

CHARTING THE FUTURE 

ClassNK

Environmental Guidelines (Edition 4.1)

[English]



ClassNK

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Introduction

Increasing demands for environmental conservation have been placed on all industries in recent years, and the maritime industry is no exception. With awareness to corporate social responsibility growing larger and efforts being made to meet the Sustainable Development Goals (SDGs), more measures are being implemented by maritime industry members to prevent air and marine pollution, etc. according to not only minimum requirements based on international conventions and standards, but also due to the introduction of more advanced technology or more strict criteria.

As a means of evaluating these efforts, the Society has developed its own criteria for evaluating ships that have introduced environmental measures for areas where requirements based on international conventions or standards do not yet exist or have not yet been made mandatory. In conjunction with this, the Society has been issuing certificates for the environmental measures adopted by ships since June 2008. In order to make the above evaluation process easier to understand, the relevant requirements have been amended so that evaluations of environmental measures are indicated as notation affixed to ship classification characters, and the first edition was published as the “Environmental Guidelines”. Since then, the Guidelines has been revised several times in accordance with the review of the relevant provisions.

The Guidelines was last formally reviewed and revised in 2016; since that time, however, another review of its provisions and contents became necessary for several reasons: some of the criteria for treaty requirements have been changed; environmental measures that were stipulated as optional advanced features in the last version of the Guidelines are now actually mandatory treaty requirements that have become common practise; and the fact that there are still currently insufficient provisions for some environmental measures considered to by many to be necessary. For these reasons, therefore, the contents of the Guidelines have been revised and updated in reference to the latest international conventions, etc., but also in response to the increased attention being paid to SDGs in recent years by societies and governments around the world.

In addition to the above, the Society launched a new certification service called in “Innovation Endorsement (IE)” in 2020 for the purpose of the dissemination and development of innovative technologies. In order to expand the scope of this certification service, it has been decided to include the environmental measures within the scope of the service. A new chapter, therefore, has been added to the Guidelines to cover such matters.

With all of this in mind, the Guidelines prescribes minimum requirements for environmental measures which are considered to be desirable with respect to current conditions. Compliance with these minimum requirements is indicated by the affixation of the notation “*Environmental Awareness*” to ship classification characters. To evaluate the higher-degree characteristics of ships taking further environmental measures, various sorts of additional features are also prescribed and indicated as marks added to the notation. In addition, for ships with advanced environmental measures, the notation “*Advanced Environmental Awareness*” is to be affixed to ship classification characters as part of the framework of “Innovation Endorsement (IE)” together with indication for the various advanced environmental measures implemented in order to evaluate their advanced nature.

In the future, the Guidelines will continue to be revised as necessary in order to enable “notation labeling” that meets the needs of the industry in accordance with future developments in environmental technology.

Correction/Revision Record

Edition	Date	Part	Details
1.0	May 2009	—	—
2.0	December 2010	Table 3.1, Table 3.2, Table 3.3, Table 4.1, Table 4.3	Correction and Review of contents
		Table 3.2 – 1.6 and 1.8 Table 3.3 – 1.1.0, 1.2.0, 1.3.0, 1.5, 1.5.1.2, 1.6 and 1.8.1	Review of the definition of certificates
		Table 3.3 – 1.1.7	Clarification of level gauges
		Table 3.3 – 1.1.8 (Insertion)	Clarification of the stipulation for the contact points for the loading of oils other than cargo oil
		4.1.2-1 and Table 4.1	Review of the mark for Bilge control
		Table 3.2, Table 3.3, Table 4.1, Table 4.2 and Table 4.3	Review of the requirements in accordance with the revision of MARPOL Annex VI
2.1	October 2011	Table 4.1, Table 4.2 and Table 4.3	Addition of features related to preventing global warming
3.0	May 2013	Table 3.2 and Table 3.3	Review of the requirements in accordance with the revision of MARPOL Annex VI (Addition of requirements related to energy efficiency)
		Table 4.1, Table 4.2 and Table 4.3	Addition of features related to air pollution prevention
		Table 3.3 – 1.1	Review of the items applicable to oil tankers
		Table 4.3 – 2.4.2	Review of the requirement for greywater
3.1	March 2016	Table 4.1, Table 4.2 and Table 4.3	Addition of features related to preventing global warming
4.0	June 2021	Introduction, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 3.3, Table 3.1, Table 3.2, Table 3.3, Table 4.1, Table 4.2, Table 4.3, Chapter 5 (New) and Appendix 1 (New)	<ul style="list-style-type: none"> - Addition of terminology, abbreviations - Addition of description of Sustainable Development Goals (SDGs) - Addition of provisions of dispensation for ships not engaged on international voyages - Review of minimum requirements • Oil pollution prevention: drip trays at air pipes connected with oil tank (except for cargo oil tank), COW manual, crude oil washing machines • Noxious liquid substances pollution prevention: Prewashing systems • SOx: Sulphur content, EGCS Ozone depleting substance: ODP and GWP of extinguishing agents • Onboard incinerators: relocation • Energy efficiency: SEEMP, DCP • BWM: relocation from additional features • SMC: environmental officers - Review of additional features • Change the numbering • Oil pollution prevention: High level alarms for lubricating oil tanks and hydraulic oil tanks, Environmentally acceptance lubricants • Sewage discharge prevention: High level

			<p>alarms for greywater tank</p> <ul style="list-style-type: none"> • Oil pollution prevention: Reduction in NOx emissions (Tier III), EU Stage V, GWP of refrigerants and extinguishing agents • Biofouling prevention: Management of biofouling <ul style="list-style-type: none"> - Establishment of Chapter 5 (Advanced environmental measures) • Reduction in greenhouse gas emission: relocation from additional features, withdrawal of description for percentage of amount of generated power • Propulsion performance: relocation from additional features for ALS, addition of ESA <ul style="list-style-type: none"> - Addition of Appendix 1 ClassNK-Innovation Endorsement Approach
4.1	February 2024	1.1.3, Table 1.2, Figure 1.20, 3.3, 4.3, Table 3.3, Table 4.1, Table 4.2, Table 4.3, Table 5.1, Table 5.2, Table 5.3 and Appendix 1	<ul style="list-style-type: none"> - Addition of terminology for green steel products and microplastics - Addition of the usage of green steel products for hull structural steel - Addition of Microplastics Collecting Systems - Amendment of the requirements related to SOx and NOx. - Amendment of the reference for Global Warning Potential. - Amendment of the image of ClassNK Innovation Endorsement

ENVIRONMENTAL GUIDELINES

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ENVIRONMENTAL GUIDELINES

Chapter 1 GENERAL PROVISIONS

1.1 General

1.1.1 Application

This Environmental Guidelines (hereinafter referred to as “the Guidelines”) applies to ships classed with the NIPPON KAIJI KYOKAI (hereinafter referred to as “the Society”), taking environmental measures and submitting an application for the affixation of notation to ship classification characters. It is assumed that the verification of the safety aspects of the ships to which the Guidelines applies has been carried out in the process required for classification in accordance with the provisions of the Rules for the Survey and Construction of Steel Ships, etc.

1.1.2 Class Notations

- 1 “*Environmental Awareness*” (abbreviated to *EA*) and additional marks are affixed to the classification characters of ships taking environmental measure according to the Guidelines.
- 2 Notwithstanding -1 above, “*Advanced Environmental Awareness*” (abbreviated as *a-EA*) are affixed to the classification character of ships taking advanced environmental measures according to the Guidelines.
- 3 Requirements based on the Guidelines are optional and are not conditions for class maintenance. However, in cases where the environmental measures covered by the Guidelines are not properly maintained, the relevant notation and additional marks will be deleted accordingly.

1.1.3 Terminology

The following are supplementary explanations of terms that are important in the application of the Guidelines.

- **MARPOL (International Convention for the Prevention of Pollution from Ships)**

It stipulates regulations on the construction and equipment of ships in order to prevent environmental pollution caused by ship operations and accidents. Annex I provides for the prevention of marine pollution by oil, Annex II provides for the prevention of marine pollution by chemical substances (limited to noxious liquid substances in bulk), Annex III provides for the prevention of marine pollution by harmful substances in packaged form, Annex IV provides for the prevention of marine pollution by sewage, Annex V provides for the prevention of marine pollution by garbage, and Annex VI provides for the prevention of air pollution and the reduction of greenhouse gases.

- **AFS (International Convention on the Control of Harmful Anti-fouling Systems on Ships)**

It stipulates restrictions on the use of antifouling paints applied to ship hulls to prevent marine organisms (such as shellfish) from attaching to the hull with respect to antifouling paints containing substances (such as TBT(tributyltin) and other organotin compounds) that have an adverse effect on the marine environment.

- **BWM (International Convention for the Control and Management of Ships' Ballast Water and Sediments)**

It stipulates ballast water treatment and exchange by mechanical, physical, chemical and biochemical means or combinations thereof in order to prevent the transboundary transfer of aquatic organisms affecting the marine environment by ship ballast water.

- **ISM CODE**

It stipulates quality standards for the safety management of ships (ships equipment, operators and managers) in order to protect human life and the marine environment from marine casualties resulting from human error in ship operations.

- **Oily-water Separating Equipment (Bilge Separator)**

Equipment that separates an oily mixture containing oil produced by leakage or maintenance work in machinery spaces into oil and water with a certain oil concentration or less. In general, the equipment consists of an oil-water separator, an oil concentration meter (including an alarm device), and an automatic shutdown device (such as a three-way valve). Discharge into the sea of oily mixtures with an oil concentration exceeding 15 ppm is prohibited under Regulation 14 of Annex I to the MARPOL Convention.

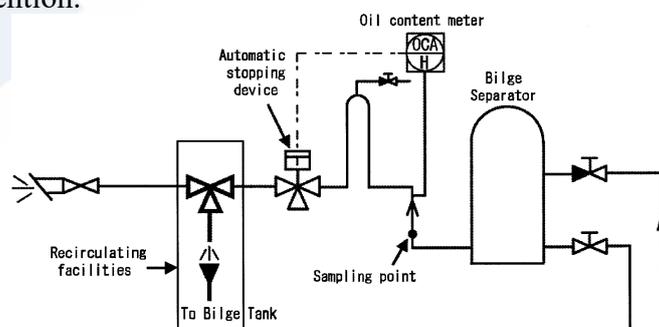


Figure 1.1 Oily-water Separating Equipment

• **Oil Discharge Monitoring and Control Systems (ODM)**

Systems found on tankers that constantly monitor whether the oil content is kept below a certain level and control (such as stopping) discharge when the oil content exceeds the certain level in cases where the tanker discharges overboard oil mixtures of oily ballast or tank cleaning water that are ballasted in its cargo tanks.

CleanTrack 1000B

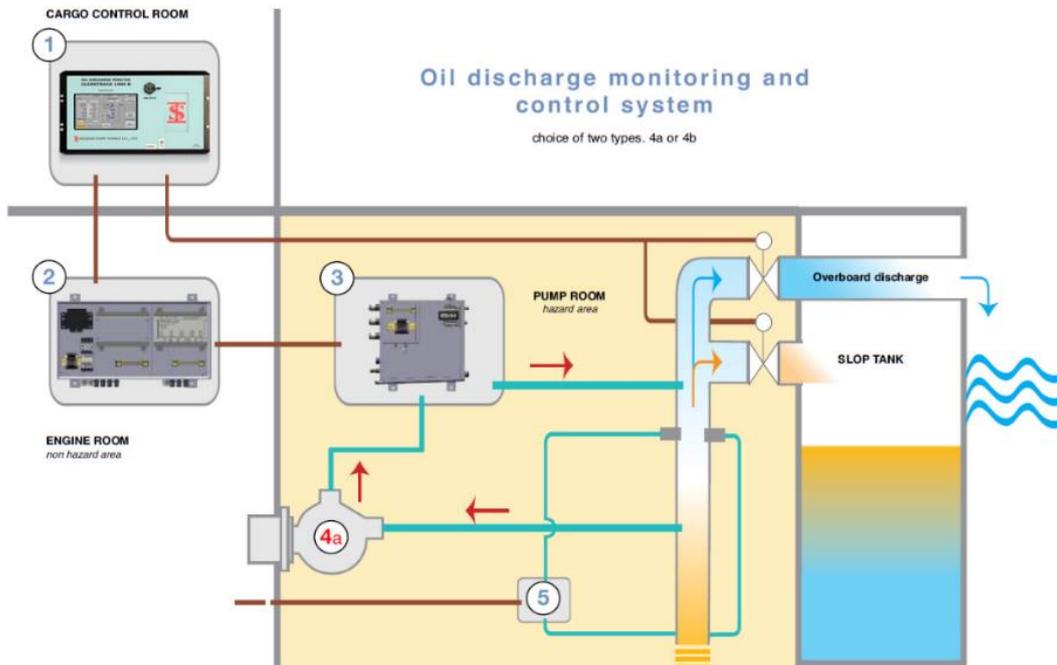


Figure 1.2 Oil Discharge Monitoring and Control System
(Courtesy of HSN-KIKAI KOGYO Co., Ltd.)

• **Crude Oil Washing Systems (COW)**

Systems that are used to clean the insides of the cargo tanks of tankers. It dissolves the residual oil and sludge remaining in the cargo tanks after the unloading of crude oil by injecting a portion of the crude oil into the tanks at high pressure during the unloading operation, and then transporting them with the crude oil to onshore receiving facilities.

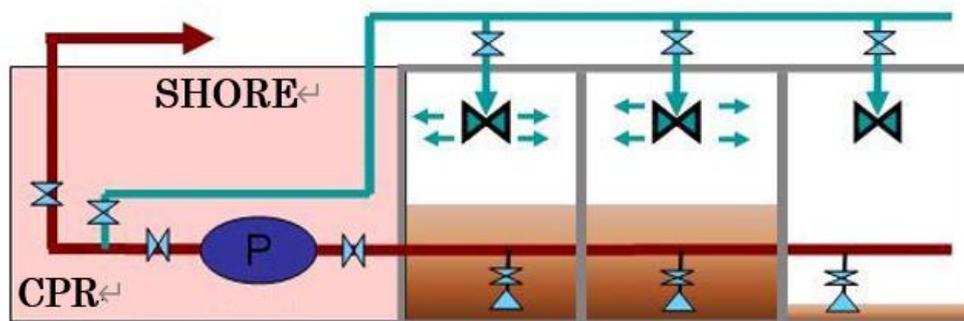


Figure 1.3 Arrangement of Crude Oil Washing Systems

• **Prewashing Systems**

Systems similar systems to crude oil washing systems (COW) that are used to wash the insides of the cargo tanks of chemical tankers. It washes residues remaining in the cargo tanks by injecting fresh water into the tanks at high pressure after the unloading of liquid chemical cargoes, and then transporting the washing water to onshore receiving facilities.



Figure 1.4 Nozzle of Prewashing Systems

• **Sewage Treatment Plants**

Systems that purify wastewater and waste from toilets and urinals, wastewater from medical premises, and other wastewater generated during ships operations by physical or chemical means.



Figure 1.5 Sewage Treatment Plant

• **Volatile Organic Compounds**

A general term for organic compounds that are easily volatilized at normal temperatures and pressures (including toluene, xylene, ethyl acetate), and a wide variety of other substances found in crude oil, gasoline, and chemicals. Such compounds are known to be a cause of photochemical oxidants (oxidizing substances in the atmosphere that cause photochemical smog) and suspended particulate matter (particles smaller than 10 micrometers).

• **NOx Emission Control**

Nitrogen oxides (NOx) is a general term for oxides of nitrogen such as NO and NO2. Regulation 13 of Annex VI of the MARPOL Convention regulates the concentration of NOx in exhaust gas for diesel engines installed on ships with an output of more than 130 kW (except for emergency engines). NOx released into the atmosphere is known to be the cause of photochemical smog and acid rain. NOx from diesel engines is mainly produced by the combination of nitrogen (N) and oxygen (O2) in the air when the material is burned at high temperatures.

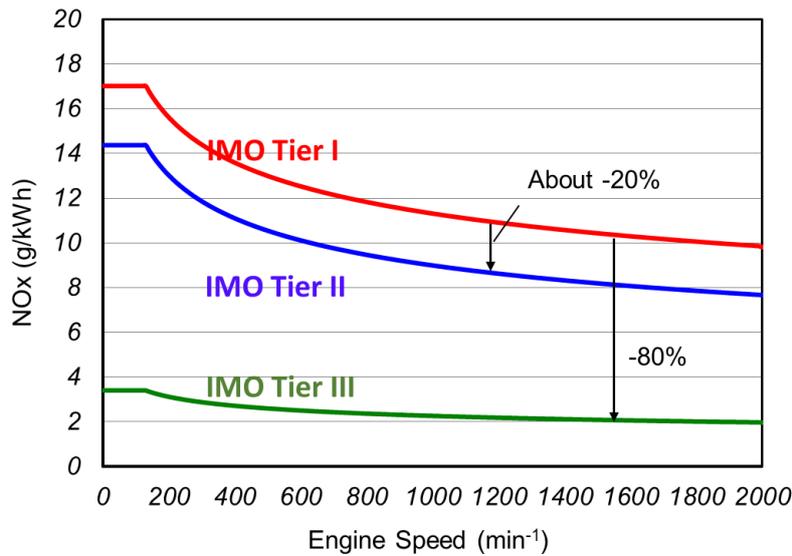


Figure 1.6 NOx emission limits

• **SOx and Particulate Matter Emission Control**

Sulphur oxides (SOx) is a general term for oxides of sulphur such as SO2 and SO3. SOx from ships is mainly produced when the sulphur content in fuel oil is burned. In addition, the condensation of SOx produces particulate matter (PM). Regulation 14 of Annex VI of the MARPOL Convention mainly regulates the concentration of sulphur in fuel oil. SOx released into the atmosphere is known to cause respiratory diseases and acid rain.

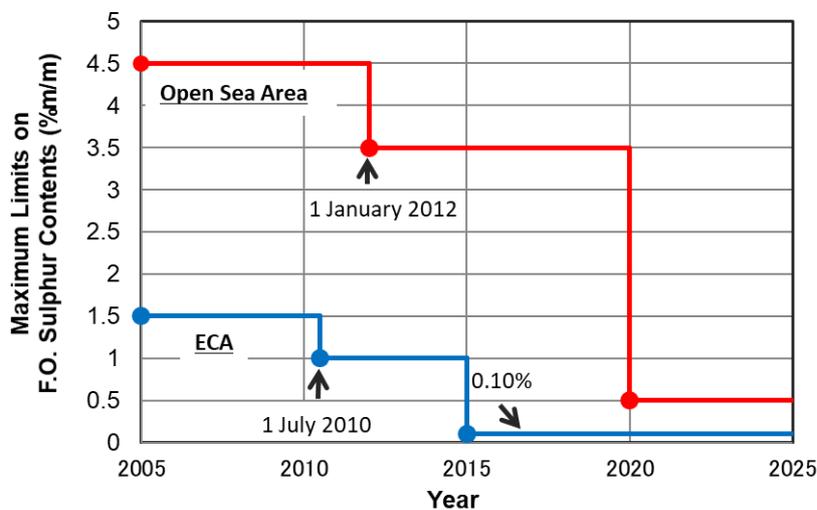


Figure 1.7 Limits of sulphur content in marine fuel oil

• **Emission Control Area (ECA)**

Annex VI of the MARPOL Convention stipulates Emission Control Areas (ECAs), which are separate from open sea areas and subject to stricter regulations, for the purpose of preventing air pollution and adverse effects on human health and the environment caused by emissions of nitrogen oxides (NOx), sulphur oxides (SOx) and particulate matter (PM). The ECAs include the North America (U.S. and Canadian coast), the U.S. Caribbean Sea, the Baltic Sea, and the North Sea.

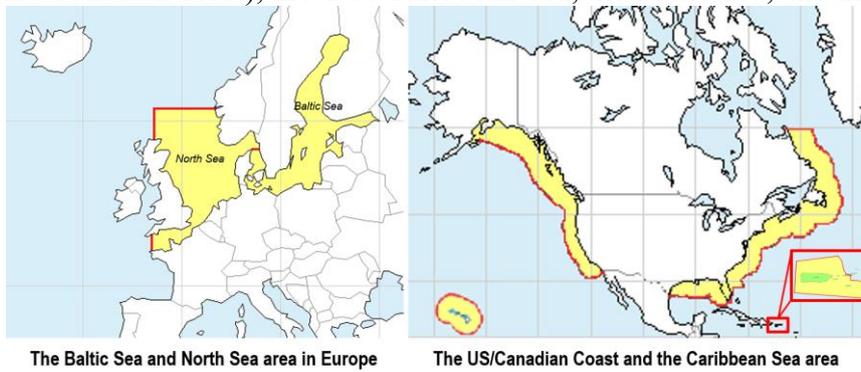


Figure 1.8 Emission Control Area (ECA)

• **Exhaust Gas Cleaning Systems (EGCS)**

Systems to reduce sulphur oxides (SOx) contained in exhaust gas. A wet exhaust gas cleaning system (EGCS) that uses cleaning water to purify exhaust gas is the most commonly used, and typical methodologies include open-loop, closed-loop, and hybrid types.

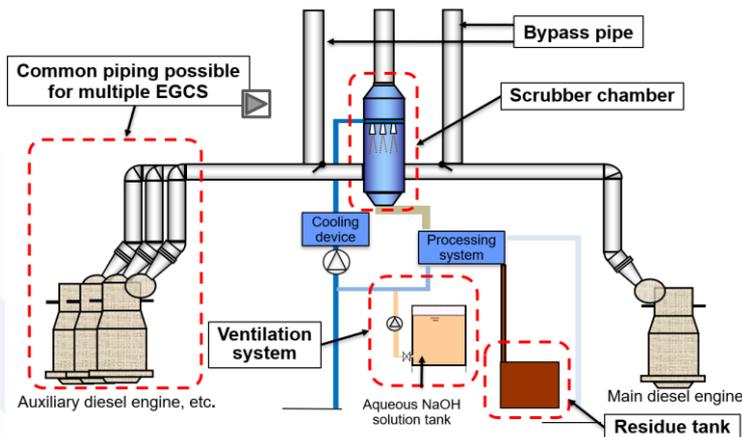


Figure 1.9 Arrangement of exhaust gas cleaning system (closed-loop type)

• **Ozone Depletion Potential (ODP)**

Relative ozone depleting impact of other substances when the ozone depleting impact of CFC-11 (trichlorofluoromethane), an ozone depleting substance, is set as the standard (1.0). Examples are shown in Table 1.1.

Table 1.1 Ozone Depletion Potential and Global Warning Potential

	CFC (Out of production)		HCFC (Out of production)		HFC		Others	
	R11	R12	R22	R123	R134a	R410A	CO2 (R744)	Ammonia (R717)
ODP	1	1	0.055	0.02	0	0	0	0
GWP	4750	10900	1810	77	1430	2090	1	0

• **Global Warming Potential (GWP)**

The relative global warming impact of other substances when the global warming impact of carbon dioxide, a global warming substance, is set as the standard (1.0). It generally refers to an accumulation period of 100 years. Examples are shown in Table 1.1 above.

• **Incinerators**

Equipment provided for the incineration of liquid wastes (such as sludge) and solid wastes (such as garbage) generated on board. Regulation 16 of Annex VI of the MARPOL Convention specifies the functional requirements for such equipment and also specifies the substances prohibited from being incinerated on board, such as plastics and heavy metals.



Figure 1.10 Incinerator (Courtesy of Miura Co., Ltd.)

• **Air Seal in Stern Tube Systems**

Systems to prevent the outflow of lubricating oil and the inflow of seawater into the stern tube by providing air spaces between the seals of the aft stern tube sealings devices and applying appropriate pressure to the air spaces in the case of oil lubricated (i.e. system to lubricate stern tube bearings by oil) stern tubes.

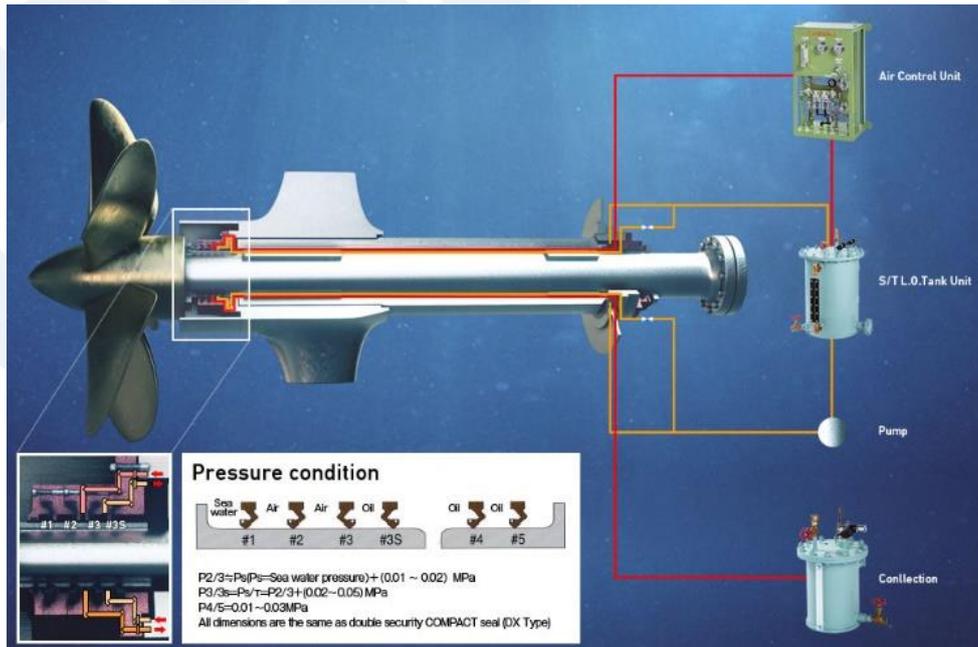


Figure 1.11 Stern Tube Air Seal (Courtesy of Eagle Industry Co., Ltd.)

- **Environmentally Acceptable Lubricants**

A lubricant that meets the definition of biodegradable, non-toxic, and non-bioaccumulative as specified in the 2013 VGP Appendix A, as opposed to conventional mineral oil-based lubricants. The U.S. Environmental Protection Agency (EPA), in its 2013 VGP regulations, requires all ships entering U.S. waters to use environmentally acceptable lubricants in all oil-to-sea interfaces. Although the 2013 VGP regulation was originally planned to be effective from 19 December 2013 to 18 December 2018 (5 years), it is currently still in force because the VIDA (Vessel Incidental Discharge Act) states that its effectiveness may be extended until the EPA or USCG finalize and implement new regulations.



Figure 1.12 Environmentally Acceptable Lubricants
(Courtesy of Eagle Industry Co., Ltd.)

- **N₂ Generators**

Systems for generating high-purity nitrogen that becomes inert gas by separating air into nitrogen and other gases using membranes or adsorbents. Compared to inert gas generators that use combustion gas from boilers, etc., there is less adverse effect on cargo because there are no impurities such as soot.



Figure 1.13 Membrane N₂ Generator System (Courtesy of Kashiwa Co., Ltd.)

• **High Voltage Shore Connection Systems**

Systems for receiving high voltage shore electric power on board. The equipment is required in order to supply electric power to facilities that require a large amount of power (such as cargo handling equipment, reefer containers, etc.) by supplying the electric power from shore power sources instead of onboard power generation. The functional requirements and requirements for inspections for such equipment are to be in accordance with the Guidelines for High Voltage Shore Connection Systems.

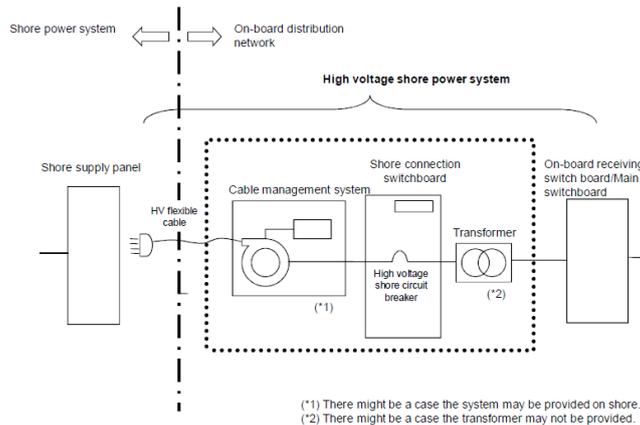


Figure 1.14 Arrangement of High Voltage Shore Connection System (Excerpt from Guidelines for High Voltage Shore Connection Systems)

• **Marine Growth Prevention Systems (MGPS)**

Systems to prevent attachment and growth of aquatic organisms in water intakes, seawater lines, etc. by injecting sodium hypochlorite or copper ions (produced by electrolysis of chlorine or seawater) into seawater intakes such as sea chests.

• **Organic Rankine Cycle Generators**

Power generation systems that uses an organic heating medium with a low evaporation temperature (low boiling point) instead of water and steam which are normally used as heating medium in a Rankine cycle power generation system consisting of a main boiler, auxiliary boiler, exhaust gas economizer, turbine, etc. The system has excellent waste heat recovery capability since steam is generated at a low boiling point.

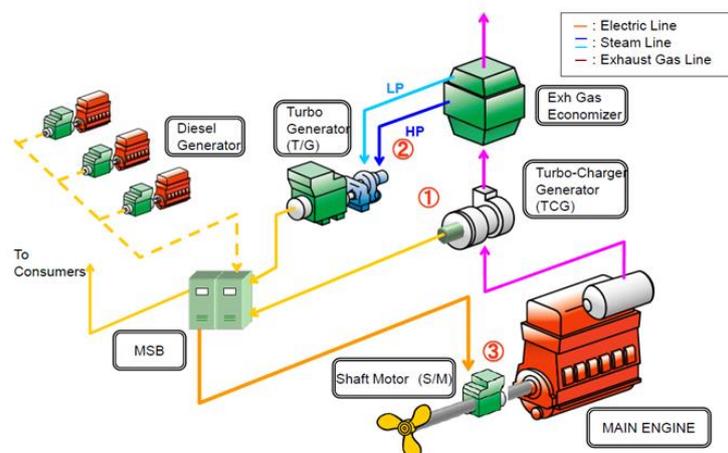


Figure 1.15 Rankine Cycle Generator (Excerpt from the ClassNK research results report of “Research on Next Generation Waste Heat Recovery System and Engine Plant Operation Optimization System (Joint Researchers: Kawasaki Kisen Kaisha, Ltd. and Japan Marine United Corporation)”))

• **Bottom Air Lubrication Systems**

Systems to reduce frictional resistance between seawater and the ship bottom by sending air into the bottom form an air layer.

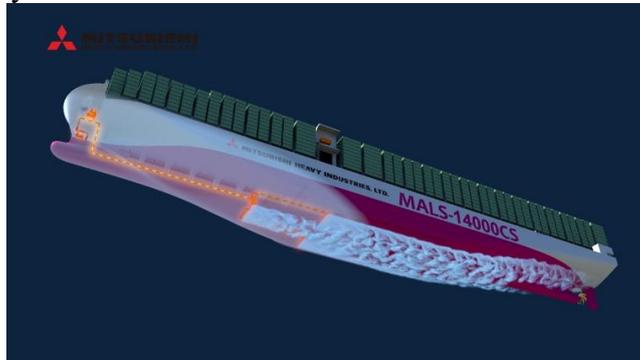


Figure 1.16 Image of Bottom Air Lubrication System (Courtesy of Mitsubishi Shipbuilding Co., Ltd.)

• **Contra-Rotating Propeller**

Equipment used to collect swirling flow as thrust by catching the swirling flow generated by the forward propeller with the rear propeller rotating in the reversing direction in order to improve ship propulsion.



Figure 1.17 Contra-rotating Propeller (Courtesy of Nakashima Propeller Co., Ltd.)

• **Energy Saving Additives**

Additives provided for propellers or rudders at the sterns of ships to improve propulsion. There are various additives such as fins to rectify the flow into the propeller, fin caps to adjust the hub vortex at the trailing edge of the propeller, rudder valves and ducts to reduce the flow velocity into the propeller and improve the wake gain.



Figure 1.18 Propeller Boss Cap Fins (PBCF) (Courtesy of MOL Techno-Trade, Ltd.)



Figure 1.19 SURF-BULB (Courtesy of Japan Marine United Corporation)

• **Green Steel Products**

Steel products manufactured by utilizing technologies that substantially reduce or eliminate the emission of carbon dioxide in the steel production process (all or part of the entire production process from raw materials to steelmaking). For example, in the blast furnace process of making pig iron from iron ore, coal (coke) is used to reduce the iron ore, and a large amount of carbon dioxide is released in the series of processes until pig iron is produced. Technologies are being considered to reduce or eliminate these carbon dioxide emissions, such as methods to use methane gas (CH₄) or hydrogen gas (H₂) as reductant substituting for or in combination with coal (coke), utilization of carbon dioxide capture technology, and use of high-efficiency and large electric furnaces (including decarbonization of their power sources).

Using the above technologies, major steelmakers in various countries have started offering green steel products with significantly reduced carbon dioxide emissions during production process compared to conventional steel products. Table 1.2 shows examples of the categories of CO₂ reduction technologies.

Table 1.2 Carbon dioxide reduction technologies for green steel products

Technologies to reduce carbon dioxide emissions in steel production process			Concept of carbon dioxide reduction in Green Steel Products	
Reduction in steel production processes	Blast furnace process	① Introduction of energy-saving and high-efficiency processes • Next generation coke oven technology (SCOPE 21), etc. ② Utilization of low-carbon raw materials and fuels • Expansion of scrap utilization (charging to converter furnaces) • Utilization of reduced iron using natural gas (ex. HBI ^{*1})	Mass balance system ^{*2}	In accordance with ISO 22095 ^{*3} , the system that amount of carbon dioxide emission reductions achieved through initiatives such as ① Energy-saving and high efficiency, ② Decarbonization of raw materials and fuels, and ③ Introduction of innovative technologies, are considered as organizational credits, and the credits are given to any steel product within the mass balance range to make steel products with low carbon dioxide emission intensity.
		③ Low-carbon process • Introduction 100% hydrogen direct reduction process • Application of direct reduction iron • Introduction of large electric furnace • Introduction of blast furnace hydrogen reduction technology		
	Electric furnace process	① Scrap utilization (current status) ② Application of direct reduced iron ③ Introduction of large electric furnaces (production of high-grade steel by electric furnaces)	—	—

*1) Hot Briquette Iron

*2) The Japan Iron & Steel Federation, "Guidelines for green steel upon the application of the mass balance approach"

*3) 5.4.2 Mass balance model in ISO 22095 "Chain of custody- General terminology and models"

• **Microplastics**

Marine plastic waste that is smaller than 5 mm in length. Microplastics are generated from a variety of plastic products, including plastic bottles, food packaging containers, garbage bags, synthetic fibers for clothing, and artificial grass. These sources are discharged into the ocean, where they are fragmented and formed by physical forces such as ultraviolet rays from sunlight, and waves. In recent years, there have been concerns about the effects of microplastics in the ocean on marine organisms and the marine ecosystem, such as the fact that microplastics in the ocean are taken into the bodies of marine organisms and remain undecomposed and the effects of chemical substances contained in or adsorbed by microplastics.



Figure 1.20 Microplastics (GESAMP website)

1.1.4 Abbreviations

The following are main abbreviations that are used in the Guidelines.

AFS: Anti-Fouling System

BWM: Ballast Water Management

BWMP: Ballast Water Management Plan

BWMS: Ballast Water Management System

CFR: Code of Federal Regulation (United States of America)

CO: Carbon Monoxide

COW: Crude Oil Washing

ECA: Emission Control Area

EEDI: Energy Efficiency Design Index

EGCS: Exhaust Gas Cleaning System

EIAPP: Engine International Air Pollution Prevention Certificate

EPA: United States Environmental Protection Agency

ETAS: Emergency Technical Assistance Service (Only used by ClassNK)

EU: European Union

GWP: Global Warming Potential

HC: Hydrocarbon

HCFC: Hydro-chlorofluorocarbons

IACS: International Association of Classification Societies

IAPP: International Air Pollution Prevention Certificate

IEE: International Energy Efficiency Certificate

IMO: International Maritime Organization

IPCC: Intergovernmental Panel on Climate Change

IWA: Inland Waterway Auxiliary (REGULATION(EU)2016/1628)

IWP: Inland Waterway Propulsion (REGULATION(EU)2016/1628)

ISM: International Safety Management

MARPOL: International Convention for the Prevention of Pollution from Ships

MEPC: Marine Environmental Protection Committee (IMO)

MGPS: Marine Growth Prevention System

N₂: Nitrogen

NO_x: Nitrogen Oxides

OCIMF: Oil Companies International Marine Forum

ODM: Oil Discharge Monitoring

ODP: Ozone Depletion Potential

P&A: Procedures & Arrangements

PM: Particulate Matter

PN: Particulate Number

ppm: Parts per Million

PR: Procedural Requirements (IACS)

SCR: Selective Catalytic Reduction

SDS: Safety Data Sheet

SEEMP: Ship Energy Efficiency Management Plan

SOPEP: Shipboard Oil Pollution Emergency Plan

SO_x: Sulphur Oxides

SMPEP: Shipboard Marine Pollution Emergency Plan

SMC: Safety Management Certificate

USCG: United States Coast Guard

VGP: Vessel General Permit

VOC: Volatile Organic Compound

1.1.5 Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development was adopted at the UN Sustainable Development Summit in September 2015. This agenda defines the Sustainable Development Goals (hereinafter referred to as SDGs) that are to be achieved by 2030. The SDGs are comprised of 17 goals and 169 targets that cover a wide variety of areas (see Figure 1.20).

The efforts to address the SDGs have become an important topic that cannot be ignored by all industries in the course of their corporate activities. Particularly in the maritime industry, there are many topics directly related to environmental issues such as marine pollution, air pollution, destruction of ecosystems, and global warming; therefore, the efforts to address the SDGs related to these issues have become important for sustainable corporate activities.

It goes without saying that the environmental measures taken by each ship based upon this “Environmental Guidelines” will be part of the efforts to address the SDGs, and it will be important to clarify the social significance of the environmental measures taken by each ship. In the Guidelines, therefore, relevant SDGs icons for clarification purposes are provided for minimum requirements (Table 3.3), for each requirement for additional features (Table 4.1), and for each requirement for advanced environmental measures (Table 5.1).

The goals and targets of all SDGs relevant to the Guidelines are shown in Table 1.1.



Figure 1.20 Sustainable Development Goals (SDGs)

Table 1.1 Relevant Sustainable Development Goals (SDGs)

Relevant SDGs	Goal	Relevant Targets
	Ensure healthy lives and promote well-being for all at all ages	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
	Ensure access to affordable, reliable, sustainable and modern energy	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix 7.3 By 2030, double the global rate of improvement in energy efficiency 7.A By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
	Ensure sustainable consumption and production patterns	12.2 By 2030, achieve the sustainable management and efficient use of natural resources 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
	Take urgent action to combat climate change and its impacts	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 13.2 Integrate climate change measures into national policies, strategies and planning 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
	Conserve and sustainably use the oceans, seas and marine resources	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Chapter 2 AUDITS

2.1 General

2.1.1 Kinds of Audits

The kinds of audits are specified as follows.

- (1) Initial Audit
- (2) Periodical Audit
- (3) Occasional Audit

2.1.2 Timing of Audits

The timing of audits is specified as follows.

- (1) Initial Audits are to be carried out at the time the application for the audit is made.
- (2) Periodical Audits are to be carried out at the times of Annual Surveys, Intermediate Surveys and Special Surveys for Classification (e.g. the times given in **1.1.3-1(1) to (3), Part B of the Rules for the Survey and Construction of Steel Ships**).
- (3) Occasional Audits are to be carried out on the following occasions at times other than Initial Audits or Periodical Audits.
 - (a) In cases where the environmental measures of ships are changed or replaced.
 - (b) In cases where any conversion affecting the environmental measures of ships are carried out.
 - (c) In cases where any applications for audits are submitted by owners.
 - (d) Other occasions when Occasional Audits are considered to be necessary.

2.1.3 Periodical Audits Carried Out in Advance and Postponement

The requirements for Periodical Audits carried out in advance are to be in accordance with the provisions relevant to Periodical Surveys for Classification (e.g. **1.1.4** or **1.1.5, Part B of the Rules for the Survey and Construction of Steel Ships**).

2.1.4 Ships Laid-up

Ships laid-up are not subject to the Periodical Audits specified in **2.1.1(2)**.

2.1.5 Preparation for Audits and Other Related Issues

- 1 In cases where ships are to be audited in accordance with the Guidelines, it is the responsibility of the Owners to notify Surveyors of the locations where they wish to undergo such audits. Surveyors are to be advised of audits a reasonable time in advance so that such audits can be carried out at proper times.
- 2 Applicants for audits are to arrange necessary preparations as required for registration, periodical and other audits specified in the Guidelines as well as those which may be required by Surveyors in accordance with provisions given in the Guidelines.
- 3 Applicants for audits are to arrange supervisors who are well conversant with all of the audit items required for the preparation of such audits and who are able to provide all necessary assistance to the Surveyor according to their requests during such audits.
- 4 Audits may be suspended in cases where necessary preparations have not been made, any appropriate supervisor is not present, or the Surveyor considers that the safety needed for the execution of the audit is not ensured.
- 5 In cases where repairs are considered to be necessary as a result of audits, Surveyors are to notify audit applicants of their findings. Applicants, upon receiving such notification, are to obtain Surveyor verification after carrying out any necessary repairs.

2.2 Initial Audits

2.2.1 General

During Initial Audits, environmental measures of ships are to be examined in order to ascertain whether the ship meets the relevant requirements in the Guidelines.

2.2.2 Submission of Plans and Documents

- 1 At Initial Audit, the relevant plans and documents specified in **Chapters 3 to 5** are to be submitted to the Society.
- 2 Notwithstanding the requirement specified in -1 above, it is not necessary to submit a separate set of the documents specified in -1 above for Initial Audits at Classification Surveys During Construction.
- 3 Submission of additional plans and documents may be required in cases where deemed necessary by the Society.

2.2.3 Audit Items

During Initial Audits, the following items are to be confirmed.

- (1) The appropriate installation of all relevant equipment.
- (2) The proper provision on board of all relevant documents, procedures manuals and record books.
- (3) In cases where Initial Audits are to be carried out at times other than at Classification Surveys During Construction, the proper maintaining on board of all relevant equipment, documents, procedural manuals, and record books, etc. In addition, required record keeping is being carried out for record books, etc.

2.3 Periodical Audits

2.3.1 General

During Periodical Audits, the environmental measures of ships are to be examined in order to ascertain whether the relevant requirements given in the Guidelines are satisfied.

2.3.2 Audit Items

During Periodical Audits, the following items are to be confirmed.

- (1) The condition of any relevant equipment is to be in good order.
- (2) Appropriate maintaining of all relevant documents, procedures manuals, etc.
- (2) Appropriate maintaining of all relevant record books, etc., and required record keeping is being carried out.

2.4 Occasional Audits

2.4.1 General

In cases where the environmental measures of ships are changed or replaced, Occasional Audits are to be carried out and such environmental measurements are to be confirmed as complying with the requirements given in the Guidelines.

Chapter 3 MINIMUM REQUIREMENTS

3.1 General

3.1.1 Application

The requirements given in this chapter are applicable to all ships to be affixed with notation to their classification characters according to the Guidelines. The audit items consist of the conventional requirements and additional requirements specified in **Table 3.1**.

3.1.2 Submission of Plans and Documents

During Initial Audits, the plans and documents specified in **Table 3.2** are to be submitted to the Society in order to audit the items specified in **Table 3.1**.

3.2 Minimum Requirements

Ships subject to the application of the Guidelines are to take the environmental measures specified in **Table 3.3**.

3.3 Dispensation for Ships not engaged on International Voyages

Ships not engaged on international voyages are not required to comply with the requirements of **1.5.2-5, 1.5.6** and **1.7** of environmental measures specified in **Table 3.3**.

Table 3.1 Audit Items

Category 1	Category 2	Items	Submissions (Table 3.2)	Requirements (Table 3.3)	Relevant SDGs
Marine Pollution Prevention	Oil Pollution Prevention	Compliance with MARPOL ANNEX I and additional requirements	1.1	1.1	    
	Noxious Liquid Substance Pollution Prevention	Compliance with MARPOL ANNEX II and additional requirements	1.2	1.2	
	Sewage Discharge Prevention	Compliance with MARPOL ANNEX IV and additional requirements	1.3	1.3	
	Garbage Discharge Prevention	Compliance with MARPOL ANNEX V and additional requirements	1.4	1.4	
Air Pollution Prevention	Air Pollution Prevention	Compliance with MARPOL ANNEX VI and additional requirements	1.5	1.5	
Preventing Destruction of Ecosystem	AFS	Compliance with the AFS Convention	1.6	1.6	
	BWM	Compliance with relevant parts of the BWM Convention	1.7	1.7	
Safety Management System	SMC	Compliance with relevant parts the SOLAS Convention and additional requirements	1.8	1.8	

Table 3.2 Plans and Documents to Be Submitted

Items		Plans and Documents to Be Submitted
1.1	1	Certificate or Statement of Compliance (if already provided)
	2*	Procedures containing measures for preventing pollution due to discharge of oil generated in machinery spaces
	3*	Procedures containing measures for preventing pollution due to discharge of oil generated in cargo spaces (tankers only)
	4*	Drawings, etc. -1. Capacity and piping arrangement of bilge water storage tanks, waste oil tanks and sludge tanks -2. Arrangement of contact points for the loading and discharging of oils other than cargo oil and the arrangement of air pipes and associated drip trays, etc. -3. Particulars of oil discharge prevention systems (May be an operational manual for the oil discharge monitoring and control system (ODM manual) related to cargo, and the bilge separator manufacturer's instruction manual for systems related to engine room bilges) -4. High level alarms/overflow systems of fuel tanks, fuel oil settling and service tanks -5. Arrangement of cargo and ballast water tanks (tankers only) -6. Plan views of cargo and ballast water arrangement systems, including systems to prevent the overfilling of cargo tanks (tankers only) -7. Arrangement of tanker cargo manifolds, associated drip trays and discharge systems (tankers only) -8. Details of Crude Oil Washing Machine (COW) (tankers of 20,000 tons deadweight and above only) -9. COW Manual (tankers of 20,000 tons deadweight and above only) -10. ODM Manual (tankers only) -11. Shipboard Oil Pollution Emergency Plan (SOPEP) -12. Membership certificate of emergency assistance system (NK ETAS or an equivalent service provided by another classification society)
1.2	1	Certificate or Statement of Compliance (if already provided)
	2	Procedure manuals listed below. -1. Procedures and Arrangements Manual (P&A Manual) -2. Shipboard Marine Pollution Emergency Plan for noxious liquid substances (SMPEP)
	3	Details of Prewashing System
1.3	1	Certificate or Statement of Compliance (if already provided)
	2	If a sewage treatment plant is installed, a certificate issued by the Administration or representative organization certifying that the plant complies with IMO Resolution MEPC.2(VI), MEPC.159(55) or MEPC.227 (64) as amended by MEPC.284(70) depending on the date of installation.
	3*	Procedures containing measures for sewage treatment
	4	Drawings, etc. -1. Details of sewage treatment and disposal systems -2. Capacity of sewage storage or treatment systems -3. Sewage piping system drawings -4. Maximum number of crew members and passengers
1.4	1*	Procedure containing measures for garbage treatment (May be included in the Garbage Management Plan)
1.5	1	Certificates (IAPP and IEE) or Statement of Compliance (if already provided) and items 1.5.1 to 1.5.6 below
1.5.1	1	An Engine International Air Pollution Prevention (EIAPP) Certificate or MARPOL Annex VI Statement of Compliance of requirements related to NOx emissions
	2	Statements indicating engine model, rated output, application and NOx emission value
	3	If NOx post-treatment system is installed, the details of said system
1.5.2	1*	Procedure for the control of sulphur content of fuel oil at the time of purchase of fuel
	2	Procedure manual for fuel oil change-over for ships entering or leaving SOx Emission Control Areas (ECA) and if ships switch between two or more types of fuel oil to comply with the regulations in the ECA.
	3	If exhaust gas cleaning system to reduce SOx is installed, the details of said system

Table 3.2 Plans and Documents to Be Submitted (continued)

Items		Plans and Documents to BeSubmitted
1.5.3	1*	Procedure for the work to be performed for controlling the loss, leakage, discharge and disposal of refrigerants
	2*	Drawings, etc. -1. Arrangement of refrigerating systems -2. Capacity of refrigerating systems -3. Details of refrigerants used -4. Details of the fire fighting media used in fixed type and portable fire extinguishing systems
1.5.4	1	Certificate from the Administration or representative organization indicating that incinerating equipment complies with Regulation 16, MARPOL Annex VI
	2*	Procedure for onboard incineration (if 1 above is applicable)
1.5.5	1	VOC Management Plan (crude oil tankers only)
1.5.6	1	Ship Energy Efficiency Management Plan (SEEMP)
1.6	1	Certificate or Statement of Compliance (if already provided)
1.7	1	Ballast Water Management Plan approved by the Society or other classification society
	2	Certificate issued by the competent authority or an organization recognized as appropriate by the Administration certifying that the ballast water treatment system (if provided) complies with the D-2 regulation of the BWM Convention.
	3	Details of the ballast water treatment system (if 2 above is applicable)
1.8	1	Certificate or Statement of Compliance (if already provided)
	2*	A list specifying their names, positions and relevant duties of environmental officers

Note

(1) An asterisk (*) at the end of each item number indicates additional requirements (or part of additional requirements).

Table 3.3 Minimum Requirements

Items	Requirements	
1.1	1	Related to Oil Pollution Prevention (MARPOL ANNEX I) To maintain a MARPOL ANNEX I Certificate (or a Statement of Compliance in cases where Annex I of the MARPOL Convention is not applicable) To comply with items 2 to 20 below. (items 11 to 20 only applicable to oil tankers)
	2	Oily mixtures to be discharged from machinery spaces are never to exceed 15 ppm under any circumstances and are to pass through appropriate systems before disposal. Such systems are to also be provided with arrangements to ensure that any discharge of oily mixtures is automatically stopped in cases where the oil content of effluents exceeds 15 ppm.
	3*	All discharges of bilge are to be recorded in the Oil Record Book.
	4*	Segregated waste oil tanks are to be installed in addition to sludge tanks for the onboard incineration of leaked oil and waste oil. Ships that use only marine gas oil as fuel oil may use sludge tanks (including bilge storage tanks approved as sludge tanks according to 2.2.1-2 of Chapter 2, Part 3 of the Rules for Marine Pollution Prevention Systems, the same applies hereinafter) as waste oil tanks.
	5	The construction and piping arrangements of sludge tanks and waste oil tanks are to be in accordance with 2.2.2 of Chapter 2, Part 3 of the Rules for Marine Pollution Prevention Systems. Manholes or access holes of sufficient size are to be provided at such positions so that each part of the tank can be cleaned without difficulty, and appropriate means to facilitate the drawing and discharge of oil residues are to be provided.
	6	Fuel oil pipes are to be entirely separate from any other pipes including the discharge piping from bilge storage tanks and sludge tanks. (13.2.2-1(1), Part D of the Rules for the Survey and Construction of Steel Ships)
	7	Standard discharge connections are to be provided in the discharge pipelines of sludge tanks and bilge storage tanks in accordance with 2.2.3 and 2.3.4(4) of Chapter 2, Part 3 of the Rules for Marine Pollution Prevention Systems.
	8*	High level alarms, overflow control devices or level monitoring systems operable from control positions are to be provided in fuel oil tanks. (Sounding pipes are not considered acceptable.)
	9*	Metallic drip trays with sufficient depth are to be provided at the contact points for the loading and discharging of oils other than cargo oil and at the air pipes connected with oil tanks.
	10*	Procedures related to handling oil and oily wastes are to be prepared, and the handling work is to be performed according to those procedures. Such procedures are to include descriptions of at least the following. -1. The loading, shifting, discharging or disposing of fuel oil, lubricating oil, and cargo oil. -2. Discharge or disposal of oil residues in sludge tanks and waste tanks, and the oily mixtures included in the bilge water of bilge storage tanks and engine rooms. -3. Procedure for the recovery of oil that has leaked onto decks.
	11	High level alarms, overflow control devices or level monitoring systems operable at control positions are to be provided in cargo oil tanks. (Sounding pipes are not considered acceptable.)
	12	Measures are to be adopted to prevent the inflow of oil that has leaked onto decks into accommodation spaces and work spaces, in accordance 4.5.1-6 of Chapter 4, Part R of the Rules for the Survey and Construction of Steel Ships.
	13	Sea suction pipes and discharge pipes for permanent ballast tanks are not to be connected to the suction and discharge pipes of cargo tanks, in accordance with 14.2.2-6 of Chapter 14, Part D of the Rules for the Survey and Construction of Steel Ships.
	14	In cases where sea suction pipes for ballasting purposes are connected to cargo oil pipes, stop valves are to be provided between the sea suction valves and the cargo oil piping, in accordance with 14.2.2-4 of Chapter 14, Part D of the Rules for the Survey and Construction of Steel Ships.
	15*	Metallic drip trays with sufficient depth are to be provided at the manifold connections of cargo pipes. The drains of such drip trays are to be led to drain tanks or other suitable oil drainage equipment.
	16*	Cargo manifolds are to be installed in accordance with OCIMF recommendations, as far as possible.
	17	Crude oil washing machines are to be provided for oil tankers of 20,000 tons deadweight and above.
	18	Approved COW Manuals, ODM Manuals and SOPEP are to be kept onboard.
	19	Work related to oil is to be entered into the Oil Record Book.
	20	ETAS related items To be registered in the Society's Emergency Technical Assistance Service (ETAS) or equivalent scheme of another classification society. (in cases where required by international conventions)

Table 3.3 Minimum Requirements (continued)

Items		Requirements
1.2	1	Related to Noxious Liquid Substances Pollution Prevention (MARPOL ANNEX II) If applicable, to maintain a MARPOL Annex II Certificate (or a Statement of Compliance in cases where Annex II of the MARPOL Convention is not applicable) To comply with items 2 to 4 below.
	2	Approved P&A Manuals and SMPEP are to be kept on board.
	3	Any cargo operation related to noxious liquid substances is to be entered into the Cargo Record Book.
	4	Prewashing systems are to be provided according to physical properties of noxious liquid substance to be carried.
1.3	1	Related to Sewage Discharge Prevention (MARPOL ANNEX IV) To maintain a MARPOL Annex IV Certificate (or a Statement of Compliance in cases where Annex IV of the MARPOL Convention is not applicable). To comply with items 2 to 5 below.
	2	Equipment for the prevention of pollution by sewage is to be installed as prescribed in Regulation 9 of Annex IV of the MARPOL Convention.
	3*	Disinfectant feed locations of sewage systems are to be easily accessible. Sampling locations are also to be easily accessible. Sampling devices may be portable.
	4*	Vent piping from sewage systems is to be independent of other ventilation systems.
	5*	To ensure sewage treatment and discharge according to Regulation 11 of Annex IV of the MARPOL Convention, procedures related to sewage treatment are to be established and implemented. These procedures are to include the following items. -1. In cases where maintenance, repairs, modifications and disinfectant feeds have been performed, records for the same are to be prepared and maintained. -2. The date, location and quantity of discharged sewage from storage tanks to reception facilities. -3. Records of discharge locations and ship operating speeds in cases where discharge equipment (sewage comminuting and disinfecting systems) according to 1.2 of Regulation 9 of Annex IV of the MARPOL Convention, has been provided.
1.4	1	Related to Garbage Discharge Prevention (MARPOL ANNEX V) To comply with items 2 and 3 below.
	2	Procedures related to the treatment of waste substances are to be prepared and effectively implemented in accordance with Annex V of the MARPOL Convention and relevant guidelines. These procedures are to include procedures for collecting, storing, processing and disposing of garbage (including the use of shipboard equipment).
	3	A form of the Garbage Record Book of Annex V of the MARPOL Convention is to be provided. The following items are to be entered into the Garbage Record Book. -1. Each discharge operation, or completed incineration, is to be recorded in the book and signed for on the date of the incineration or discharge by the officer in charge. -2. The entry for each incineration or discharge is to include the date and time, position of the ship, description of the garbage and the estimated amount incinerated or discharged. -3. In the event of any discharge, escape or accidental loss, an entry is to be made in the book describing the circumstances of, and the reasons for, such loss.
1.5	1	Related to Air Pollution Prevention (MARPOL ANNEX VI) To maintain a MARPOL ANNEX VI Certificate (or a Statement of Compliance in cases where Annex VI of the MARPOL Convention is not applicable) To comply with 1.5.1 (NO _x related items), 1.5.2 (SO _x related items), 1.5.3 (Ozone Depleting Substances related items), 1.5.4 (Onboard Incineration), 1.5.5 (VOC related items) and 1.5.6 (Energy Efficiency related items) below.
1.5.1	1	NO_x related items Applicable to the diesel engines specified in Regulations 13.1, and 13.2 of Annex VI of the MARPOL Convention.
	2	Diesel engines subject to Item 1 above are to comply with the requirements given in Regulations 13.3 to 13.5 of Annex VI of the MARPOL Convention. Ships are to possess either an Engine International Air Pollution Prevention (EIAPP) Certificate (or a Statement of Compliance in cases where Regulation 13 of Annex VI of the MARPOL Convention is not applicable) issued by the Administration or representative organization, as certification of such compliance.
	3	Diesel engines conforming to item 1 above are to be provided with a NO _x Technical File and Record Book of Engine Parameters satisfying the requirements given in Regulation 2.15 of Annex VI of the MARPOL Convention.

Table 3.3 Minimum Requirements (continued)

Items		Requirements
1.5.1	4*	In cases where NOx reduction systems are provided, the following items are to be satisfied for such systems. -1. Even if NOx reduction systems fail, engines are to operate safely and continuously without any hindrance. -2. Systems are to be operated in accordance with manufacturer instructions, if any. -3. Systems are to be designed, manufactured and fitted such that structural integrity and isolation from large vibrations are ensured. -4. Adequate size hatches are to be provided for inspections and maintenance. -5. Devices for recording operation status are to be provided. The device operation and control levels are to be recorded, and such records are to be stored.
1.5.2	1	SOx related items The sulphur content of the fuel oil used in ships is either not to exceed 0.50%, or ships are to be provided with systems (such as exhaust gas cleaning system (EGCS)) that are equivalent in effectiveness to Regulation 4 of Annex VI of the MARPOL Convention in terms of reducing sulphur oxide (SOx) emissions, as defined in Regulation 4. The following items are to be satisfied for such systems.
	2	The sulphur content of the fuel oil for ships engaged in voyages in SOx Emission Control Areas is not to exceed the values specified in Regulation 14.4, Annex VI of the MARPOL Convention. Or, ships are to be provided with systems (such as exhaust gas cleaning system (EGCS)) that are equivalent in effectiveness to the Regulation 4, Annex VI of the MARPOL Convention in terms of reducing sulphur oxide (SOx) emissions, as defined in Regulation 4, the items below are to be satisfied for such systems.
	3*	In cases where systems (such as exhaust gas cleaning system (EGCS)) are provided that are equivalent in effectiveness to Regulation 4 of Annex VI of the MARPOL Convention in terms of reducing sulphur oxide (SOx) emissions, as defined in Regulation 4, the following items are to be satisfied for such systems. -1. Even if NOx reduction systems fail, engines are to operate safely and continuously without any hindrance. -2. Systems are to be operated in accordance with manufacturer instructions, if any. -3. Systems are to be designed, manufactured and fitted such that structural integrity and isolation from large vibrations are ensured. -4. Adequate size hatches are to be provided for inspections and maintenance. -5. Devices for recording operation status are to be provided. The device operation and control levels are to be recorded, and such records are to be stored.
	4*	Procedures for the purchase of fuel with reduced sulphur content in compliance with 1 and 2 above are established.
	5	The Bunker Delivery Note and samples are to be in accordance with Regulation 18 of Annex VI of the MARPOL Convention, depending on the type of fuel being used.
1.5.3	1	Ozone Depleting Substance related items Items 2 to 8 below apply to all refrigerating machinery, refrigerating facilities, air-conditioning equipment and fire extinguishing facilities which use ozone depleting substances provided on ships. However, permanently sealed equipment where there are no refrigerant charging connections or potentially removable components containing ozone depleting substances are not applicable. (e.g. independent refrigerators and air conditioning units provided for domestic use)
	2	Refrigerating machinery, refrigerating facilities and air-conditioning equipment are not to use ozone depleting substances, excluding hydro-chlorofluorocarbons (HCFCs), as refrigerants. After 1 January 2020, HCFCs cannot be newly installed as a refrigerant.
	3*	In order to prevent refrigerant leaks, appropriate locations in refrigerant facilities, such as locations where leaks are likely to occur and refrigerant maintenance locations, are to be monitored.
	4	Compressors for refrigerants are to be designed to discharge any refrigerant contained within to receivers during maintenance.

Table 3.3 Minimum Requirements (continued)

Items		Requirements
1.5.3	5	Procedures with methods to be implemented for controlling loss, leakage, discharge and disposal of refrigerants are to be prepared and implemented. These procedures are to contain at least the following items. -1. Measures to be adopted in cases where leaks have been confirmed by leak detectors. -2. Appropriate shut-off methods to prevent the emission of refrigerants into the atmosphere during maintenance, overhauling or repair work. -3. During the recovery of refrigerants, recovery equipment is to be provided in order to discharge refrigerants into existing receivers or special cylinders, which have enough capacity to store the entire amount of refrigerant between shut-off points.
	6	A list and a record book of equipment containing ozone depleting substances are to be maintained on board ship and the following items are to be recorded during the filling and disposing of refrigerants as well as during repairs and modifications to refrigerating installations: -1. Refrigerant added to each system, -2. Leakage of refrigerant including corrective actions, -3. Recovered refrigerant and its storage, and -4. Disposed-off refrigerants.
	7*	Fixed fire extinguishing systems are not to include halon 1211, 1301, 2402 and perfluorohydrocarbons, in accordance with 10.4.1-3 of Part R of the Rules for the Survey and Construction of Steel Ships. All extinguishing agents are to have an ozone depletion potential of zero and a global warming potential (values from IPCC AR4 (IPCC(2007))) of less than 4000.
	8	Item 7 above is also applicable to portable fire extinguishing systems.
1.5.4	1	Onboard Incinerators related items To comply with items 2 and 3 below, in cases where onboard incinerators are installed.
	2	The incinerators are to satisfy Regulations 16.7 and 16.9 of Annex VI of the MARPOL Convention. Additionally, the incinerators are to be being of type approved one by the Administration or representative organization.
	3*	In cases where onboard incinerators are installed, work is to be performed according to procedures that contain the items mentioned below. The procedures are to contain the following. -1. Incineration of substances specified in Regulations 16.2 and 16.3 of Annex VI of the MARPOL Convention is to be prohibited. -2. If areas exist in which incineration is prohibited by the Administration of a coastal state where the ship is expected to ply, incineration is to be prohibited in such areas. -3. Incineration work is to be carried out according to the procedures given in the onboard incinerator operation manual as specified in Regulation 16.7 of Annex VI of the MARPOL Convention.
1.5.5	1	VOC related items For crude oil tankers, an approved VOC Management Plan is to be maintained on board ship.
1.5.6	1	Energy Efficiency related items Applicable to the ships specified in Regulation 19 of Annex VI of the MARPOL Convention.
	2	Ships subject to item 1 above are to comply with Regulations 20 to 22 of Annex VI of the MARPOL Convention. Ships are to possess an International Energy Efficiency Certificate (IEEC) issued by the Administration or representative organization, as certification of such compliance.
	3	The Ship Energy Efficiency Management Plan (SEEMP) is to be developed in accordance with IMO Resolution MEPC.282(70) and maintained on board ship.
	4	Reporting of fuel oil consumption to the Administration or representative organization is properly carried out, and relevant collected data and a Statement of Compliance are properly maintained.
1.6	1	AFS related items To maintain an AFS Convention Certificate. To comply with the AFS Convention and to possess a Statement of Compliance issued by the Society or other approved organization in cases where the AFS Convention is not applicable.

Table 3.3 Minimum Requirements (continued)

Items		Requirements
1.7	1	BWM related items A Ballast Water Management Plan (BWMP) approved by the Society or other approved organization is to be provided.
	2	A Ballast Water Record Book is to be maintained on board ship.
	3	A ballast water treatment system approved by the Administration or representative organization is to be provided for ships which have reached the date of application of Regulation D-2 of the International Convention for the Control and Management of Ship Ballast Water and Sediments. A system installed on ships on or after 28 October 2020 is to be approved in accordance with IMO Resolution MEPC.300(72). A system installed on ships before 28 October 2020 is to be approved in accordance with IMO Resolution MEPC.174(58) or IMO Resolution MEPC.279(70). The date of installation is the date of delivery to the ship in contract or implementation.
1.8	1	SMC related items A Maintenance of Safety Management Certificate (SMC) (or a Statement of Compliance in cases where Chapter IX, SOLAS Convention is not applicable) according to the ISM Code is to be maintained.
	2*	Ships are to be manned by environmental officers who are responsible for the following environmental measures on board. -1. Compliance with the latest international conventions, regional regulations, and the items specified in this Guidelines. -2. Implementation of environmental measures. -3. Maintenance and management of work procedures and records. -4. Training and education of seafarers.

Note

(1) An asterisk (*) at the end of each item number indicates additional requirements (or part of additional requirements).

Chapter 4 ADDITIONAL FEATURES

4.1 General

4.1.1 Application

The requirements given in this chapter are applicable to ships taking more high degree environmental measures in cases where the additional features of such ships are indicated as marks added to “*Environmental Awareness*”.

4.1.2 Additional Marks

- 1 Additional marks corresponding to applicable environmental measures may be added to the notation “*Environmental Awareness*” affixed to ship classification characters. (e.g. “*Environmental Awareness with additional characteristics: Bilge Control and FO Tank Protection*” (abbreviated to *EA + BILGE CONTROL, FOTP*))
- 2 Applicable environmental measures and additional marks are specified in **Table 4.1**.

4.1.3 Submission of Plans and Documents

During Initial Audits, the plans and documents specified in **Table 4.2** are to be submitted for the audit specified in **Table 4.1**.

4.2 Additional Requirements

Ships subject to the application of this chapter are to take the environmental measures specified in **Table 4.3** corresponding to any additional marks.

4.3 Dispensation for Ships not engaged on International Voyages

Ships not engaged on international voyages are not required to comply with the requirements of **2.11.3** of environmental measures specified in **Table 4.3**.

Table 4.1 Audit Items

Category 1	Category 2	Additional features	Marks	Item	Submissions (Table 4.2)	Requirements (Table 4.3)	Relevant SDGs
Marine Pollution Prevention	Oil Pollution Prevention	BILGE CONTROL	BILGE CONTROL	Integrated Bilge Water Treatment System (IBTS)	2.1	2.1	 
				Oil Content of Bilge discharge below 5 ppm			
				All Bilge Water transferred to shore			
		FO TANK PROTECTION	FOTP	Protection of Fuel Oil Tanks (tank location from outer shell by specified minimum distance)	2.2	2.2	
		LO TANK ALARM	LOTA	High Level Alarms for Lubricating Oil Tanks and Hydraulic Oil Tanks	2.3	2.3	
		STERN TUBE SEALING	STS	Use of Stern Tube Air Seals	2.4	2.4	
ENVIRONMENTALLY ACCEPTABLE LUBRICANTS	EAL	Use of Environmentally Acceptable Lubricants	2.5	2.5			
Noxious Liquid Substances Pollution Prevention	---	---	---	---	---	---	---
Sewage Discharge Prevention	GREYWATER	GW	Sewage Treatment System	2.6	2.6	 	
Garbage Discharge Prevention	GARBAGE	GB	All Garbage transferred to shore	NA	2.7	  	

Table 4.1 Audit Items (continued)

Category 1	Category 2	Additional features	Marks	Item	Submissions (Table 4.2)	Requirements (Table 4.3)	Relevant SDGs
Marine Pollution Prevention	Water Pollution Reduction	N2 GENERATOR	N2	Provision of N ₂ Generating Equipment	2.8	2.8	 
Air Pollution Prevention	Air Pollution Prevention	NOx	NOx	Reduction in NOx emissions (80% regulated value or below)	2.9	2.9	 
		NOx Tier Iii	NOx -Tier III	Reduction in NOx emissions (Tier III or below)	2.10	2.10	
		SOx	SOx	Reduction in Sulphur content of fuel oil (0.1% or below)	2.11	2.11	
		LOW EMISSION VESSEL	LEV	Emission Reduction (CO, HC, NOx, PM, PN)	2.12	2.12	
		REFRIGERATION SYSTEMS	R	Use of Refrigerant which has a Global Warming Potential (GWP) of less than 1500	2.13	2.13	
		FIRE FIGHTING SYSTEMS	F	Use of Extinguishing Agents which has a Global Warming Potential (GWP) of less than 1500	2.14	2.14	
		VOC	VOC	Provision of Volatile Organic Compound Emission Control System	2.15	2.15	
		SHORE POWER CONNECTION	SPC	High Voltage Shore Power Connection System	2.16	2.16	
Preventing Destruction of Ecosystem	AFS	---	---	---	---	---	---
	BWM	---	---	---	---	---	---
	Biofouling Prevention	BIOFOULING MANAGEMENT	BFM	Management of Biofouling	2.17	2.17	 

Table 4.1 Audit Items (continued)

Category 1	Category 2	Additional features	Marks	Item	Submissions (Table 4.2)	Requirements (Table 4.3)	Relevant SDGs
Safety Management System	SMC	---	---	---	---	---	---
Others	Propulsion Performance	PROPULSION SYSTEM	CRP	Contra-Rotating Propeller	2.18	2.18	 

Table 4.2 Plans and Documents to Be Submitted

Items		Plans and Documents to Be Submitted
2.1	1	Relevant drawings of the integrated bilge system, if installed.
	2	Statements certifying that the oil content of discharged bilge is less than 5 ppm.
2.2	1	Relevant drawings and statements if the fuel oil tank arrangement complies with requirement 2.2 (in Table 4.3) of the Guidelines
2.3	1	Relevant drawings of high level alarms for lubricating oil tanks and hydraulic oil tanks.
2.4	1	Stern tube air seal construction drawings.
2.5	1	Safety Data Sheet (SDS) for environmentally acceptable lubricants and documentations certifying compliance with the 2013 Vessel General Permit (2013 VGP) of the U.S. Environmental Protection Agency (EPA) (e.g. documentations certifying the acquisition of environmental labels, or declarations issued by the manufacturer).
	2	A statement issued by the manufacturer of the stern tube sealing device certifying the replaced environmentally acceptable lubricants can be used in the seal ring of the stern tube sealing device in use.
2.6	1	Treatment system and discharge water quality details in cases where greywater is treated.
	2	Water quality and shore drinking water standard details in cases where greywater is re-utilized.
2.7	1	---
2.8	1	Drawings of N ₂ generating system.
2.9	1	Statements certifying that the total NO _x emission value does not exceed 80% of the regulated NO _x emission value for the relevant ship.
2.10	1	Statements certifying that the NO _x emission value from individual diesel engine does not exceed Tier II NO _x emission value.
2.11	1	Documents specifying the method to confirm sulphur concentration of fuels at periodical audit when 4.3 is applied and the requirement of 2.11.3 in Table 4.3 is dispensed with.
2.12	1	Procedures for the exhaust gas measurement. (NO _x Technical File may be used in cases where the procedures are to be included in the NO _x Technical File.)
	2	Results of exhaust gas measurement. (NO _x Technical File may be used in cases where the results are to be included in the NO _x Technical File.)
	3	A document specifying the procedures for checking emissions other than NO _x on board. (NO _x Technical File may be used in cases where the procedures are to be included in the NO _x Technical File.)
	4	Details of devices for reducing emissions other than NO _x if provided.
2.13	1	Documents related to refrigerant used on board ships.
2.14	1	Documents related to extinguishing agents used on board ships.
2.15	1	Certificate from the Administration or representative organization indicating that the VOC emission control system, if provided, complies with the MSC/Circ.585 or USCG 46CFR39 (MARPOL Annex VI Certificate Supplement)
	2	Details of the re-liquefaction system, if provided.
	3	System operating procedures to prevent the emission of VOC or re-liquefaction system.
2.16	1	Electrical power consumption details during times in port and high voltage shore power connection system details, if installed.
2.17	1	Procedures and management plans for biofouling management that comply with MEPC.207(62).
	2	Details of the marine growth prevention systems (MGPS) and related drawings of the sea chest and seawater cooling systems, if the MGPS are installed.
2.18	1	Plans related to contra-rotating propellers.
	2	Documents related to improvement of propulsion performance.

Table 4.3 Additional Requirements

Items		Requirements
2.1	1	Oil Pollution Prevention – Bilge related items To comply with any of items 2 to 4 given below.
	2	The Integrated Bilge Water Treatment System specified in “REVISED GUIDELINES FOR SYSTEMS FOR HANDLING OILY WASTES IN MACHINERY SPACES OF SHIPS INCORPORATING GUIDANCE NOTES FOR AN INTEGRATED BILGE WATER TREATMENT SYSTEM (IBTS)” of MEPC.1/Cir.642 is to be installed.
	3	It is to be ensured that the oil content of discharged bilge is less than 5 <i>ppm</i> . IMO Resolution MEPC.107(49) is to apply mutatis mutandis to the test standards for 5 <i>ppm</i> equipment. If compliance with this resolution is difficult then the system is to comply with a method deemed by the Society as appropriate.
	4	All bilge water is to be transferred to shore reception facilities.
2.2	1	Oil Pollution Prevention – Protection of Fuel Oil Tanks Fuel oil tanks and piping are to comply with Regulation 12A of Annex I of the MARPOL Convention. The minimum protection distance is to be 1.2 times as much as the required value based on provisions 6 to 8 of Regulation 12A.
2.3	1	Oil Pollution Prevention – High Level Alarms for Lubricating Oil Tanks and Hydraulic Oil Tanks High level alarms or level monitoring systems operable from control positions are to be provided in lubricating oil tanks and hydraulic oil tanks. (Sounding pipes are not considered acceptable.)
2.4	1	Oil Pollution Prevention – Stern Tube Air Seal Air seal construction or equivalent arrangements, such as fresh water seals, are to be such that stern tube lubricating oil does not come in contact with seawater.
2.5	1	Oil Pollution Prevention – Environmentally Acceptable Lubricants All oil to sea interfaces (stern tubes, rudder bearings, controllable pitch propellers, thrusters, thruster bearings, azimuth thrusters, propulsion pods, stabilizers, etc.) are to use environmentally acceptable lubricants comply with Part 2.2.9 of the 2013 Vessel General Permit (2013 VGP) of the U.S. Environmental Protection Agency (EPA), unless technically infeasible.
2.6	1	Sewage Discharge Prevention – Greywater To comply with either item 2 or item 3 below.
	2	Equipment for the retention of greywater (water from bathrooms and showers) and treated sewage through treatment plants are to be installed. High level alarms are to be provided on the equipment.
	3	Re-used or recycled greywater is to satisfy the onshore drinking water standards of the flag state or port state. Water quality is to be confirmed based on the test standards specified in the directives of the Administration if any. If compliance with these standards is difficult then the system is to comply with a method deemed by the Society as appropriate.
2.7	1	Garbage Discharge Prevention – Garbage All garbage generated on board ship is to be transferred to shore reception facilities. The records of such garbage are to be maintained in the Garbage Record Book.
2.8	1	Water Pollution Reduction – N₂ Generator The inert gas system provided on ships such as tankers is to use N ₂ generating equipment. However, all the gas in tanks is to be replaced by said generating equipment only.

Table 4.3 Additional Requirements (continued)

Items		Requirements																		
2.9	1	Air Pollution Prevention – NOx According to items 2 to 6 below.																		
	2	The NOx total emission value, NOx_{total} (equation 1) of emissions from all diesel engines (excluding special engines for emergency use) of outputs 130 kW or greater installed on the ship is not to exceed 80% of the NOx emission limit NOx_{limit} (equation 2) for the ship. $NOx_{total} = \sum_{i=1}^N (NOx_{Cert,i} \cdot P_i) \quad (\text{g/h}) \quad (1)$ $NOx_{limit} = \sum_{i=1}^N (NOx_{IMO,i} \cdot P_i) \quad (\text{g/h}) \quad (2)$ where N : Number of all diesel engines (excluding special engines for emergency use) of output 130 kW or greater installed on the ship P_i : Rated output of each diesel engine (kW) $NOx_{Cert,i}$: Weighted NOx emission value from each approved diesel engine (g/kWh) $NOx_{IMO,i}$: NOx emission limit for each diesel engine (according to Regulations 13.3 to 13.5 of Annex VI of the MARPOL Convention) (g/kWh)																		
	3	If each of the engines is a family engine or a group engine in accordance with the NOx Technical Code, the emission value may be taken as the emission value of the parent engine.																		
	4	Regardless of item 3, if measurements are performed on an actual ship, the method of performing such measurements is to be according to the onboard simplified measurement method and the onboard monitoring method specified in Regulation 2.15 of Annex VI of the MARPOL Convention.																		
	5	In order to confirm that compliance with item 2 is maintained, verification is to be performed during Periodical Audits by the onboard NOx verification method specified in the approved technical file.																		
	6	In cases where NOx reduction equipment is provided, 1.5.1.4 of Table 3.3 is to be satisfied.																		
2.10	1	Air Pollution Prevention – NOx Tier III NOx emission value from an individual diesel engine with a power output over 130 kW (except diesel engines intended for emergency services) installed on board are not to exceed Tier III NOx emission value.																		
	2	The provisions of 2.9.3 to 2.9.6 of Table 4.3 are to be replaced with this requirement and applied.																		
2.11	1	Air Pollution Prevention – SOx According to items 2 to 3 below.																		
	2	The sulphur content of all fuel oils is not to exceed 0.1%.																		
	3	The Bunker Delivery Note and sample are to be in accordance with the requirements given in 1.5.2.5 of Table 3.3 .																		
2.12	1	Air Pollution Prevention – LEV (Emission reduction) According to items 2 to 3 below.																		
	2	The exhaust gases from all diesel engines with a power output over 130 kW installed on board are not to exceed following values. <table border="1"> <thead> <tr> <th>Output P (kW)</th> <th>CO(g/kWh)</th> <th>HC(g/kWh)</th> <th>NOx(g/kWh)</th> <th>PM(g/kWh)</th> <th>PN (/kWh)</th> </tr> </thead> <tbody> <tr> <td>130 < P < 300</td> <td>3.50</td> <td>1.00</td> <td>2.10</td> <td>0.10</td> <td>-</td> </tr> <tr> <td>P > 300</td> <td>3.50</td> <td>0.19</td> <td>1.80</td> <td>0.015</td> <td>1x10¹²</td> </tr> </tbody> </table> (Note) These values are based upon the values for IWP and IWA of stage V as defined in REGULATION(EU) 2016/1628.	Output P (kW)	CO(g/kWh)	HC(g/kWh)	NOx(g/kWh)	PM(g/kWh)	PN (/kWh)	130 < P < 300	3.50	1.00	2.10	0.10	-	P > 300	3.50	0.19	1.80	0.015	1x10 ¹²
	Output P (kW)	CO(g/kWh)	HC(g/kWh)	NOx(g/kWh)	PM(g/kWh)	PN (/kWh)														
130 < P < 300	3.50	1.00	2.10	0.10	-															
P > 300	3.50	0.19	1.80	0.015	1x10 ¹²															
3	Measurement of exhaust gas is to be in accordance with the NOx Technical Code or ISO 8178-1.																			
2.13	1	Air Pollution Prevention – Global Warming Potential (GWP) of Refrigerants Refrigerants used on board are to have an Ozone Depleting Potential (ODP) rating of zero and a Global Warming Potential (GWP) of less than 1500, based on the values from IPCC AR4 (IPCC(2007)).																		
2.14	1	Air Pollution Prevention – Global Warming Potential (GWP) of Extinguishing Agents Extinguishing agents used on board are to have an Ozone Depleting Potential (ODP) rating of zero and a Global Warming Potential (GWP) of less than 1500, based on the values from IPCC AR4 (IPCC(2007)).																		

Table 4.3 Additional Requirements (continued)

Items		Requirements
2.15	1	Air Pollution Prevention - VOCs In ships carrying crude oil, petroleum products or chemicals with flash points below 60°C, either item 2 or 3 as well as item 4 below are to be complied with.
	2	A VOC emission control system complying with MSC/Circ.585 or USCG 46CFR39 is to be provided. Such system is to be approved and certified by the Society or an approved organization.
	3	The construction of the system is to be such that vapors of volatile organic compounds generated in cargo tanks are not discharged outside the ship by the re-liquefaction process.
	4	A transfer procedure manual for the equipment in item 2 or 3 above is to be provided.
2.16	1	Air Pollution Prevention – High Voltage Shore Power Connection System A high voltage shore power connection system which is capable of supplying sufficient electrical power to the ship is to be provided. (High voltage means over 1kV.)
2.17	1	Biofouling Prevention – Management of Biofouling Measures to prevent biofouling are to be taken in accordance with MEPC.207(62).
2.18	1	Propulsion Performance – Contra-Rotating Propeller A contra-rotating propeller is to be installed. This includes a contra-rotating propeller for podded propulsion.

Chapter 5 ADVANCED ENVIRONMENTAL MEASURES

5.1 General

5.1.1 Application

The requirements given in this chapter are applicable to ships with advanced environmental measures that fall within the scope of “Innovation Endorsement (IE)” (see Appendix 1), in cases where the notation “*Advanced Environmental Awareness(XX)*” is to be affixed to the classification character of ships. The characters “XX” in parenthesis specify the relevant advanced environmental measures implemented.

5.1.2 Marks of Advanced Environmental Measures

- 1 The notation “*Environmental Awareness(XX)*” may be affixed to classification characters in accordance with applicable advanced environmental measures. The characters “XX” in parenthesis specify the relevant advanced environmental measures implemented, and these are listed one after another in cases where multiple measures are implemented.
(e.g. “*Advanced Environmental Awareness: Air Lubrication System and Energy Saving Additives*” (abbreviated to *a-EA(ALS, ESA)*)
- 2 Applicable environmental measures and marks are specified in **Table 5.1**.
- 3 Regardless of 2 above, for ships taking environmental measures not specified in the Guidelines, relevant marks may be added upon the application for such marks.

5.1.3 Submission of Plans and Documents

During Initial Audits, the plans and documents specified in **Table 5.2** are to be submitted for the audit on the measures specified in **Table 5.1**.

5.2 Requirements

Ships subject to the application of this chapter are to take the environmental measures specified in **Table 5.3** corresponding to any marks.

Table 5.1 Audit Items

Category 1	Category 2	Features	Marks	Item	Submissions (Table 5.2)	Requirements (Table 5.3)	Relevant SDGs
Air pollution Prevention	Reduction in Greenhouse Gas Emissions	ZERO/LOW EMISSION	SCELL (-PA) ⁽¹⁾	Adoption of Solar Cell ⁽²⁾⁽³⁾	3.1	3.1	 
			FCELL (-PA) ⁽¹⁾	Adoption of Fuel Cell ⁽²⁾⁽³⁾	3.2	3.2	
			WINDG (-PA) ⁽¹⁾	Adoption of Wind Generator ⁽²⁾⁽³⁾	3.3	3.3	
			ORCWHR (-PA) ⁽¹⁾	Adoption of Waste Heat Recovery System with Low-Boiling Medium such as Organic Rankine Cycle Generator System ⁽²⁾⁽³⁾	3.4	3.4	
			EGWHR (-PA) ⁽¹⁾	Adoption of Exhaust Gas Waste Heat Recovery System ⁽²⁾⁽³⁾	3.5	3.5	
			GRS ⁽⁴⁾	Usage of green steel products for hull structural steel or others	3.6	3.6	
Others	Propulsion Performance	AIR LUBRICATION SYSTEM	ALS	Provision of Bottom Air Lubrication Systems ⁽³⁾	3.7	3.7	 
		ENERGY SAVING ADDITIVES	ESA	Adoption of Energy Saving Additives (fins, fin caps, rudder bulbs, ducts, etc.)	3.8	3.8	
	Marine Environment Purification	MICRO-PLASTICS COLLECTION	MPC	Provision of Microplastics Collecting Systems	3.9	3.9	  

Notes

- (1) “PA” is affixed in case where the systems are used for main propulsion assist.
- (2) In cases where the system is used for onboard power supply, marks can be affixed when the systems have a capacity of 1% or more of the single main generator.
- (3) In cases where the installation of the systems are required under the Rules for the Survey and Construction of Steel Ships, etc., the ships are to comply with those requirements deemed necessary by the Society.
- (4) Upon application, the percentage of green steel products used for hull structure or others (by weight, %) at the time of construction relative to the lightweight of the ship may be added in Descriptive Note(s) of Class Certificate. In this case, minimum value is to be 10 and fractions less than 10 is to be rounded down.

Table 5.2 Plans and Documents to Be Submitted

Items		Plans and Documents to Be Submitted
3.1	1	Solar cell system related information: system capacity, wiring system diagrams, arrangement plans and system components.
3.2	1	Fuel cell system related information: system capacity, wiring system diagrams, arrangement plans and system components.
3.3	1	Wind generator system related information: system capacity, wiring system diagrams, arrangement plans and system components.
3.4	1	Waste heat recovery system with low-boiling medium such as organic rankine cycle generator system related information: generation capacity, wiring system diagrams, piping diagrams, arrangement plans and system components.
3.5	1	Plans related to exhaust gas waste heat recovery system.
3.6	1	Statement of conformity assessment on green steel products and document for the percentage of green steel products used for hull structure steel or others
3.7	1	Plans related to bottom air lubrication systems.
	2	Documents related to improvement of propulsion performance.
3.8	1	Plans related to energy saving additives such as fins, fin caps, rudder bulbs, ducts, etc.
	2	Documents related to improvement of propulsion performance.
3.9	1	Specifications and operation manuals for microplastics collecting systems, wiring system diagrams, piping system diagrams, arrangement plans and treatment procedures after microplastics collection (a garbage management plan is acceptable)

Table 5.3 Requirements

Items		Requirements
3.1	1	Reduction in Greenhouse Gas Emissions – solar cell system A solar cell system which can be operated individually or in parallel with an onboard power source is to be provided.
3.2	1	Reduction in Greenhouse Gas Emissions – fuel cell system A fuel cell system which can be operated individually or in parallel with an onboard power source is to be provided.
3.3	1	Reduction in Greenhouse Gas Emissions – wind generator system A wind generator system which can be operated individually or in parallel with an onboard power source is to be provided.
3.4	1	Reduction in Greenhouse Gas Emissions – waste heat recovery system with low-boiling medium A waste heat recovery system with low-boiling medium such as organic rankine cycle generator system is to be provided.
3.5	1	Reduction in Greenhouse Gas Emissions – exhaust gas waste heat recovery system An exhaust gas waste heat recovery system is to be provided.
3.6	1	Reduction in Greenhouse Gas Emissions – green steel products Green steel products that have been decarbonized in the steel production process (all or part of the entire production process from raw materials to steelmaking) are to be used for hull structural steel or others. In addition, the percentage of green steel products used for hull structure or others (by weigh) at the time of construction relative to the lightweight of the ship is to be more than 10 %.
3.7	1	Propulsion Performance – bottom air lubrication system A bottom air lubrication system which reduces the viscosity resistance of the ship bottom is to be provided.
3.8	1	Propulsion Performance – contra-rotating propeller Energy saving additives (fins, fin caps, rudder bulbs, ducts, etc.) are to be provided.
3.9	1	Marine Environment Purification – microplastics collecting systems The systems that collect microplastics floating in seawater are to be provided.

Appendix 1 ClassNK Innovation Endorsement Approach

As companies pursue ESG management and the SDGs to realize a sustainable society, various innovations have been vital to resolve challenges.

ClassNK has offered Innovation Endorsement (IE) as a framework to support innovative initiatives through third-party certification. The basic concept of IE is introduced here as “ClassNK Innovation Endorsement Approach”.



Background

Innovation Endorsement (IE) is ClassNK’s initiative as the third-party certification body to create new value based on “Third party certification/ evaluation/ rating”, which is one of the three business pillars on “ClassNK Digital Grand Design 2030”^{*1} announced in February 2020. It has described the future shape required to a classification society in the digital society.

(*1) Related press release: “ClassNK develops its Digital Grand Design 2030”
https://www.classnk.or.jp/hp/en/hp_news.aspx?id=4702&type=press_release&layout=1

Policy

The principle policy of Innovation Endorsement (IE) is as follows.

- Speed-focused: As the innovation progresses rapidly, we focus on the speed to fully follow their pace, establish evaluation technologies as a third party, and certify them.
- Cooperation with front runners: It is likely that a clear evaluation standard has yet to be established for innovative technologies, we examine and develop evaluation standards in collaboration with pioneering front runners.
- Certification expected by customers and society: In response to the expansion of the scope of innovative initiatives, the scope and target of certification will be also expanded based on customer needs and social conditions.

Scope of certification

The scope of Innovation Endorsement (IE) includes four categories: Digital^{*2}, Environment, Safety, and Labor. In addition, “Yours” demonstrates ClassNK’s commitment to work to meet any needs of customers and society.

(*2) IE was launched focusing on digital innovation in July 2020.

Target of certification

Innovation Endorsement (IE) covers three categories as the target of certification: Ships, Products & Solutions, and Providers.

- Notation: For ships, notation such as “DSS”^{*3} and “a-EA”^{*4} indicating advanced initiatives related to the digitalization and environment have been incorporated to the ship, are added in its certificate of classification and support the enhancement of the ship’s value.
- P&S certification: For products and solutions (P&S), we examine and verify their innovative functions based on our knowledge and experience as the third-party body and issue certificates for supporting the deployment of products and services.
- Provider certification: For organizations (providers) engaging in innovative initiatives, we provide flexible supports from the early stage with three levels of certification, (1) concept, (2) demonstration, and (3) sustainable implementation.

ClassNK is committed to contributing to the sustainable evolution of the maritime and offshore business by actively supporting innovative technologies through Innovation Endorsement (IE), and looks ahead to trends of innovations, and continues its innovation ecosystem to respond quickly to customers’ advanced initiatives.

(*3) DSS: Abbreviation for Digital Smart Ship. Refer to Guidelines for Digital Smart Ships.

(*4) a-EA: Abbreviation for Advanced-Environmental Awareness. Refer to Environmental Guideline Chapter 5.

For inquiries and applications, please contact
Digital Transformation Center, ClassNK
TEL: +81-3-5226-2738 (main)
FAX: +81-3-5226-2056
E-Mail: dxc@classnk.or.jp

For information on this publication, please contact the following:

NIPPON KAIJI KYOKAI

Rules Development Department

Tel. : +81-3-5226-2181

Email : dvd@classnk.or.jp



NIPPON KAIJI KYOKAI

Rule Development and ICT Division

Rule Development Department

3-3 Kioi-cho, Chiyoda-ku, Tokyo 102-0094, JAPAN

Tel : +81-3-5226-2181

Fax : +81-3-5226-2172

E-mail : dvd@classnk.or.jp

www.classnk.com