



GUIDE FOR

THE ENVIRONMENTAL PROTECTION NOTATION FOR
VESSELS

SEPTEMBER 2009 (Updated May 2018 – see next page)

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

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Updates

May 2018 consolidation includes:

- June 2016 version plus Notice No. 9

June 2016 consolidation includes:

- May 2015 version plus Notice No. 8 and Corrigenda/Editorials

May 2015 consolidation includes:

- August 2014 version plus Notice No. 7 and Corrigenda/Editorials

August 2014 consolidation includes:

- February 2014 version plus Notice No. 6

February 2014 consolidation includes:

- June 2013 version plus Notice No. 5 and Corrigenda/Editorials

June 2013 consolidation includes:

- January 2012 version plus Notice No. 4

January 2012 consolidation includes:

- August 2011 version plus Corrigenda/Editorials

August 2011 consolidation includes:

- April 2011 version plus Notice No. 3

April 2011 consolidation includes:

- February 2011 version plus Notice No. 2

February 2011 consolidation includes:

- September 2009 version plus Notice No. 1

Foreword

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 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**) or Environmental Protection Plus (**ENVIRO+**) for vessels. 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.

This Guide supersedes the *ABS Guide for the Class Notation Environmental Safety (ES)*, March 2001 (Updated June 2008). 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. Vessels under construction as of the date this Guide becomes effective may receive the **ES** notation, provided that the **ES** notation was requested prior to the date this Guide becomes effective. A vessel is “under construction”, for purposes of this provision, if the contract date for construction between the shipbuilder and the prospective owner is prior to the date this Guide becomes effective. 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 effective date of this Guide is the first day of the month of publication.



GUIDE FOR

THE ENVIRONMENTAL PROTECTION NOTATION FOR VESSELS

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SECTION 1 General

1 Scope and Application

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.

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

3 Basis of Notation

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

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 3 of this Guide for additional requirements.

3.3 ENVIRO+ Notation

Compliance with applicable requirements of the **ENVIRO** notation and 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 4 of this Guide for additional requirements.



SECTION 2 Documentation

1 Certification and Documentation

1.1 ENVIRO Notation

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 3/1.1)
- 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 to MARPOL 73/78
- 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 statement of compliance relating to NO_x control in accordance with MARPOL 73/78 Annex VI, Regulation 13. Further explanations of the Regulations (e.g., backgrounds, outlines, etc.) are available in the *ABS Guidance Notes on the Prevention of Air Pollution from Ships*.

1.3 ENVIRO+ Notation

In addition to 2/1.1, 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 Part C, *ABS Guide for Bridge Design and Navigational Equipment/Systems*
- ii) Incinerator type approval certificate in accordance with IMO Resolution MEPC 76(40) and Resolution MEPC.93(45), Amendments to the Standard Specification for Shipboard Incinerators

3 Operational Procedures

3.1 ENVIRO Notation (1 May 2018)

3.1.1 Documents to be Submitted for Review

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_x emission, including fueling management plan and procedure
- vi)* Refrigerant systems management plan

3.1.2 Documents to be Furnished Onboard

The following documents are to be furnished onboard:

- i)* Instructions and procedures addressing operation and control of NO_x exhaust gas cleaning systems
- ii)* Instructions and procedures addressing operation and control of SO_x exhaust gas cleaning systems

3.3 ENVIRO+ Notation

In addition to 2/3.1, the sewage management plan of 2/3.1.1 *ii)* is to include the grey water system.

5 Plans and Additional Information

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.

5.1 ENVIRO Notation (1 August 2014)

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_x control and measurement procedures
- ix)* Diagrammatic details of fuel oil system, including details of SO_x control
- x)* Diagrammatic details of permanent refrigerant system
- xi)* Details of fire extinguishing media used in vessel's fixed fire fighting systems and extinguishers

5.3 ENVIRO+ Notation (1 August 2014)

In addition to 2/5.1, the following plans or information are to be submitted for approval, review or reference, as appropriate:

- i) Layout and dimensional details of the bridge and its workstations (see A13 of the *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 *Steel 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 Definitions

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.

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 Waste Water (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.

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.

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)

9 Abbreviations

ACC	Automatic Centralized Control (ABS notation)
ACCU	Automatic Centralized Control Unmanned (ABS notation)
AFS	Anti-fouling system
BWM	Ballast water management
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations (USA)
COW	Crude oil washing
ECA	Emission control area
GWP	Global warming potential (based on a 100-year time horizon)
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 _x	Nitrogen oxides
ODS	Ozone depleting substances
POT	Protection of Fuel and Lubricating Oil Tanks (ABS notation)
ppm	Parts per million
SO _x	Sulfur oxides
UNEP	United Nations Environment Program
USCG	United States Coast Guard
VEC	Vapor Emission Control (ABS notation)
VOCs	Volatile organic compounds

11 References

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

- 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)

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 Steel Vessels*)

Diesel Engine Exhaust NO_x Content – Technical Code on Control Emission of Nitrogen Oxides from Marine Diesel Engines (NO_x Technical Code, 2008), IMO Resolution MEPC.177(58)

Exhaust Gas Cleaning Systems – IMO Resolution MEPC.170(57) Guidelines for Exhaust Gas Cleaning Systems

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)

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 76(40) Standard Specification for Shipboard Incinerators



SECTION 3 ENVIRO Notation

1 Design Characteristics

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:

1.1 Propulsion Plant Automation

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

For vessels 90 meters in length and greater, the requirements for the **ACC** or **ACCU** notation are specified in 4-9-1/3.1 and 4-9-1/3.3 of the *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*, respectively.

For vessels less than 90 meters in length:

- i) The requirements for the **ACC** notation are specified in 4-9-1/3.1 of the *Steel Vessel Rules*.
- ii) The requirements for the **ACCU** notation are specified in 4-7-1/1 of the *ABS Rules for Building and Classing Steel Vessels Under 90 meters (295 feet) in Length (Under 90m Rules)*.

3 Management and Support Systems *(1 August 2014)*

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

3.1 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

3.3 Safety and Environmental Management

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

3.5 Support Systems – **Rapid Response Damage Assessment Program** *(1 May 2015)*

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.

5 Sea Discharge – Oil

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

5.1 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 3/5.1.1 through 3/5.1.5.

5.1.1 Protection of Fuel Oil Tanks

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

5.1.2 High Level Alarms

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

5.1.3 Oil Filtering Equipment

Oil filtering equipment 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.

5.1.4 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.

5.1.5 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 m³ (0.70 ft³) for vessels of less than 300 gross tons
- ii) 0.06 m³ (2.11 ft³) for vessels of 300 or more but less than 1,600 gross tons
- iii) 0.12 m³ (4.21 ft³) 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.

5.3 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 3/5.1.1 through 3/5.1.5 and 3/5.3.1 through 3/5.3.4.

5.3.1 Gauging Systems

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

5.3.2 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 3/7.3 of this Guide.

5.3.3 Ballast Arrangements

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 *Steel Vessel Rules*.

5.3.4 Crude Oil Washing (COW) Systems

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

7 Sea Discharge – Noxious Liquid Substances

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 3/7.1 through 3/7.5.

7.1 Gauging Systems

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 *Steel Vessel Rules*. Restricted gauging systems are to be in compliance with 5C-9-13/1 of the *Steel Vessel Rules*.

7.3 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. 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 m³ (2.11 ft³) for loading hoses or arms with inside diameters of 50 mm (2 in.) or less
 - 0.12 m³ (4.21 ft³) for loading hoses or arms with inside diameters of more than 50 mm (2 in.) but less than 100 mm (4 in.)
 - 0.24 m³ (8.42 ft³) for loading hoses or arms with inside diameters of 100 mm (4 in.) or more but less than 150 mm (6 in.)
 - 0.36 m³ (12.63 ft³) for loading hoses or arms with inside diameters of 150 mm (6 in.) or more but less than 300 mm (12 in.)
 - 0.48 m³ (16.84 ft³) 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 *Steel 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.

7.5 Ballast Arrangements

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 *Steel Vessel Rules*.

9 Sea Discharge – Sewage

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 3/9.1 through 3/9.5.

9.1 Treatment

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, 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.)

9.3 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.

9.5 Sewage Management Plan

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 ABS ID 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 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 the sewage system.

11 Sea Discharge – Garbage

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 3/11.1.

11.1 Garbage Management Plan

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 ABS ID 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 3/3.1)

13 Sea Discharge – Water Ballast

13.1 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 3/13.3 through 3/13.9.

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

13.3 Ballast Water Management Plan

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)".

13.5 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.

13.5.1 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)".

13.5.2 Ballast Water Management Systems

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)".

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)".

13.7 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.

13.9 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 3/3.1.

15 Sea Discharge – Anti-Fouling Systems

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 3/15.1.

15.1 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.

17 Air Discharge – Nitrogen Oxides (NO_x) Emission

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

17.1 Diesel Engines

For NO_x 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 sea-bed mineral resources

Marine diesel engines are to be certified for NO_x emission in accordance with the requirements of Regulation 13, MARPOL Annex VI and the NO_x Technical Code, 2008.

17.1.1 Tier I

17.1.1(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_x emissions from the engines' exhausts are within the Tier I limits of Regulation 13, MARPOL Annex VI.

17.1.1(b) Construction prior to 1 January 2000. 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.

17.1.2 Tier II

17.1.2(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_x emissions from the engines' exhausts are within the Tier II limits of Regulation 13, MARPOL Annex VI.

17.1.3 Tier III

17.1.3(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 an Emission Control Area (ECA) are prohibited unless the NO_x emissions from the engines' exhausts are within the Tier III limits of Regulation 13, MARPOL Annex VI.

17.1.4 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_x or SO_x and particulate matter. Criteria and procedures for designation of ECAs are set forth in Appendix III of MARPOL Annex VI.

17.1.5 NO_x Exhaust Gas Cleaning Systems

Special consideration will be given to exhaust gas cleaning systems provided the systems are at least as effective in terms of NO_x emission reduction as required by 3/17.1.1 through 3/17.1.3 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 ABS

19 Air Discharge – Sulfur Oxides (SO_x) Emission

This Subsection addresses requirements aimed at reducing the potential adverse effects on the air environment by SO_x emission from vessels.

19.1 Fuel Oil for Combustion

19.1.1 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

19.1.2 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)* 3.5% mass/mass prior to 1 January 2020
- ii)* 0.5% mass/mass on and after 1 January 2020

19.1.3 Fuel Oil Sulfur Content – Emission Control Areas (ECAs)

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

- i)* 1.5% mass/mass prior to 1 July 2010
- ii)* 1.0% mass/mass on and after 1 July 2010
- iii)* 0.1% mass/mass on and after 1 January 2015

ECAs include the Baltic Sea, North Sea, and any other sea area designated by IMO. See 3/17.1.4 of this Guide and Regulation 14.3 of MARPOL Annex VI.

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 ABS ID 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_x 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 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 fuel oil systems.

19.1.4 Fuel Oil Availability

The fuel oil management plan is to contain a course of action when purchase of fuel oil complying with 3/19.1.2 is not available in accordance with the vessel's voyage plan. Where fuel oil complying with 3/19.1.2 is not available at a bunkering port or terminal, the course of action should include any or combination of, but not be limited to, the following:

- i) Bunker the minimal amount of fuel oil necessary to proceed to a port or terminal where fuel oil complying with 3/19.1.2 can be obtained
- ii) Carriage of sufficient amounts of Marine Distillate Fuels, such as grades DMA, DMB, and DMC of ISO 8217, in appropriate bunker tanks
- iii) If fuel oil compatibility can be confirmed by a fuel oil test company, the high sulfur fuel oil exceeding 3/19.1.2 should be diluted by mixing with a low sulfur fuel oil taken onboard at the next available bunkering port or terminal
- iv) If fuel oil compatibility can be confirmed by a fuel oil company, the high sulfur fuel oil exceeding 3/19.1.2 and low sulfur fuel oil can be mixed, to the required ratio, in the settling tank to obtain fuel oil with sulfur content complying with 3/19.1.2 prior to use in marine diesel engines, oil fired boilers, or other oil fired equipment
- v) Use of exhaust gas cleaning systems

Upon receiving fuel oil not in compliance with the sulfur content of 3/19.1.2, the following is to be recorded in the appropriate vessel's log:

- Date, time, and name of port or terminal
- Sulfur content as indicated on the bunker delivery note
- List of fuel oil tanks bunkered with non-compliant fuel oil
- Volume of non-compliant fuel oil in each tank
- Course of action taken

19.3 SO_x Exhaust Gas Cleaning Systems

For marine diesel engines, oil fired boilers and inert gas generators, special consideration will be given to exhaust gas cleaning systems provided the systems are at least as effective in terms of SO_x emission reduction as required by 3/19.1.2, 3/19.1.3, and Regulation 14, MARPOL Annex VI. Exhaust gas cleaning systems are to:

- i) Comply with IMO Resolution MEPC.170(57), Guidelines for Exhaust Gas Cleaning Systems
- ii) Be operated and controlled in accordance with manufacturers' instructions and procedures
- iii) Be approved by ABS

21 Air Discharge – Cargo Vapor Emission

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 *Steel Vessel Rules*.

23 Air Discharge – Incinerators

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.76(40), Standard Specification for Shipboard Incinerators. In particular, incinerators are 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 Subsection 3/11.

25 Air Discharge – Refrigerant Systems

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

25.1 General Requirements

The requirements of Subsection 3/25 are applicable to refrigerant systems (see Subsection 2/7) onboard vessels. For additional requirements pertaining to refrigerated cargoes, see Part 6, Chapter 2 of the *Steel 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 Subsection 3/25.

25.3 Acceptable Refrigerants (18 June 2013)

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.

25.5 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.

25.7 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.

25.9 Refrigerant Systems Management Plan

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 ABS ID 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.

27 Air Discharge – Fire-fighting Systems

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

27.1 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



SECTION 4 ENVIRO+ Notation

1 Design Characteristics

Vessels are to comply with the appropriate automation requirements of 3/1.1 and the requirement of 4/1.1.

1.1 Navigation Bridge Design

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

3 Management and Support Systems (1 August 2014)

In addition to the requirements in Subsection 3/3, vessels are to comply with 4/3.1.

3.1 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*.

5 Sea Discharge – Oil

In addition to the text in Subsection 3/5, vessels are to comply with 4/5.1.

5.1 Machinery Spaces

5.1.1 Protection of Fuel Oil Tanks and Lubricating Oil Tanks

In addition to 3/5.1.1, 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 *Steel Vessel Rules*.

5.1.2 High Level Alarms

In addition to 3/5.1.2, 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.

5.1.3 Oil Filtering Equipment

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.

7 Sea Discharge – Noxious Liquid Substances

Vessels are to comply with the appropriate sea discharge – noxious liquid substances requirements of Subsection 3/7 and the requirements of 4/7.1 and 4/7.3.

7.1 Gauging Systems (2014)

In lieu of 3/7.1, chemical cargo tanks are to be fitted with closed gauging systems which are to be in compliance with 5C-9-13/1 of the *Steel 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 3/7.1.

7.3 Cargo Tanks Arrangement (1 June 2016)

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 *Steel 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 *Steel 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.

9 Sea Discharge – Sewage

Vessels are to comply with the appropriate sea discharge – sewage requirements of Subsection 3/9 and the requirements of 4/9.1 and 4/9.3.

9.1 Sewage Treatment Plant

In lieu of 3/9.1, a sewage treatment plant is to be provided and is to comply with MARPOL Annex IV under the guidelines specified in IMO Resolution MEPC.159(55), Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants, or the equivalent marine sanitation device of USCG regulations Title 33 CFR Part 159. (Refer to USCG NVIC 1-09.)

9.3 Domestic Waste Water (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.

11 Sea Discharge – Garbage

Vessels are to comply with the appropriate sea discharge – garbage requirements of Subsection 3/11 and the requirements of 4/11.1 and 4/11.3.

11.1 Arrangements

Dedicated arrangements are to be provided for storage of garbage.

11.3 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 Subsection 4/21.

12 Sea Discharge – Water Ballast

Vessels are to comply with the appropriate sea discharge – water ballast requirements of Subsection 3/13.

13 Sea Discharge – Anti-Fouling Systems (5 April 2011)

Vessels are to comply with the appropriate sea discharge – anti-fouling systems requirements of Subsection 3/15.

15 Air Discharge – Nitrogen Oxides (NO_x) Emission

Vessels are to comply with the appropriate air discharge – NO_x emission requirements of Subsection 3/17.

17 Air Discharge – Sulfur Oxides (SO_x) Emission

Vessels are to comply with the appropriate air discharge – SO_x emission requirements of Subsection 3/19 and the requirement of 4/17.1.

17.1 Fuel Oil Sulfur Content - Global

In lieu of 3/19.1.2i), the sulfur content of fuel oil used onboard is not to exceed the limit of 3.0% mass/mass prior to 1 January 2020.

19 Air Discharge – Cargo Vapor Emission

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

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

21 Air Discharge – Incinerators (15 August 2011)

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 Subsection 3/23, 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.

23 Air Discharge – Refrigerant Systems

Vessels are to comply with the appropriate air discharge – refrigerant systems requirements of Subsection 3/25 and the requirements of 4/23.1.

23.1 Acceptable Refrigerants (18 June 2013)

In lieu of 3/25.3, 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 Subsection 3/25. 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.

25 Air Discharge – Fire-fighting Systems

Vessels are to comply with the appropriate air discharge – fire-fighting systems requirements of Subsection 3/27 and the requirement of 4/25.1.

25.1 Fire-extinguishing Medium

In lieu of 3/27.1ii), the GWP is to be less than 2000.



SECTION 5 Surveys After Construction

1 Surveys

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 Subsection 2/1
- ii) Operational procedures as outlined in Subsection 2/3