warn of the level reaching a predetermined high level.

#### 13.1.3 Oily Water Separator

Oily Water Separator for machinery spaces is to be provided with alarm arrangements to indicate when the oil content of the effluent exceeds 15 ppm. In addition, automatic stopping arrangements

are to be provided for any discharge of oily mixtures when the oil content in the effluent exceeds 15 ppm.

#### 13.1.4 Sludge Tank

The total capacity of sludge tanks is to meet the criteria specified in MARPOL Annex I, Unified Interpretations 16.1 and 16.2, as applicable, based on the maximum period of voyage between ports where sludge can be discharged ashore, daily fuel oil consumption, homogenizers or sludge incinerators installed, and fuel purification.

#### 13.1.5 Collecting Trays

Collecting trays with capacities of at least the following are to be fitted under all vents for fuel oil tanks, lubricating oil tanks, other oil tanks (e.g., hydraulic oil) and overflow tanks, and filling manifolds:

- i) 0.02 m<sup>3</sup> (0.70 ft<sup>3</sup>) for vessels of less than 300 gross tons
- ii) 0.06 m<sup>3</sup> (2.11 ft<sup>3</sup>) for vessels of 300 or more but less than 1,600 gross tons
- iii) 0.12 m<sup>3</sup> (4.21 ft<sup>3</sup>) for vessels 1,600 gross tons or more

In addition, collecting trays are to be provided with means for the disposal of any drainage without discharging it into the sea.

### 13.3 Cargo Area

Vessels designed or adapted to carry a cargo of oil and/or oil product in bulk are to hold and maintain a valid IOPP Certificate with Form B in accordance with the requirements of MARPOL Annex I.

In addition, these vessels are to comply with the requirements of 2/13.1 through 2/13.1.5 and 2/13.3.1 through 2/13.3.4. of this Guide.

#### 13.3.1 Tank Overfill Protection (1 June 2020)

Cargo oil tanks are to be fitted with tank overfill protection in accordance with 5C-1-7/21.15 of the *Marine Vessel Rules*.

#### 13.3.2 Cargo Deck

The cargo deck area is to be fitted with means and arrangements to reduce the likelihood of a cargo spill on deck reaching the sea in accordance with 2/15.3 of this Guide.

#### 13.3.3 Ballast Arrangements (1 June 2020)

Ballast systems serving segregated ballast tanks are to be independent of similar equipment serving cargo oil tanks and of cargo tanks themselves in accordance with 5C-1-7/5.3.2(a) of the *Marine Vessel Rules*.

#### 13.3.4 Crude Oil Washing (COW) Systems (1 June 2020)

Crude oil washing systems are to comply with 5C-1-7/3.3.4(e) of the *Marine Vessel Rules*.

## 15 Sea Discharge - Noxious Liquid Substances (1 June 2020)

This Subsection addresses requirements aimed towards the prevention of pollution to the sea environment by noxious liquid substances (NLS) discharges from vessels.

Vessels designed or adapted to carry a cargo of NLS in bulk are to hold and maintain a valid NLS Certificate [see 2/1.1v)] in accordance with the requirements of MARPOL Annex II.

In addition, these vessels are to comply with the requirements of 2/15.1 through 2/15.5 of this Guide.

### 15.1 Gauging Systems (1 June 2020)

Chemical cargo tanks are to be fitted with restricted gauging systems unless a closed type system is required by Section 5C-9-17 of the *Marine Vessel Rules*. Restricted gauging systems are to be in compliance with 5C-9-13/1 of the *Marine Vessel Rules*.

### 15.3 Cargo Deck (1 June 2020)

The cargo deck area is to be fitted with means and arrangements to reduce the likelihood of a cargo spill on deck reaching the sea. These means and arrangements are to include, as a minimum but not be limited to, the following:

- i) Collecting trays with capacities of at least the following are to be fitted under cargo loading manifolds or transfer connections:
- 0.06 m<sup>3</sup> (2.11 ft<sup>3</sup>) for loading hoses or arms with inside diameters of 50 mm (2 in.) or less
  - 0.12 m<sup>3</sup> (4.21 ft<sup>3</sup>) for loading hoses or arms with inside diameters of more than 50 mm (2 in.) but less than 100 mm (4 in.)
  - 0.24 m<sup>3</sup> (8.42 ft<sup>3</sup>) for loading hoses or arms with inside diameters of 100 mm (4 in.) or more but less than 150 mm (6 in.)
  - 0.36 m<sup>3</sup> (12.63 ft<sup>3</sup>) for loading hoses or arms with inside diameters of 150 mm (6 in.) or more but less than 300 mm (12 in.)
  - 0.48 m<sup>3</sup> (16.84 ft<sup>3</sup>) for loading hoses or arms with inside diameters of 300 mm (12 in.) or more

In addition, collecting trays are to be provided with means for the disposal of any drainage without discharging it into the sea.

- ii) Continuous coamings are to be fitted on deck in accordance with 5C-9-3/7.7 and 5C-9-3/7.7 (IMO) of the *Marine Vessel Rules*. In addition, the deck drainage system is to be provided with means for the disposal of any cargo drainage without discharging it into the sea.

### 15.5 Ballast Arrangements (1 June 2020)

Pumps and ballast systems serving permanent ballast tanks are to be independent of similar equipment serving chemical cargo tanks and of cargo tanks themselves in accordance with 5C-9-3/5.1, 5C-9-3/5.1 (IMO), and 5C-9-3/5.1 (ABS) of the *Marine Vessel Rules*.

## 17 Sea Discharge - Sewage (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects on the sea environment by sewage discharges from vessels.

Vessels are to hold and maintain a valid International Sewage Pollution Prevention Certificate in accordance with the requirements of MARPOL Annex IV.

In addition, vessels are to comply with the requirements of 2/17.1 through 2/17.5.

### 17.1 Sewage Treatment (1 June 2020)

As specified in MARPOL Annex IV, Regulation 9, a sewage comminuting and disinfecting system is to be provided and type-approved by the Flag Administration. Alternatively, an appropriately sized sewage holding tank is to be provided in accordance with Regulation 9.

Where installed, a sewage treatment plant is to comply with MARPOL Annex IV under the guidelines specified in IMO Resolution MEPC.2(VI) for plants installed before 1 January 2010, IMO Resolution MEPC.159(55) for plants installed on or after 1 January 2010, IMO Resolution MEPC.227(64) for plants installed on or after 1 January 2016, or equivalent marine sanitation device of USCG regulations Title 33 CFR Part 159. (Refer to USCG NVIC 9-82, change 1 and NVIC 1-09, as appropriate.)



### 17.3 Piping Arrangement

A suitable discharge pipeline is to be provided which leads to the exterior of the vessel and can be fitted with a standard shore connection, as specified in MARPOL Annex IV, Regulation 10.

### 17.5 Sewage Management Plan (1 June 2020)

A sewage management plan is to be placed onboard for the guidance of the operating personnel. This plan is to give clear guidance to the crew about the sewage system and is to include, as a minimum:

- i) Vessel Name and Class Number
- ii) Simplified diagrams and component description of the sewage system
- iii) Step-by-step instructions for the operation and management of the sewage system
- iv) Methods and means of recording all sewage discharges, whether to sea or to any reception facility. The recorded data shall include, as a minimum, date of discharge; quantity of sewage discharge; location and type of reception facility; and for sea discharges, the distance to the nearest land and the vessel's speed.

The sewage management plan is to be submitted for review by the Bureau to verify the presence of the above information, which is to be consistent with the design information and limitations considered in the classification of the vessel. The Bureau is not responsible for the operation of the sewage system.

## 19 Sea Discharge - Garbage (1 June 2020)

This Subsection addresses requirements aimed towards the prevention of pollution to the sea environment by garbage discharges from vessels.

Vessels are to comply with the requirements of MARPOL Annex V, Regulations for the Prevention of Pollution by Garbage from Ships and the requirements of 2/19.1 below.

### 19.1 Garbage Management Plan (1 June 2020)

A garbage management plan is to be placed onboard for the guidance of the crew. This plan is to be in accordance with MEPC/Circular 317, Guidelines for the Development of Garbage Management Plans, and is to include, as a minimum:

- i) Vessel Name and Class Number
- ii) Procedures for collecting and separating, processing (including volume reduction), storing, and disposing of garbage
- iii) Procedures for the operation of the equipment onboard associated with the handling of garbage
- iv) An Environmental Officer designated in charge of carrying out the plan (see 2/11.1 of this Guide)

## 21 Sea Discharge - Water Ballast (1 June 2020)

### 21.1 General

This Subsection addresses requirements aimed towards the prevention of transporting harmful aquatic organisms and pathogens via water ballast discharges from vessels.

Vessels are to comply with the requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention) and the requirements of 2/21.3 through 2/21.9 of this Guide

This Subsection does not address requirements for the design of ballast systems or ballast water treatment systems.

### 21.3 Ballast Water Management Plan (1 June 2020)

A ballast water management plan is to be placed onboard for the guidance of the crew. This plan is to be in accordance with IMO Resolution MEPC.127(53), "Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4)" and MEPC 306(73), "Amendments to the Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4)".

### 21.5 Methods of Ballast Water Management

Methods of ballast water management are to consist of ballast water exchange or ballast water management systems in accordance with the BWM Convention.

#### 21.5.1 Ballast Water Exchange

The three accepted methods for ballast water exchange are as follows:

- i) *Sequential method* - a process by which a ballast tank is first emptied and then refilled with replacement ballast water to achieve at least a 95% volumetric exchange.
- ii) *Flow-through method* - a process by which replacement ballast water is pumped into a ballast tank allowing the water to overflow the tank.
- iii) *Dilution method* - a process by which replacement ballast water is filled through the top of the ballast tank with simultaneous discharge from the bottom at the same flow rate.

As a minimum, ballast water exchange procedures are to be in accordance with IMO Resolution MEPC.124(53), "Guidelines for Ballast Water Exchange (G6)". Design and construction of ballast water exchange arrangements are to be in accordance with IMO Resolution MEPC.149(55), "Guidelines for Ballast Water Exchange Design and Construction Standards (G11)".

#### 21.5.2 Ballast Water Management Systems (1 June 2020)

Ballast water management systems are to be type-approved in accordance with IMO Resolution MEPC.174(58), "Guidelines for Approval of Ballast Water Management Systems (G8)" for systems installed before 28 October 2020 or, for systems installed after 28 October 2020, IMO Resolution MEPC.279(70) "2016 Guidelines for Approval of Ballast Water Management Systems (G8)" or IMO Resolution MEPC.300(72) "Code for Approval of Ballast Water Management Systems (BWMS Code).

In addition, ballast water management systems that make use of active substances are to comply with IMO Resolution MEPC.169(57), "Procedure for Approval of Ballast Water Management Systems that Make Use of Active Substances (G9)".

### 21.7 Ballast Water Records

Records of ballast water management are to be maintained onboard in accordance with Regulation B-2 and Appendix II of the BWM Convention.

### 21.9 Responsible Officer

The Environmental Officer is to be responsible for verifying that all applicable ballast water handling and treatment procedures of the ballast water management plan are followed and for recording and maintaining the appropriate records of same. See 2/11.1 of this Guide.

## 23 Sea Discharge - Anti-Fouling Systems (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects of introducing organotin compounds to the sea environment by anti-fouling systems of vessels.

Vessels 400 gross tons and above are to hold and maintain a valid International Anti-Fouling System Certificate in accordance with the requirements of the AFS Convention.

Vessels 24 meters or more in length, but less than 400 gross tons, are to hold and maintain a valid Declaration on Anti-Fouling System in accordance with the requirements of the AFS Convention.

In addition, vessels are to comply with the requirements of 2/23.1 of this Guide.

### 23.1 Application of Organotin Compounds

Anti-fouling systems for hulls or external parts or surfaces:

- i) Are not to bear organotin compounds which act as biocides, or
- ii) Are to bear a coating that forms a barrier to prevent leaching of organotin compounds from an underlying non-compliant system

Small quantities of organotin compounds (such as mono- and di-substituted organotin compounds) are allowed as a chemical catalyst. The levels of these compounds are not to provide a biocidal effect and are not to be present above 2,500 milligram (mg) total tin per kilogram (kg) of dry paint.

## 25 Air Discharge - Nitrogen Oxides (NO<sub>x</sub>) Emission (1 June 2020)

This Subsection addresses requirements aimed towards the prevention of pollution to the air environment by NO<sub>x</sub> emission from vessels.

### 25.1 Diesel Engines (1 June 2020)

For NO<sub>x</sub> emissions, marine diesel engines with power output greater than 130 kW, installed on or after 1 January 2000, are to comply with the requirements of 3/17.1. In addition, these requirements apply to marine diesel engines which undergo major conversions, as defined by MARPOL Annex VI, on or after 1 January 2000. They do not apply to diesel engines which:

- i) Are used solely for emergencies
- ii) Are installed in lifeboats
- iii) Are solely dedicated to the exploration, exploitation, and associated offshore processing of seabed mineral resources

Marine diesel engines are to be certified for NO<sub>x</sub> emission in accordance with the requirements of Regulation 13, MARPOL Annex VI and the NO<sub>x</sub> Technical Code, 2008 (2017 Edition).

#### 25.1.1 Tier I

*25.1.1(a) Construction on or after 1 January 2000.* The operation of marine diesel engines, excluding i) through iii) above, which are installed on vessels constructed on or after 1 January 2000 and prior to 1 January 2011 are prohibited unless the NO<sub>x</sub> emissions from the engines' exhausts are within the Tier I limits of Regulation 13, MARPOL Annex VI.

*25.1.1(b) Marine diesel engines, excluding i). through iii). above, with a power output of more than 5,000 kilowatt (kW) and a per cylinder displacement at or above 90 liters installed on vessels constructed on or after 1 January 1990 but prior to 1 January 2000 are to comply with the Tier I emission levels and the requirements of Regulations 13.7.1 through 13.7.5 of MARPOL Annex VI, by application of an Approved Method certified by an Administration and which is commercially available for the particular engine.*

#### 25.1.2 Tier II

*25.1.2(a) Construction on or after 1 January 2011.* The operation of marine diesel engines, excluding i) through iii) above, which are installed on vessels constructed on or after 1 January 2011 are prohibited unless the NO<sub>x</sub> emissions from the engines' exhausts are within the Tier II limits of Regulation 13, MARPOL Annex VI.

### 25.1.3 Tier III

#### 25.1.3(a) Construction on or after 1 January 2016.

The operation of marine diesel engines, excluding i). through iii). above, which are installed on vessels constructed on or after 1 January 2016 and operating in the North American Emission Control Area (ECA), or the United States Caribbean Sea ECA, are prohibited unless the NO<sub>x</sub> emissions from the engines' exhausts are within the Tier III limits of Regulation 13, MARPOL Annex VI.

#### 25.1.3(b) Construction on or after 1 January 2021. (1 June 2020)

The operation of marine diesel engines, excluding i). through iii). above, which are installed on vessels constructed on or after 1 January 2021 and operating in the Baltic Sea ECA, or the North Sea ECA, are prohibited unless the NO<sub>x</sub> emissions from the engines' exhausts are within the Tier III limits of Regulation 13, MARPOL Annex VI.

### 25.1.4 Emission Control Area (ECA)

An Emission Control Area (ECA), designated by IMO, is any sea area, including any port areas or coastal areas, where there exists a need to prevent, reduce, and control emissions of NO<sub>x</sub> or SO<sub>x</sub> and particulate matter. Criteria and procedures for designation of ECAs are set forth in Appendix III of MARPOL Annex VI.

### 25.1.5 NO<sub>x</sub> Exhaust Gas Cleaning Systems (1 June 2020)

Special consideration will be given to exhaust gas after treatment systems provided the systems are at least as effective in terms of NO<sub>x</sub> emission reduction as required by 2/25.1.3 and Regulation 13, MARPOL Annex VI. Exhaust gas cleaning systems are to:

- i) Comply with the appropriate IMO guidelines
- ii) Be operated and controlled in accordance with manufacturers' instructions and procedures
- iii) Be approved by the Bureau for compliance with the applicable parts of the *ABS Guide for Exhaust Emission Abatement* and the *Marine Vessel Rules*.

## 27 Air Discharge - Sulfur Oxides (SO<sub>x</sub>) Emission (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects on the air environment by SO<sub>x</sub> emission from vessels.

### 27.1 Fuel Oil for Combustion

#### 27.1.1 Fuel Oil Quality

Fuel oil delivered and used onboard is to:

- i) Comply with the requirements of Regulation 18.3, MARPOL Annex VI
- ii) Be free from inorganic acid
- iii) Be derived from blends of hydrocarbons from petroleum refining as per Regulation 18.3.1 or methods other than petroleum refining as per Regulation 18.3.2

#### 27.1.2 Fuel Oil Sulfur Content - Global

When operating globally outside an ECA, the sulfur content of fuel oil used onboard is not to exceed the following limits:

- i) 0.5% mass/mass on and after 1 January 2020

### 27.1.3 Fuel Oil Sulfur Content - Emission Control Areas (ECAs) (1 June 2020)

When operating within an ECA, the sulfur content of fuel oil used onboard is not to exceed the following limits:

- i) 0.1% mass/mass on and after 1 January 2015

Those vessels using separate fuels when entering or leaving an ECA are to include in the fuel oil management plan, as a minimum, the following:

- Vessel Name and Class Number
- Step-by-step instructions and procedures on how to perform the fuel oil changeover
- Diagrammatic details of the fuel oil system including details of change over for SO<sub>x</sub> control
- Methods and means of recording volume of low-sulfur fuel oils in tanks, and date, time, and position of the vessel when any operation of fuel oil changeover is completed prior to entry into or is commenced after exit from an ECA

The fuel oil management plan is to be submitted for review by the Bureau to verify the presence of the above information, which is to be consistent with the design information and limitations considered in the classification of the vessel. The Bureau is not responsible for the operation of fuel oil systems.

### 27.1.4 Fuel Oil Non-Availability (1 June 2020)

The fuel oil management plan is to contain a course of action in accordance with Regulation 18.2.1 of MARPOL Annex VI when compliant fuel oils as per 2/27.1.2 or 2/27.1.3 are not available according to the vessel's voyage plan. The fuel oil management plan may consider the guidance of IMO Circular MEPC.1/Circ.878 "Guidance on the Development of a Ship Implementation Plan for the Consistent Implementation of the 0.5% sulphur limit under MARPOL Annex VI" and in particular that a procedure for Fuel Oil Non-Availability Reporting (FONAR) should be in place and that the master and chief engineer should be conversant about when and how FONAR should be used and who it should be reported to.

## 27.3 SO<sub>x</sub> Exhaust Gas Cleaning Systems (1 June 2020)

For marine diesel engines, oil fired boilers and inert gas generators, special consideration will be given to exhaust gas cleaning systems as an equivalent compliance in accordance with Regulation 4 of MARPOL Annex VI provided the systems are at least as effective in terms of SO<sub>x</sub> emission reduction as required by 2/27.1.2, 2/27.1.3, and Regulation 14, MARPOL Annex VI. Exhaust gas cleaning systems are to:

- i) Comply with the requirements of the IMO Guidelines for Exhaust Gas Cleaning Systems , Resolution MEPC.170(57) prior to 1 July 2010, the requirements of MEPC.184(59) prior to 15 May 2015 and MEPC.259(68), as amended, thereafter
- ii) Be operated and controlled in accordance with manufacturers' instructions and procedures
- iii) Be approved by ABS for compliance with the applicable parts of the *ABS Guide for Exhaust Emission Abatement* and the *Marine Vessel Rules*.

## 29 Air Discharge - Cargo Vapor Emission (1 June 2020)

This Subsection addresses requirements aimed towards the prevention of pollution to the air environment by cargo vapor emission from vessels.

Where a tanker is regulated by an Administration for volatile organic compounds (VOCs) emissions, it is to hold and maintain the class notation **VEC** (Vapor Emission Control). See 5C-1-7/21 of the *Marine Vessel Rules*.

### 31 Air Discharge - Incinerators (1 June 2020)

This Subsection addresses requirements aimed towards the prevention of pollution to the air environment from vessels by incinerators.

Where installed onboard, incinerators are to be type-approved in accordance with IMO Resolution MEPC.244(66) as amended, Standard Specification for Shipboard Incinerators. Incinerators are also to comply with the emission standards of Annex A1 of the IMO Resolution.

Onboard incineration is to conform to Regulation 16 of MARPOL Annex VI, and the following substances are prohibited from being incinerated:

- i) MARPOL Annex I, II, and III cargo residues
- ii) Polychlorinated biphenyls (PCBs)
- iii) Garbage containing more than traces of heavy metals
- iv) Refined petroleum products containing halogen compounds
- v) Sewage sludge and sludge oil, either of which is not generated onboard
- vi) Polyvinylchlorides (PVCs) except by incinerators issued IMO Type Approval Certificates
- vii) Exhaust gas cleaning system residues

Incineration of any garbage, excluding *iii*), is to be recorded in the Garbage Record Book in accordance with MARPOL Annex V. See 2/19.

### 33 Air Discharge - Refrigerant Systems (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects on the air environment by refrigerant systems onboard vessels.

#### 33.1 General Requirements (1 June 2020)

The requirements of 2/33 are applicable to refrigerant systems (see 1/5, Definitions) onboard vessels. For additional requirements pertaining to refrigerated cargoes, see Part 6, Chapter 2 of the *Marine Vessel Rules*.

Stand-alone air-conditioning or refrigerator units and permanently sealed equipment, where there are no refrigerant charging connections or potentially removable components containing ozone depleting substances (ODS), are not subject to the requirements of 2/33.

#### 33.3 Acceptable Refrigerants

Refrigerant systems are to be provided with environmentally friendly refrigerants. The use of ozone depleting refrigerants is prohibited other than hydro-chlorofluorocarbons (HCFCs), which will be permitted on ships constructed prior to 1 January 2020.

#### 33.5 Systems Arrangements

Refrigerant systems are to be arranged with appropriate means for isolation of sections and components to allow for system maintenance without releasing any substantial quantity of the refrigerant.

Unavoidable minimal release associated with recovery is permitted provided recovery units are installed for the evacuation of the system. For refrigerant recovery, compressors/recovery units are to be capable of evacuating a system charge into an independent/separate liquid storage container(s). The recovered refrigerant storage capacity of this storage container(s) is to be at least 125% of the largest volume of refrigerant in any one segment of the refrigeration system which can be isolated. Each portion of the system that can be isolated is to have piping connections suitable for the attachment of the recovery equipment.

### 33.7 System Leaks Monitoring

Annual refrigerant leakage is to be not more than 10% of the total refrigerant charge of each system.

An appropriate leak detection system is to be provided to continuously monitor spaces into which the refrigerant could leak. Further, an alarm is to be given in a manned location when the refrigerant concentration exceeds a predetermined limit (for example, 25 ppm for ammonia or 300 ppm for halogenated fluorocarbons). Corrective action to repair a refrigerant leak is to be taken as soon as practicable after the activation of the alarm.

### 33.9 Refrigerant Systems Management Plan (1 June 2020)

A refrigerant systems management plan is to be placed onboard for the guidance of the operating personnel. This plan is to give clear guidance to the crew about the refrigerant systems and is to include, as a minimum:

- i) Vessel Name and Class Number
- ii) Simplified diagrams and component description of all refrigerant systems
- iii) Procedures detailing the means to control the loss, leakage, venting, and disposal of refrigerants
- iv) Methods and means of recording in mass (kilograms) refrigerant inventory. The recorded data shall include, as a minimum, the following:
  - a) Supply of refrigerant onboard
  - b) Discharge of refrigerant to the atmosphere due to leaks or system maintenance
  - c) Recovered refrigerant including its storage location
  - d) Refrigerant disposal to land-based reception facilities

The refrigerant systems management plan is to be submitted for review by ABS to verify the presence of the above information, which is to be consistent with the design information and limitations considered in the classification of the vessel. ABS is not responsible for the operation of refrigerant systems.

## 35 Air Discharge - Fire-fighting Systems (1 June 2020)

This Subsection addresses requirements aimed at reducing the potential adverse effects on the air environment by fire-fighting systems onboard vessels.

### 35.1 Fire-extinguishing Medium

The use of Halons or perfluorocarbon mediums is not permitted in fixed fire extinguishing systems or portable fire extinguishers. Alternative mediums to Halons or perfluorocarbons may be acceptable, provided:

- i) They contain no ozone depleting substances
- ii) They have a GWP less than 4000

## 37 NOx Tier III Notation (1 June 2020)

The notation **NOx-Tier III** indicates that all marine diesel engines with power output greater than 130 kW, other than those exempted as per Para 1.2 of Regulation 13 of Annex VI of the MARPOL 73/78 Regulations, as applicable, have been certified for compliance with Para 5.1 of Regulation 13 of Annex VI of MARPOL 73/78, and provided with an approved NOx Technical File and Engine International Air Pollution (EIAPP) certification.

Where ABS has not acted as the Recognized Organization (on behalf of the flag Administration) for the engine EIAPP certification, copies of the following are to be submitted for review for each engine:

- i) EIAPP Certificate.
- ii) NOx Technical File and Onboard NOx Verification Procedures.
- iii) NOx critical component drawings.
- iv) Supporting documentation of the engine group/family approval.
- v) Conformity of Production procedures.

Engines using SCR or EGR equipment to meet the Tier III NOx limits, and which have not applied the applicable optional notations of the ABS *EEA Guide*, are to comply with the minimum requirements of that guide, as prescribed in 1/15 Table 1 of the ABS *EEA Guide*, for assignment of the **NOx-Tier III** notation.

### **39 Surveys (1 June 2020)**

As applicable, all annual, intermediate and renewal or periodical surveys for the various MARPOL Annexes are to be satisfactorily completed, as well as completion of the periodical survey requirements of machinery, as specified in Chapters 6 and 8, and survey requirements of Sections 7-9-7 and 7-9-13 of the *ABS Rules for Survey After Construction (Part 7)*.

At each periodical survey, the attending Surveyor is to verify the following are maintained onboard:

- i) Certification and documentation as outlined in 2/3 of this Guide.
- ii) Operational procedures as outlined in 2/5 of this Guide.





## SECTION 3 **ENVIRO+Notation** (1 June 2020)

### 1 **Certification and Documentation** (1 June 2020)

In addition to the documentation in 2/3 of this Guide, the following certification and documentation are required, as applicable, to receive the Environmental Protection Plus, **ENVIRO+**, notation:

- i) Documentation indicating relevant navigational equipment complies with criteria of Section 3, *ABS Guide for Bridge Design and Navigational Equipment/Systems*.

### 3 **Operational Procedures** (1 June 2020)

In addition to the documents in 2/5.1 of this Guide, the sewage management plan of 2/5.1ii) is to include the grey water system.

### 5 **Plans and Additional Details** (1 June 2020)

In addition to the plans and details in 2/7 of this Guide, the following plans or details are to be submitted for approval, review or reference, as appropriate:

- i) Layout and dimensional details of the bridge and its workstations (see 3/13 of the *ABS Guide for Bridge Design and Navigational Equipment/Systems* for additional plans and data to be submitted)
- ii) Cargo vapor emission arrangements; tank gauging systems; cargo transfer rates; hazardous areas (see 5C-1-7/21.3 of the *Marine Vessel Rules*)
- iii) Details and diagrams of incinerator to include the feed to the incinerator and the incinerator's operating system
- iv) Inventory of hazardous and potentially hazardous materials as per the *ABS Guide for the Inventory of Hazardous Materials*

### 7 **Design Characteristics** (1 June 2020)

Vessels are to comply with the appropriate automation requirements of 2/9.1 of this Guide and the requirement of 3/7.1 below:

#### 7.1 **Navigation Bridge Design**

Vessels are to hold and maintain the class notation NBLES (Navigational Bridge Layout and Equipment/Systems). See Section 3 of the *ABS Guide for Bridge Design and Navigational Equipment/Systems*.

### 9 **Management and Support Systems** (1 June 2020)

In addition to the requirements in 2/11 of this Guide, vessels are to comply with 3/9.1 below:

#### 9.1 **Recycling**

Vessels are to hold and maintain the class notation **IHM** (Inventory of Hazardous Materials). See the *ABS Guide for the Inventory of Hazardous Materials*.

### 11 **Sea Discharge - Oil** (1 June 2020)

In addition to the text in 2/13 of this Guide, vessels are to comply with 3/11.1 below:

## 11.1 Machinery Spaces

### 11.1.1 Protection of Fuel Oil Tanks and Lubricating Oil Tanks (1 June 2020)

In addition to 2/13.1.1 of this Guide, arrangements of fuel oil tanks and lubricating oil tanks are to comply with the requirements for the class notation **POT** in 4-6-4/17.5 of the *Marine Vessel Rules*.

### 11.1.2 High Level Alarms

In addition to 2/13.1.2 of this Guide, lubricating oil tanks and other oil tanks (e.g., hydraulic oil) are to be fitted with an alarm to warn of the level reaching a predetermined high level.

### 11.1.3 Oily Water Separator (1 June 2020)

Oil filtering equipment for machinery spaces is to be provided with alarm arrangements to indicate when the oil content of the effluent exceeds 5 ppm. In addition, automatic stopping arrangements are to be provided for any discharge of oily mixtures when the oil content in the effluent exceeds 5 ppm.

## 13 Sea Discharge - Noxious Liquid Substances (1 June 2020)

Vessels are to comply with the appropriate sea discharge - noxious liquid substances requirements of 2/15 of this Guide and the requirements of 3/13.1 and 3/13.3 below:

### 13.1 Gauging Systems (1 June 2020)

In lieu of 2/15.1 of this Guide, chemical cargo tanks are to be fitted with closed gauging systems which are to be in compliance with 5C-9-13/1 of the *Marine Vessel Rules* with the exception of Offshore Vessels carrying limited quantities of Noxious Liquid Substances. OSV's carrying limited quantities of NLS need only to comply with 2/15.1 of this Guide.

### 13.3 Cargo Tanks Arrangement (1 June 2020)

The arrangements of chemical cargo tanks are to comply with the double hull and double bottom requirements of a Type 2 ship unless a Type 1 ship is required by Section 5C-9-17 of the *Marine Vessel Rules*. The locations of the cargo tanks from bottom and side shell plating are to be in compliance with 5C-9-2/6.1.2 of the *Marine Vessel Rules*.

For offshore support vessels complying with IMO Res. A.673 (16) *Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk on Offshore Support Vessels*, cargo tanks are to be located at distance B/20 vertically above the molded line of the bottom shell plating at center line and nowhere less than 760 mm (30 in.) from the shell plating. This requirement does not apply to the tanks for diluted slops arising from tank washing.

## 15 Sea Discharge - Sewage (1 June 2020)

Vessels are to comply with the appropriate sea discharge - sewage requirements of 2/17 of this Guide and the requirements of 3/15.1 and 3/15.3 below:

### 15.1 Sewage Treatment Plant (1 2020)

In lieu of 2/17.1 of this Guide, a sewage treatment plant is to be provided and is to comply with MARPOL Annex IV under the guidelines specified in IMO Resolution MEPC.227(64), 2012 Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants, as amended by MEPC.284(70) or the equivalent marine sanitation device of USCG regulations Title 33 CFR Part 159. (Refer to USCG NVIC 1-09.)

### 15.3 Domestic Wastewater (Grey Water)

Sewage treatment plants are to be equipped with means to treat grey water in addition to sewage.

For vessels in port, a sewage holding tank, if installed in conjunction with the treatment plant, is to have sufficient capacity for the storage of both sewage and grey water. The tank is to be fitted with a high level alarm.

## **17 Sea Discharge - Garbage (1 June 2020)**

Vessels are to comply with the appropriate sea discharge - garbage requirements of 2/19 and the requirements of 3/17.1 and 3/17.3.

### **17.1 Arrangements**

Dedicated arrangements are to be provided for storage of garbage.

### **17.3 Food Wastes**

Vessels are not to dispose of food wastes into the sea except when they have been passed through a comminuter or grinder. Such comminuted or ground food wastes are to be capable of passing through a screen with openings no greater than 25 mm (1 in.).

In addition, food wastes may be incinerated. See 3/29.

## **19 Sea Discharge – Water Ballast (1 June 2020)**

Vessels are to comply with the appropriate sea discharge – water ballast requirements of 2/21.

## **21 Sea Discharge - Anti-Fouling Systems (1 June 2020)**

Vessels are to comply with the appropriate sea discharge - anti-fouling systems requirements of 2/23.

## **23 Air Discharge - Nitrogen Oxides (NO<sub>x</sub>) Emission (1 June 2020)**

Vessels are to comply with the appropriate air discharge - NO<sub>x</sub> emission requirements of 2/25.

## **25 Air Discharge - Sulfur Oxides (SO<sub>x</sub>) Emission (1 June 2020)**

Vessels are to comply with the appropriate air discharge - SO<sub>x</sub> emission requirements of 2/27 of this Guide and the requirement of 3/25.1 below:

### **25.1 Fuel Oil Sulfur Content (1 June 2020)**

- i) As indicated in 2/27.1.2 of this Guide, the sulfur content of fuel oil used on board globally (Excluding ECA Zones) is not to exceed the limit of 0.5% mass/mass.
- ii) As indicated in 2/27.1.3 of this Guide, the sulfur content of fuel oil used onboard in ECA Zones is not to exceed the limit of 0.1% mass/mass.

## **27 Air Discharge - Cargo Vapor Emission (1 June 2020)**

Vessels are to comply with the appropriate air discharge - cargo vapor emission requirements of 2/29 of this Guide.

Tankers carrying crude oil or petroleum products with flash point less than 60°C are to hold and maintain the class notation **VEC** (Vapor Emission Control). See 5C-1-7/21 of the *Marine Vessel Rules*.

## **29 Air Discharge - Incinerators (1 June 2020)**

For vessels 500 gross tons and over, at least one incinerator is to be installed onboard and is to comply with the air discharge - incinerators requirements of 2/31 of this Guide, unless stowage arrangements for all garbage and other shipboard wastes generated during the ship's normal service are provided until off-loaded to shore, and related procedures are available onboard.

### **31 Air Discharge - Refrigerant Systems (1 June 2020)**

Vessels are to comply with the appropriate air discharge - refrigerant systems requirements of 2/33 of this Guide and the requirements of 3/31.1 of this Guide.

#### **31.1 Acceptable Refrigerants (18 June 2013)**

In lieu of 2/33.3 of this Guide, refrigerant systems are to be provided with environmentally friendly refrigerants. The use of ozone depleting refrigerants is prohibited other than hydro-chlorofluorocarbons (HCFCs), which will be permitted on ships constructed prior to 1 January 2020. Furthermore, the use of refrigerants with global warming potential (GWP) greater than 2000 are prohibited other than for the notation, **EP2020+**.

Where the use of a refrigerant medium exceeds a GWP of 2000, a special notation, **EP2020+**, will be assigned provided the refrigerant system complies with all the other conditions and requirements of 3/25 of this Guide. The notation **EP2020+** signifies the Owner's commitment to replace the existing refrigerant with one having a GWP less than or equal to 2000 by the year 2020.

### **33 Air Discharge - Fire-fighting Systems (1 June 2020)**

Vessels are to comply with the appropriate air discharge - fire-fighting systems requirements of 2/35 of this Guide and the requirement of 3/33.1.

#### **33.1 Fire-extinguishing Medium**

As indicated in 2/35.1.ii of this Guide, the GWP is to be less than 2000.

### **35 Surveys (1 June 2020)**

As applicable, all annual, intermediate and renewal or periodical surveys for the various MARPOL Annexes are to be satisfactorily completed, as well as completion of the periodical survey requirements of machinery, as specified in Chapters 6 and 8, and survey requirements of Sections 7-9-7 and 7-9-13 of the *ABS Rules for Survey After Construction (Part 7)*.

At each periodical survey, the attending Surveyor is to verify the following are maintained onboard:

- i)* Certification and documentation as outlined in 3/1 of this Guide
- ii)* Operational procedures as outlined in 3/3 of this Guide.



## SECTION 4 Low Emissions Vessel (LEV) Notation (1 June 2020)

### 1 Scope

The optional notation **LEV** recognizes that the specified internal combustion engines installed on a vessel meet stricter gaseous and particulate pollutant limits than regulated by MARPOL Annex VI. The **LEV** notation recognizes that engine emissions meet the corresponding levels for engine size, power and application regulated by other regional, national or local regulatory instruments, for example EU for equivalent marine, heavy duty or non-road mobile machinery applications. Typically, these regulatory instruments regulate NO<sub>x</sub> emissions, as does MARPOL Annex VI Regulation 13, but in addition set limits for CO, HC, PM and PN. The benchmark emissions limits for the ABS **LEV** notation are EU Tier V, for example EU Regulation 2016/1628.

Assignment of the optional **LEV** notation is strictly voluntary and does not confer compliance, certification, Type Approval or any other form of formal documentation of regulatory compliance with other regulatory instruments.

Vessels installed with engines in compliance with the requirements of Section 4 of this Guide may be assigned the class notation **LEV**, Low Emissions Vessel.

Internal combustion engines which are solely intended to use for emergencies or installed in the lifeboat of a vessel are not required to comply with these requirements.

### 3 Plans and Documentation

The following plans and documentation are required to be submitted, as applicable, to receive the Low Emissions Vessel, **LEV** notation:

- i) The list of engines installed onboard including their purpose or use, emissions test cycle (e.g. E3, E2, D2, C1) and serial numbers.
- ii) For those engines that have already been certified as meeting other regional, national or local exhaust emissions regulatory instruments, all documentation associated with that certification or type approval, e.g. certification, technical details, test plans, emissions test reports, third party endorsements, etc.

*Note: Those engines will also need to be verified as meeting the requirements of 4-2-1 of the Marine Vessel Rules before being eligible to be installed on ABS Classed vessels.*

- iii) Technical details of engine type / model, this may include, but is not limited to, kW/cylinder, BMEP, compression ratio, cylinder configuration together with additional information critical to the engine exhaust emissions including, but not limited to, fuel injection system including injection timing arrangements, combustion chamber details, turbocharging and charge air cooling arrangements, any specific engine or emission control features, and in particular for engines designed for lower emissions under this LEV framework, details of exhaust aftertreatment systems such as SCR systems or Diesel Particulate Filters (DPF). This information may be summarized in a LEV technical file where not already captured by the Annex VI and NO<sub>x</sub> Technical Code NO<sub>x</sub> technical file or the documentation requirements of other regulatory instruments.
- iv) Proposed categorization of the engine family or engine group, including adjustable features, applicable fuel specifications, means for spare part supply, etc.
- v) Testbed and emissions measurements procedures and relevant standards, such as ISO 8178-1.

- vi) Emissions test report as witnessed and verified by an independent third party acceptable to the Bureau, for example a Recognized Organization authorized by the flag Administration or regulatory authority.
- vii) A document containing information for on-board verification of the emission components, settings, replacement parts and controls to verify continual compliance with the LEV emission limits.
- viii) Operation and maintenance manuals for the engine and, in particular, any aftertreatment systems such as SCR or DPF units required for achieving LEV emission levels.

## 5 Engine Exhaust Gas Emissions

### 5.1 Emission Limits

The benchmark emissions limits for the ABS **LEV** notation are EU Tier V, as referenced in EU Regulation 2016/1628 and tabulated below in Table 1 for inland waterway propulsion (IWP) and inland waterway auxiliary (IWA) engines with emissions limits.

**TABLE 1**

<i>Emission Category</i>	<i>Power Range kW</i>	<i>CO g/kWh</i>	<i>HC g/kWh</i>	<i>NOx g/kWh</i>	<i>PM mass g/kWh</i>	<i>PN #/kWh</i>
IWP & IWA	$130 \leq P < 300$	3.50	1.00	2.10	0.10	-
IWP & IWA	$P \geq 300$	3.50	0.19	1.80	0.015	$1 \times 10^{12}$

### 5.3 Engine Emission Tests

Engine emissions tests are to be undertaken in accordance with the requirements of the specified regulatory instrument referenced by the application for ABS **LEV** notation.

ABS will also consider assignment of the **LEV** notation(s) based on testing undertaken in accordance with Annex VI and the NOx Technical Code (NTC) Chapter 5 and ISO 8178. Where the request for notation includes recognition of the emissions levels of PM and/or PN (which are not regulated pollutants within Annex VI and the NTC), then this testing is to be undertaken at the same time as the gaseous emissions testing and is to be undertaken in accordance with ISO 8178-1, “Reciprocating internal combustion engine – Exhaust emission measurement – Part 1: Testbed measurement systems of gaseous and particulate emissions”.

### 5.5 Engine Emissions Verification

The engine exhaust emissions test report, together with the documentation outlined under 4/3 of this Guide, will be reviewed by the designated ABS technical office for verification of the gaseous and particulate exhaust emissions and confirmation of acceptability for assignment of the **LEV** notation.

A copy of the approval letter, together with the LEV specific documentation referenced under 4/3 of this guide (technical file, onboard verification document and operation and maintenance manuals, as applicable) required for on-board verification of continual compliance with the LEV emission limits are to be retained onboard for verification during the initial, annual, intermediate and renewal MARPOL Surveys.

## 7 Notations and Recognition

The optional **LEV** notation will be assigned upon verification that the specified installed engines meet the requirements of Section 4 of this Guide.

Upon satisfactory review of the submitted plans and documentation, together with verification of the installation onboard to the Surveyor's satisfaction, the vessel will be eligible for assignment of the **LEV** notation. A record comment will be issued indicating descriptive letters recognizing the specified regulatory instrument emission limits that the engine has been recognized as meeting, and the associated gaseous or particulate pollutant. Some examples are listed below:

- **LEV** (Main Engine EU Stage V, IWP, NO<sub>x</sub>, CO, HC)
- **LEV** (Aux Engine EU Stage V, IWA, NO<sub>x</sub>, CO, HC, PM, PN)

The **LEV** notation recognizes that the specified internal combustion engines installed on a vessel meet stricter gaseous and particulate pollutant limits than regulated by MARPOL Annex VI. However, assignment of the optional **LEV** notation is strictly voluntary and does not confer compliance, certification, Type Approval or any other form of formal documentation of regulatory compliance with other regulatory instruments.

Engines using SCR or EGR equipment to meet the **LEV** NO<sub>x</sub> limits, are to comply with the applicable requirements of the *ABS Guide for Exhaust Emission Abatement*, for assignment of the **LEV** notation.

## 9 Surveys

As applicable, all annual, intermediate and renewal or periodical surveys for MARPOL Annex VI Regulation 13 are to be satisfactorily completed, as well as completion of the periodical survey requirements of machinery, as specified in Chapters 6 and 8, and survey requirements of Sections 7-9-7 and 7-9-13 of the *ABS Rules for Survey After Construction* (Part 7). Additional verification required by the **LEV** documentation will be completed at the initial survey and the aforementioned surveys.

At each survey, the attending Surveyor is to verify that the following are maintained onboard:

- i) Certification and documentation as outlined in 4/3 and 4/5.3 of this Guide.



## SECTION 5 EEDI-Ph3 Notation (2021)

### 1 Scope

The optional class Notation **EEDI-Ph3** is applicable to a ship whose verified attained EEDI value is less than or equal to the required value for EEDI Phase 3 in MARPOL Annex VI, Regulation 21 as amended by IMO Resolution MEPC.324(75).

Ships requesting the **EEDI-Ph3** Notation are to comply with the applicable requirements of MARPOL Annex VI, Regulations 19, 20 and 21, and are to hold a valid International Energy Efficiency Certificate.

### 3 Document Submission

For verification of the required EEDI value for the issuance of **EEDI-Ph3** Notation, the following document is to be submitted to ABS for review:

- Calculations for the required value for EEDI Phase 3

In addition, where ABS has not acted as the Recognized Organization (on behalf of the flag Administration) for verification of the compliance with MARPOL Annex VI, Regulations 19 through 21, the documents listed below are to be submitted to ABS for information and record:

- i) International Energy Efficiency Certificate
- ii) EEDI Technical File

### 5 Notation Assignment

#### 5.1 Required EEDI Value

The required EEDI value is to be determined in accordance with MARPOL Annex VI, Regulation 21 as amended by MEPC.324(75), using a phase 3 reduction factor as applicable to the ship type and ship size.

#### 5.2 Attained EEDI Value

Attained EEDI value is to be obtained from ship's IEEC and/or EEDI Technical File.

#### 5.3 Verification

Upon verification that the attained EEDI value is not greater than the required EEDI value, the Notation **EEDI-Ph3** may be assigned.