INTERNATIONAL MARITIME ORGANIZATION

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MARITIME SAFETY COMMITTEE
94th session
Agenda item 3

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CONSIDERATION AND ADOPTION OF AMENDMENTS TO MANDATORY INSTRUMENTS

Adoption of the International Code for Ships Operating in Polar Waters (Polar Code)

Note by the Secretariat

SUMMARY

Executive summary:	The Committee is invited to consider, with a view to adoption, the draft International Code for Ships Operating in Polar Waters (Polar Code)
Strategic direction:	5.2
High-level action:	5.2.1
Planned output:	5.2.1.15
Action to be taken:	Paragraph 2
Related documents:	MSC 93/22/Add.3, annexes 23 and 24; NCSR 1/28, annex 18; MSC 94/3 and MSC 94/9

1 The Committee will recall that, at its ninety-third session, it approved, in principle, with a view to adoption at its ninety-fourth session, the draft International Code for Ships Operating in Polar Waters (Polar Code)*, set out in the annex, which will become mandatory under the new SOLAS chapter XIV (see document MSC 94/3, annex 1).

Action requested of the Committee

2 The Committee is invited to consider the draft Polar Code, with a view to adoption in conjunction with the adoption of the aforementioned draft new SOLAS chapter XIV.

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* It should be noted that the draft Polar Code, set out in the annex, does not reflect the outcome of NCSR 1 regarding the draft chapters 9 (Safety of navigation) and 10 (Communication). In this context, the report of NCSR 1 will be considered under agenda item 9 (see also document MSC 94/9).

ANNEX

DRAFT RESOLUTION MSC.[...](94)
(adopted on [... November 2014])

ADOPTION OF THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS (POLAR CODE)

THE MARITIME SAFETY COMMITTEE,

RECALLING article 28(b) of the Convention on the International Maritime Organization concerning the function of the Committee,

RECOGNIZING the need to provide a mandatory framework for ships operating in polar waters due to the additional demands on ships, their systems and operation, which go beyond the existing requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (hereinafter referred to as "the Convention"), and other relevant binding IMO instruments,

NOTING resolution MSC.[…(94)], by which it adopted, inter alia, the new chapter XIV of the Convention to make the introduction and parts I-A and I-B mandatory under the Convention,

HAVING CONSIDERED, at its [ninety-fourth] session, the draft International Code for Ships Operating in Polar Waters,

1. ADOPTS the International Code for Ships Operating in Polar Waters (Polar Code), the text of which is set out in the annex to the present resolution;

2. INVITES Contracting Governments to the Convention to note that the Polar Code will take effect on […….] upon entry into force of the new chapter XIV of the Convention;

3. REQUESTS the Secretary-General of the Organization to transmit certified copies of the present resolution and the text of the Polar Code, contained in the annex, to all Contracting Governments to the Convention;

4. FURTHER REQUESTS the Secretary-General of the Organization to transmit copies of the present resolution and the text of the Code contained in the annex to all Members of the Organization which are not Contracting Governments to the SOLAS Convention.

DRAFT INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS

CONTENTS

PREAMBLE

1 The International Code for Ships Operating in Polar Waters has been developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters.

2 The Code acknowledges that polar water operation may impose additional demands on ships, their systems and operation beyond the existing requirements of the International Convention for the Safety of Life at Sea (SOLAS), 1974, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL), as amended, and other relevant binding IMO instruments.

2bis The Code acknowledges that the Polar Waters impose additional navigational demands beyond those normally encountered. In many areas, the chart coverage may not currently be adequate for coastal navigation. It is recognized even existing charts may be subject to unsurveyed and uncharted shoals.

3 The Code also acknowledges that coastal communities in the Arctic could be, and that polar ecosystems are vulnerable to human activities, such as ship operation.

4 The relationship between the additional safety measures and the protection of the environment is acknowledged as any safety measure taken to reduce the probability of an accident, will largely benefit the environment.

5 While Arctic and Antarctic waters have similarities, there are also significant differences. Hence, although the Code is intended to apply as a whole to both Arctic and Antarctic, the legal and geographical differences between the two areas have been taken into account.

6 The key principles for developing the Polar Code have been to use a risk-based approach in determining scope and to adopt a holistic approach in reducing identified risks.

INTRODUCTION

1 Goal

The goal of this Code is to provide for safe ship operation and the protection of the polar environment by addressing risks present in polar waters and not adequately mitigated by other instruments of the Organization.

2 Definitions

For the purpose of this Code, the terms used have the meanings defined in the following paragraphs. Terms used in part I-A, but not defined in this section shall have the same meaning as defined in SOLAS. Terms used in part II-A, but not defined in this section shall have the same meaning as defined in MARPOL.

2.1 *Category A ship* means a ship designed for operation in polar waters in at least medium first-year ice, which may include old ice inclusions.

2.2 *Category B ship* means a ship not included in category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions.

2.3 *Category C ship* means a ship designed to operate in open water or in ice conditions less severe than those included in categories A and B.

2.4 *First-year ice* means sea ice of not more than one winter growth developing from young ice with thickness from 0.3-2.0 metre[1].

2.4bis *Ice free waters* means no ice present. If ice of any kind is present this term shall not be used[1].

2.4ter *Ice of land origin* means Ice formed on land or in an ice shelf, found floating in water[1].

2.5 *MARPOL* means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL), as amended.

2.6 *Medium first-year ice* means first-year ice of 70-120 cm thickness[1].

2.6bis *Old ice* means sea ice which has survived at least one summer's melt; typical thickness up to 3 m or more. It is subdivided into residual first-year ice, second-year ice and multi-year ice[1].

2.7 *Open water* mean a large area of freely navigable water in which sea ice is present in concentrations less than 1/10. No ice of land origin is present[1].

2.8 *Organization* means the International Maritime Organization.

2.9 *Sea ice* means any form of ice found at sea which has originated from the freezing of sea water[1].

2.10 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.

[1] Refer to the WMO Sea Ice Nomenclature.

2.11 *STCW Convention* means the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.

2.12 *Tankers* mean oil tankers as defined in SOLAS regulation II-1/2.22, chemical tankers as defined in SOLAS regulation II-1/3.19 and gas carriers as defined in SOLAS regulation VII/11.2.

2.13 *Thin first-year ice* means first-year ice 30 to 70 cm thick.

3 Sources of hazards

3.1 The Polar Code considers hazards which may lead to elevated levels of risk due to increased probability of occurrence, more severe consequences, or both:

.1 ice as it may affect hull structure, stability characteristics, machinery systems, navigation, the outdoor working environment, maintenance and emergency preparedness tasks, and malfunction of safety equipment and systems;

.2 experiencing topside icing, with potential reduction of stability and equipment functionality;

.3 low temperature as it affects the working environment and human performance, maintenance and emergency preparedness tasks, material properties and equipment efficiency, survival time and performance of safety equipment and systems;

.4 extended periods of darkness or daylight as it may affect navigation and human performance;

.5 high latitude as it affects navigation systems, communication systems and the quality of ice imagery information;

.6 remoteness and possible lack of accurate and complete hydrographic data and information, reduced availability of navigational aids and seamarks with increased potential for groundings compounded by remoteness, limited readily deployable SAR facilities, delays in emergency response and limited communications capability, with the potential to affect incident response;

.7 potential lack of ship crew experience in polar operations, with potential for human error;

.8 potential lack of suitable emergency response equipment, with the potential for limiting the effectiveness of mitigation measures;

.9 rapidly changing and severe weather conditions, with the potential for escalation of incidents; and

.10 the environment with respect to sensitivity to harmful substances and other environmental impacts and its need for longer restoration.

3.2 The risk level within polar waters may differ depending on the geographical location, time of the year with respect to daylight, ice-coverage, etc. Thus, the mitigating measures required to address the above specific hazards may vary within polar waters and may be different in Arctic and Antarctic waters.

4 Structure of the Code

This Code consists of Introduction, parts I and II. The Introduction contains mandatory provisions applicable to both part I and part II. Part I is subdivided into part I-A, which contains mandatory provisions on safety measures, and part I-B containing recommendations on safety. Part II is subdivided into part II-A, which contains mandatory provisions on pollution prevention, and part II-B containing recommendations on pollution prevention.

5 Figures illustrating the Antarctic area and Arctic waters, as defined in SOLAS regulations XIV/1.2 and XIV/1.3, respectively[, and MARPOL Annex I, regulations […]; Annex II, regulations […]; Annex IV, regulation […]; and Annex V, regulation […]]

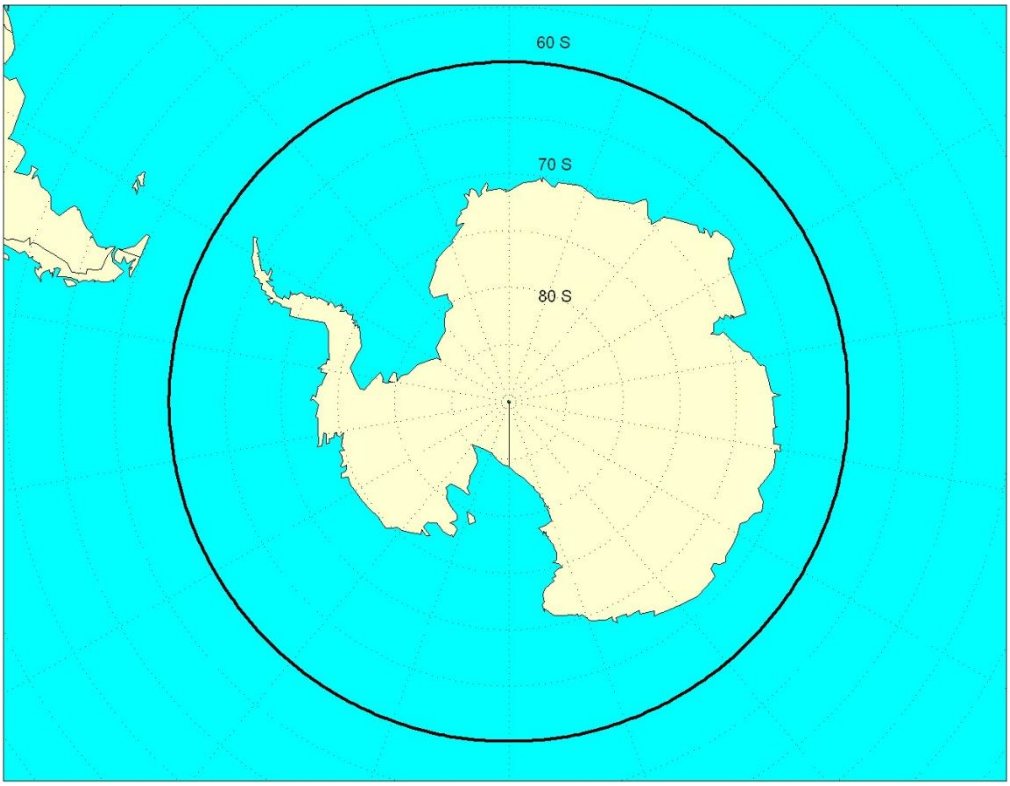

Figure 1 – Maximum extent of Antarctic Waters application[2]

[2] Maps are for illustrative purposes only.

Figure 2 – Maximum extent of Arctic waters application[3]

[3] It should be noted that the figures are for illustrative purposes only.

PART I-A
SAFETY MEASURES

CHAPTER 1 – GENERAL

1.1 Structure of this part

Each chapter in this part consists of the overall goal of the chapter, functional requirements to fulfill the goal, and regulations. A ship shall be considered to meet a functional requirement set out in this part when either:

.1 the ship's design and arrangements comply with all the regulations associated with that functional requirement; or

.2 part(s) or all of the ship's relevant design and arrangements have been reviewed and approved in accordance with regulation 4 of SOLAS chapter XIV, and any remaining parts of the ship comply with the relevant regulations.

1.2 Definitions

In addition to the definitions included in the relevant SOLAS chapters and the introduction of this Code, the following definitions are applicable to this part.

1.2.1 *Escort* means any ship with superior ice capability in transit with another ship.

1.2.2 *Escorted operation* means any operation in which a ship's movement is facilitated through the intervention of an escort.

1.2.3 *Habitable environment* means a ventilated environment that will protect against hypothermia.

1.2.4 *Icebreaker* means any ship whose operational profile may include escort or ice management functions, whose powering and dimensions allow it to undertake aggressive operations in ice-covered waters.

1.2.5 *Ice Class* means the notation assigned to the ship by the Administration or by an organization recognized by the Administration showing that the ship has been designed for navigation in sea-ice conditions.

1.2.6 *Maximum expected time of rescue* means the time adopted for the design of equipment and system that provide survival support. It shall never be taken as less than 5 days.

1.2.7 *Machinery Installations* means equipment and machinery and its associated piping and cabling, which is necessary for the safe operation of the vessel.

1.2.7bis *Mean Daily Low Temperature* (MDLT) means the mean value of the daily low temperature for each day of the year over a minimum 10 year period. A data set acceptable to the Administration may be used if 10 years of data is not available[4].

[4] Refer also to additional guidance in part I-B.

[1.2.7ter *Operation in ice* means for passenger ships or tankers operation in any waters other than open waters or bergy waters and for cargo ships other than tankers operation in water with a total ice concentration of more than 2/10.]

1.2.8 *Polar Class (PC)* means the ice class assigned to the ship by the Administration or by an organization recognized by the Administration based upon IACS Unified Requirements.

1.2.8bis *Polar Service Temperature (PST) means* a temperature specified for a ship which is intended to operate in low air temperature, which shall be set at least 10^0C below the lowest MDLT for the intended area and season of operation in polar waters.

1.2.8ter *Ship intended to operate in low air temperature* means a ship which is intended to undertake voyages to or through areas where the lowest Mean Daily Low Temperature (MDLT) is below -10^0C.

1.3 Certificate and survey

1.3.1 Every ship to which this Code applies shall have on board a valid Polar Ship Certificate.

1.3.2 The Polar Ship Certificate shall be issued after an initial or renewal survey to a ship which complies with the relevant requirements of this Code. The certificate referred to in this regulation shall be issued either by the Administration or by any person or organization recognized by it in accordance with SOLAS regulation XI-1/1. In every case, that Administration assumes full responsibility for the certificate.

1.3.3 The Polar Ship Certificate shall be drawn up in the form corresponding to the model given in annex […] to part I-A of this Code. If the language used is neither English, nor French nor Spanish, the text shall include a translation into one of these languages.

1.3.4 Polar Ship Certificate validity and renewal survey dates shall be harmonized with those related to other SOLAS certificates.

1.3.4bis This certificate shall include a supplement recording additional equipment and [the ship's operational capabilities and limitations under 1.5] that do not appear in the certificate. When there are no limitations in addition to those in the certificate, this shall be indicated in the supplement.

1.4 Performance standards

1.4.1 Unless expressly provided otherwise, ship systems and equipment addressed in this Code shall satisfy at least the same performance standards referred to in SOLAS.

1.4 2 For ships operating in low air temperature, a polar service temperature (PST) shall be specified and shall be at least 10^0C below the lowest MDLT for the intended area and season of operation in polar waters. Systems and equipment required by this Code shall be fully functional at the polar service temperature.

1.4.3 For ships operating in low air temperature, survival systems and equipment shall be fully operational at the polar service temperature during the maximum expected rescue time.

[1.5 Operational limitations

When operational limitations are established, an assessment as required by the Code shall be carried out, taking into consideration the following:

.1 the anticipated range of operating conditions;

.2 hazards as listed in section 3 of the Introduction, as applicable; and

.3 additional hazards, if identified.]

CHAPTER 2 – POLAR WATER OPERATIONAL MANUAL

2.1 Goal

The goal of this chapter is to provide the owner, operator, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.

2.2 Functional requirements

2.2.1 In order to achieve the goal set out in paragraph 2.1 above, the following functional requirements are embodied in the regulations of this chapter.

[2.2.1bis The Manual shall include the ship-specific capabilities and limitations in relation to the assessment required under section 1.5.]

2.2.2 The Manual shall include or refer to specific procedures to be followed in normal operations and in order to avoid encountering conditions that exceed the ships capabilities.

2.2.3 The Manual shall include or refer to specific procedures to be followed in the event of incidents in polar waters.

2.2.4 The Manual shall include or refer to specific procedures to be followed in the event that conditions are encountered which exceed the ships' specific capabilities and limitations in paragraph 2.2.1.

2.2.5 The Manual shall include or refer to procedures to be followed when using icebreaker assistance, as applicable.

2.3 Regulations

2.3.1 In order to comply with the functional requirements of paragraphs 2.2.1 to 2.2.5, the manual shall be carried on board.

2.3.1bis In order to comply with the functional requirements of paragraph 2.2.1, the manual shall contain relevant information with the ship's capabilities and limitations for:

[.1 operation in ice, as applicable;]

.2 operation in low air temperatures, as applicable;

.3 communication and navigation capabilities in high latitudes; and

.4 voyage duration.

2.3.2 In order to comply with the functional requirements of paragraph 2.2.2, the manual shall include risk-based procedures for the following:

.1 voyage planning to avoid ice and/or temperatures that exceed the ship's design capabilities or limitations;

.2 arrangements for receiving forecasts of the environmental conditions;

.3 means of addressing any limitations of the hydrographic, meteorological and navigational information available;

.4 operation of equipment required under other chapters of this Code; and

.5 implementation of special measures to maintain equipment and system functionality under low temperatures, topside icing and the presence of sea ice, as applicable.

2.3.3 In order to comply with the functional requirements of paragraph 2.2.3, the manual shall include risk-based procedures to be followed for:

.1 contacting emergency response providers for salvage, SAR, spill response, etc. as applicable; and

.2 in the case of ships ice strengthened in accordance with chapter 3, procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.

2.3.4 In order to comply with the functional requirements of paragraph 2.2.4, the manual shall include risk-based procedures to be followed for measures to be taken in the event of encountering ice and/or temperatures which exceed the ships design capabilities or limitations.

2.3.5 In order to comply with the functional requirements of paragraph 2.2.5, the manual shall include risk-based procedures for monitoring and maintaining safety during operations in ice, as applicable, including any requirements for escort operations or ice breaker assistance. Different operational limitations may apply depending on whether the ship is operating independently or with icebreaker escort. Where appropriate, the PWOM should specify both options.

CHAPTER 3 – SHIP STRUCTURE

3.1 Goal

The goal of this chapter is to provide that the material and scantling of the structures retain their structural integrity based on global and local response due to environmental loads and conditions.

3.2 Functional requirements

3.2.1 In order to achieve the goal set out in 3.1 above, the following functional requirements are embodied in the regulations of this chapter:

.1 for ships intended to operate in low air temperature, materials used shall be suitable for operation at the ships polar service temperature.

.2 in ice strengthened ships, the structure of the ship shall be designed to resist both global and local structural loads anticipated under the foreseen ice conditions.

3.3 Regulations

3.3.1 In order to comply with the functional requirements of paragraph 3.2.1.1 above, materials of exposed structures in ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[5] or other standards offering an equivalent level of safety based on the polar service temperature.

3.3.2 In order to comply with the functional requirements of paragraph 3.2.1.2 above, the followings apply:

.1 Scantlings of category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[6] or other standards offering an equivalent level of safety.

.2 Scantlings of category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[7]or other standards offering an equivalent level of safety.

.3 Scantlings of ice strengthened category C ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate for the ice types and concentrations encountered in the area of operation.

.4 Category C ships need not be Ice Strengthened if, in the opinion of the Administration, the ships' structure is adequate for its intended operation.

CHAPTER 4 – STABILITY AND SUBDIVISION

4.1 Goal

The goal of this chapter is to ensure provision of adequate stability and subdivision in intact and damaged conditions.

4.2 Functional requirements

4.2.1 In order to achieve the goal set out in paragraph 4.1 above, the following functional requirements are embodied in the regulations of this chapter:

.1 Ships shall have sufficient stability in intact condition when subject to ice accretion.

.2 Ships of category A and B constructed on or after [DD/MM/YYYY] shall have sufficient residual stability to sustain ice-related damages.

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5 Refer to IACS UR S6 Use of Steel Grades for Various Hull Members – Ships of 90 m in Length and Above (latest version) or IACS URI Requirements concerning Polar Class (latest version), as applicable.

6 Refer to Polar Class 1-5 of IACS URI Requirements concerning Polar Class (latest version).

7 Refer to Polar Class 6-7 of IACS URI Requirements concerning Polar Class (latest version).

4.3 Regulations

4.3.1 Stability in intact conditions

4.3.1.1 In order to comply with the functional requirements of paragraph 4.2.1.1, for ships operating in areas and during periods where ice accretion is likely to occur, the following icing allowance should be made in the stability calculations:

.1 30 kg per square metre on exposed weather decks and gangways;

.2 7.5 kg per square metre for projected lateral area of each side of the vessel above the water plane; and

.3 the projected lateral area of discontinuous surfaces of rail, sundry booms, spars (except masts) and rigging of vessels having no sails and the projected lateral area of other small objects should be computed by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.

4.3.1.2 Ships operating in areas and during periods where ice accretion is likely to occur should be:

.1 designed to minimize the accretion of ice; and

.2 equipped with such means for removing ice as the Administration may require; for example, electrical and pneumatic devices, and/or special tools such as axes or wooden clubs for removing ice from bulwarks, rails and erections.

4.3.1.3 Information on the ice accretion stipulated in the stability calculations shall be given in the Polar Water Operational Manual.

4.3.1.4 Ice accretion shall be monitored and appropriate measures taken to ensure that the ice accretion does not exceed the values given in the Polar Water Operational Manual.

4.3.2 Stability in damaged conditions

4.3.2.1 In order to comply with the functional requirements of paragraph 4.2.1.2, ships of category A and B constructed on or after [DD/MM/YYYY] shall be able to withstand flooding resulting from hull penetration due to ice impact. The residual stability following ice damage shall be such that the factor s_i, as defined in SOLAS regulation II-1/7-2.2 and 2.3, has s_i= 1 for all loading conditions d_s, d_l and d_p as defined in SOLAS regulations II-1/2.10, 2.11 and 2.12. Damage stability GZ, Range and heel at equilibrium criteria contained in instruments applicable to ship types not included in SOLAS chapter II-1, part B should be substituted as the denominators to the GZmax and Range numerators, respectively, and heel at equilibrium used in the calculation of the K factor value in the s_{final},i formula for the purposes of calculating s_i.

4.3.2.2 The ice damage extent to be assumed when demonstrating compliance with paragraph 4.41 shall be such that:

.1 longitudinal extent is 0.045*length of upper ice waterline length if centred forward of the point of maximum beam on the waterline, and 0.015*length of waterline length otherwise;

.2 transverse extent penetration depth is 760 mm measured normal to the shell over the full extent of the damage;

.3 vertical extent is the lesser of 0.2 of draft at the upper ice waterline, or the longitudinal extent;

.4 the centre of the ice damage may be located at any point between the keel and 1.2 times the deepest ice draft; and

.5 the vertical extent of damage may be assumed to be confined between the keel and 1.2 times the deepest ice draft.

4.3.2.3 Damage as defined in paragraph 4.4.2 is to be assumed at any position along the side shell.

CHAPTER 5 – WATERTIGHT AND WEATHERTIGHT INTEGRITY

5.1 Goal

The goal of this chapter is to provide measures to maintain watertight and weathertight integrity.

5.2 Functional requirements

In order to achieve the goal set out in paragraph 5.1 above, all closing appliances and doors relevant to watertight and weathertight integrity of the ship shall be operable.

5.3 Regulations

5.3.1 In order to comply with the functional requirements of paragraph 5.2 above, the following apply:

.1 For ships operating in areas and during periods where ice accretion is likely to occur, means shall be provided to remove or prevent ice and snow accretion around hatches and doors.

.2 In addition, for ships intended to operate in low air temperature the following apply:

.1 if the hatches or doors are hydraulically operated, means shall be provided to prevent freezing or excessive viscosity of liquids; and

.2 watertight and weathertight doors, hatches and closing devices which are not within an habitable environment and require access while at sea shall be designed to be operated by personnel wearing heavy winter clothing including thick mittens.

CHAPTER 6 – MACHINERY INSTALLATIONS

6.1 Goal

The goal of this chapter is to ensure that, machinery installations are capable of delivering the required functionality necessary for safe operation of ships.

6.2 Functional requirements

6.2.1 In order to achieve the goal set out in paragraph 6.1 above, the following functional requirements are embodied in the regulations of this chapter:

6.2.1.1 Machinery installations shall provide functionality under the anticipated environmental conditions, taking into account:

.1 ice accretion and/or snow accumulation;

.2 ice ingestion from seawater;

.3 freezing and increased viscosity of liquids;

.4 seawater intake temperature; and

.5 snow ingestion.

6.2.1.2 In addition, for ships intended to operate in low air temperatures:

.1 machinery installations shall provide functionality under the anticipated environmental conditions, also taking into account:

.1 cold and dense inlet air; and

.2 loss of performance of battery or other stored energy device; and

.2 materials used shall be suitable for operation at the ships polar service temperature.

6.2.1.3 In addition, for ships ice strengthened in accordance with chapter 3, machinery installations shall provide functionality under the anticipated environmental conditions, taking into account loads imposed directly by ice interaction.

6.3 Regulations

6.3.1 In order to comply with the functional requirement of paragraph 6.2.1.1 above, taking into account the anticipated environmental conditions, the following apply:

.1 Machinery installations and associated equipment shall be protected against the effect of ice accretion and/or snow accumulation, ice ingestion from sea water, freezing and increased viscosity of liquids, seawater intake temperature and snow ingestion.

.2 Working liquids shall be maintained in a viscosity range that ensures operation of the machinery.

.3 seawater supplies for machinery systems shall be designed to prevent ingestion of ice[8], or otherwise arranged to ensure functionality.

6.3.2 In additions, for ships intended to operate in low air temperatures, the following apply:

[8] Refer to MSC/Circ.504, *Guidance on design and construction of sea inlets under slush ice conditions.*

.1 in order to comply with the functional requirement of paragraph 6.2.1.2 above, exposed machinery and electrical installation and appliances shall function at the polar service temperature.

.2 In order to comply with the functional requirement of paragraph 6.2.1.2.1 above, means shall be provided to ensure that combustion air for internal combustion engines driving essential machinery is maintained at a temperature in compliance with the criteria provided by the engine manufacturer.

.3 In order to comply with the functional requirements of paragraph 6.2.1.2.2 above, materials of exposed machinery and foundations shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[9, 10] or other standards offering an equivalent level of safety based on the polar service temperature.

6.3.3 In addition, for ships ice strengthened in accordance with chapter 3, in order to comply with the functional requirements of paragraph 6.2.1.3 above, the following apply:

.1 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category A ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[9]or other standards offering an equivalent level of safety.

.2 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of category B ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[10] or other standards offering an equivalent level of safety.

.3 Scantlings of propeller blades, propulsion line, steering equipment and other appendages of ice-strengthened category C ships shall be approved by the Administration, or a recognized organization accepted by it, taking into account acceptable standards adequate with the ice types and concentration encountered in the area of operation.

CHAPTER 7 – FIRE SAFETY/PROTECTION

7.1 Goal

The goal of this chapter is to ensure that fire safety systems and appliances are effective and operable, and that means of escape remain available so that persons on board can safely and swiftly escape to the lifeboat and liferaft embarkation deck under the expected environmental conditions.

7.2 Functional requirements

7.2.1 In order to achieve the goal set out in paragraph 7.1 above, the following functional requirements are embodied in the regulations of this chapter:

[9] Refer to Polar Class 1–5 of IACS URI Requirements concerning Polar Class (2011).

[10] Refer to Polar Class 6–7 of IACS URI Requirements concerning Polar Class (2011).

.1 all components of fire safety systems and appliances if installed in exposed positions shall be protected from ice accretion and snow accumulation;

.2 local equipment and machinery controls shall be arranged so as to avoid freezing, snow accumulation and ice accretion and their location to remain accessible at all time;

.3 the design of fire safety systems and appliances shall take into consideration the need for persons to wear bulky and cumbersome cold weather gear, where appropriate;

.4 means shall be provided to remove or prevent ice and snow accretion from accesses; and

.5 extinguishing media shall be suitable for intended operation.

7.2.2 In addition, for ships intended to operate in low air temperature, the following apply:

.1 all components of fire safety systems and appliances shall be designed to ensure availability and effectiveness under the polar service temperature; and

.2 materials used in exposed fire safety systems shall be suitable for operation at the polar service temperature.

7.3 Regulations

7.3.1 In order to comply with the requirement of paragraph 7.2.1.1, the following apply:

.1 isolating and pressure/vacuum valves in exposed locations are to be protected from ice accretion and remain accessible at all time; and

.2 all two-way portable radio communication equipment shall be operable at the polar service temperature.

7.3.2 In order to comply with the requirement of paragraph 7.2.1.2, the following apply:

.1 fire pumps including emergency fire pumps, water mist and water spray pumps shall be located in compartments maintained above freezing;

.2 the fire main is to be arranged so that exposed sections can be isolated and means of draining of exposed sections shall be provided. Fire hoses and nozzles need not be connected to the fire main at all times, and may be stored in protected locations near the hydrants;

.3 firefighter's outfits shall be stored in warm locations on the ship; and

.4 where fixed water-based firefighting systems are located in a space separate from the main fire pumps and use their own independent sea suction, this sea suction is to be also capable of being cleared of ice accumulation.

7.3.3 In order to comply with the requirement of paragraph 7.2.2.1, portable and semi-portable extinguishers shall be located in positions protected from freezing temperatures, as far as practical. Locations subject to freezing are to be provided with extinguishers capable of operation under the polar service temperature.

7.3.4 In order to comply with the functional requirements of paragraph 7.2.2.2 above, materials of exposed fire safety systems shall be approved by the Administration, or a recognized organization accepted by it, taking into account standards acceptable to the Organization[11] or other standards offering an equivalent level of safety based on the polar service temperature.

CHAPTER 8 – LIFE-SAVING APPLIANCES AND ARRANGEMENTS

8.1 Goal

The goal of this chapter is to provide for safe escape, evacuation and survival.

8.2 Functional requirements

In order to achieve the goal set out in paragraph 8.1 above, the following functional requirements are embodied in the regulations of this chapter:

8.2.1 *Escape*

8.2.1.1 Exposed escape routes shall remain accessible and safe, taking into consideration the potential icing of structures and snow accumulation.

8.2.1.2 Survival craft and muster and embarkation arrangements shall provide safe abandonment of ship, taking into consideration the possible adverse environmental conditions during an emergency.

8.2.2 *Evacuation*

8.2.2.1 All life-saving appliances and associated equipment shall provide safe evacuation and be functional under the possible adverse environmental conditions during the maximum expected time of rescue.

8.2.3 *Survival*

8.2.3.1 Adequate thermal protection shall be provided for all persons on board, taking into account the intended voyage, the anticipated weather conditions (cold and wind), and the potential for immersion in polar water, where applicable.

8.2.3.2 Life-saving appliances and associated equipment shall take account of the potential of operation in long periods of darkness, taking into consideration the intended voyage.

8.2.3.3 Taking into account the presence of any hazards, as identified in section 1 (Introduction), resources shall be provided to support survival following abandoning ship, whether to the water, to ice or to land, for the maximum expected time of rescue. These resources shall provide:

.1 a habitable environment;

.2 protection of persons from the effects of cold, wind and sun;

.3 space to accommodate persons equipped with thermal protection adequate for the environment;

[11] Refer to IACS UR S6 Use of Steel Grades for Various Hull Members – Ships of 90 m in Length and Above (2013) or IACS URI Requirements concerning Polar Class (2011).

.4 means to provide sustenance;

.5 safe access and exit points; and

.6 means to communicate with rescue assets.

8.3 Regulations

8.3.1 *Escape*

In order to comply with the functional requirements of paragraphs 8.2.1.1 and 8.2.1.2 above, the following apply for:

.1 ships exposed to ice accretion, means shall be provided to remove or prevent ice and snow accretion from escape routes, muster stations, embarkation areas, survival craft, its launching appliances and access to survival craft;

.2 ships constructed on or after [*date of entry into force*], exposed escape routes shall be arranged so as not to hinder passage by persons wearing suitable polar clothing; and

.3 ships intended to operate in low air temperatures, adequacy of embarkation arrangements shall be assessed, having full regard to any effect of persons wearing additional polar clothing.

8.3.2 *Evacuation*

In order to comply with the functional requirements of paragraph 8.2.2.1 above, the following apply:

.1 ships shall have means to ensure safe evacuation of persons, including safe deployment of survival equipment, when operating in ice-covered waters, or directly onto the ice, as applicable; and

.2 where the regulations of this chapter are achieved by means of adding devices requiring a source of power, this source shall be able to operate independently of the ship's main source of power.

8.3.3 *Survival*

8.3.3.1 In order to comply with the functional requirements of paragraph 8.2.3.1 above, the following apply:

.1 for passenger ships, a proper sized immersion suit or a thermal protective aid shall be provided for each person on board; and

.2 where immersion suits are required, they shall be of the insulated type.

8.3.3.2 In order to comply with the functional requirements of paragraph 8.2.3.2 above, ships intended to operate in extended periods of darkness, searchlights suitable for continuous use to facilitate operation in ice shall be provided for each lifeboat.

8.3.3.3 In order to comply with the functional requirements of paragraph 8.2.3.3 above, the following apply:

.1 no lifeboat shall be of any type other than partially or totally enclosed type; and

.2 an assessment shall consider the need for ships to be provided with survival resources for use following abandonment, onto ice or land to maximize the probability of survival for the expected time of rescue.

.3 Taking into account the assessment referred to in paragraph .2 above, appropriate survival resources, which address both individual (personal survival equipment) and shared (group survival equipment) needs, shall be provided, as follows:

.1 life-saving appliances and group survival equipment that provide effective protection against direct wind chill for all persons on board;

.2 personal survival equipment in combination with life-saving appliances or group survival equipment that provide sufficient thermal insulation to maintain the core temperature of persons subject to the polar service temperature; and

.3 personal survival equipment that provide sufficient protection to prevent frostbite of all extremities under the polar service temperature.

.4 In addition, whenever the assessment referred to in paragraph 8.3.3.3.1 identifies a potential of abandonment onto ice or land, the following apply:

.1 group survival equipment shall be carried, unless an equivalent level of functionality for survival is provided by the ship's normal life-saving appliances;

.2 when required, personal and group survival equipment sufficient for 110% of the persons on board shall be stowed in easily accessible locations, as close as practical to the muster or embarkation stations;

.3 containers for group survival equipment shall be designed to be easily movable over the ice and be floatable;

.4 whenever the assessment identifies the need to carry personal and group survival equipment, means shall be identified of ensuring that this equipment is accessible following abandonment;

.5 if carried in addition to persons, in the survival craft, the survival craft and launching appliances shall have sufficient capacity to accommodate the additional equipment;

.6 passengers shall be instructed in the use of the personal survival equipment and the action to take in an emergency; and

.7 the crew shall be trained in the use of the personal survival equipment and group survival equipment.

8.3.3.4 In order to comply with the functional requirements of paragraph 8.2.3.3.4 above, adequate emergency rations shall be provided, for the maximum expected time of rescue.

CHAPTER 9 – SAFETY OF NAVIGATION

9.1 Goal

The goal of this chapter is to provide appropriate nautical information and navigational equipment functionality for safe navigation.

9.2 Functional requirements

In order to achieve the goal set out in paragraph 9.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

9.2.1 *Nautical information*

9.2.1.1 Ships shall be equipped to receive up-to-date information including ice information for safe navigation.

9.2.1.2 Systems for providing reference headings and position fixing shall be suitable for the intended areas.

9.2.2 *Navigational equipment functionality*

The navigational equipment and systems shall be designed, constructed, and installed to retain their functionality under the expected environmental conditions in the area of operation.

9.3 Regulations

9.3.1 *Nautical information*

9.3.1.1 In order to comply with the requirements of paragraph 9.2.1 above, the following apply:

.1 ships shall have equipment capable of receiving and displaying information on ice [thickness and concentration]; and

.2 ships shall have two independent echo-sounding devices.

9.3.1.2 In order to comply with the requirements of paragraph 9.2.1.2 above, the following apply:

.1 ships shall have two non-magnetic means to determine and display their heading. Both means shall be independent, and if energy-consuming, they shall be connected to the ship's main and emergency source of power and [to an individual Uninterruptible Power Supply UPS unit with a minimum operating duration of 30 minutes]; and

.2 ships proceeding to latitudes over 80 degrees shall be fitted with at least one GNSS compass or equivalent.

9.3.2 *Navigational equipment functionality*

In order to comply with the requirements of paragraph 9.2.2.1 above, the following apply:

.1 Ships intended to operate low air temperature shall be fitted with a suitable means to de-ice sufficient conning position windows to provide unimpaired forward and astern vision from conning positions.

.2 The windows described in .1 shall be fitted with an efficient means of clearing melted ice, freezing rain, snow, mist and spray from outside and accumulated condensation from inside. A mechanical means to clear moisture from the outside face of a window shall have operating mechanisms protected from freezing or the accumulation of ice that would impair effective operation.

.3 Means to prevent the accumulation of ice on antennas required for navigation, communication and safe operation shall be provided.

.4 Ships shall be equipped with two remotely rotatable, narrow-beam search lights controllable from the bridge to provide lighting over an arc of 360 degrees. If such coverage is not possible to obtain, two supporting searchlights shall be placed one on each side of the bridge wing.

.5 [For ships intended to operate in ice], the following apply:

.1 where equipment required by SOLAS chapter V or this chapter have sensors that project below the hull, such sensors shall be protected against ice;

.2 [in category A ships [constructed on or after [date]] the bridge wings shall be enclosed or designed to protect navigational equipment and operating personnel; and

.3 ships that may be involved in operations with an icebreaker escort shall be equipped with a manually initiated flashing red light visible from astern to indicate when the ship is stopped. This light shall have a range of visibility of at least two (2) nautical miles, the horizontal and vertical arcs of visibility shall conform to the stern light specifications in COLREG.

CHAPTER 10 – COMMUNICATION

10.1 Goal

The goal of this chapter is to provide for effective communication for ships and survival craft during normal operation and in emergency situations taking into account operation in high latitude.

10.2 Functional requirements

In order to achieve the goal set out in 10.1 above, the following functional requirements are embodied in the regulations of this chapter as appropriate.

10.2.1 *Ship communication*

10.2.1.1 Two-way voice and data communications [reliable] at all points along the intended operating routes taking account of the limitations of shore stations [and available satellite communications] shall be provided [by the ship borne equipment];

10.2.1.2 Suitable means of communications shall be provided where escort and convoy operations are expected.

10.2.1.3 Appropriate communication equipment to enable telemedical assistance in polar areas shall be provided.

(Note: Need clarifications on what kind of telemedical assistance that is available/possible.)

10.2.2 *Survival craft communications capabilities*

10.2.2.1 [All [rescue boats] and lifeboats, whenever released, shall carry at least one equipment capable of transmitting and receiving GMDSS compatible communications suitable for, distress alerting, locating, [and on-scene communications.; and]

10.2.2.2 All [other] survival craft, whenever released [for evacuation], shall carry equipment suitable for [distress alerting and] locating.

10.3 Regulations

10.3.1 *Ship communication*

10.3.1.1 In order to comply with the functional requirements of paragraph 10.2.1.3 above, ships intended to provide icebreaking escort] shall be equipped with a special sound signaling system mounted to face astern to indicate escort and emergency manoeuvres to following ships as described in the International Code of Signals.

10.3.1.2 In order to comply with the functional requirements of paragraph 10.2.1.4 above, on-scene communications capability in ships, shall include [maritime VHF-DSC equipment. and equipment for voice communications with aircraft on 121.5 and 123.1 MHz.

10.3.2 *Survival craft communications capabilities*

10.3.2.1 In order to comply with the functional requirements of paragraph 10.2.2.1 above, the following apply:

.1 on-scene communications capability in lifeboats, shall include maritime VHF-DSC equipment and equipment for voice communications with aircraft on 121.5 and 123.1 MHz;

.2 all rescue boats and lifeboats, shall carry on-scene communications equipment for use with rescue assets upon evacuation into the water or to ice or to land; and

.3 [Distress alerting and locating equipment required by 10.2.2 shall include [EPIRBs SARTs and AIS-SARTs] [EPIRBs and search and rescue locating devices]. Such equipment shall conform to performance standards referred in SOLAS or other alternative equipment that is compatible with GMDSS and acceptable to the Administration.]

10.3.2.2 [Mandatory communications equipment for use in survival craft and rescue boats shall be capable of operation during the maximum expected time of rescue].

CHAPTER 11 – VOYAGE PLANNING

11.1 Goal

The goal of this chapter is to ensure that the Company, master and crew are provided with sufficient information to enable operations to be conducted with due consideration to safety of ship and persons on board and, as appropriate, environmental protection.

11.2 Functional requirements

In order to achieve the goal set out in paragraph 11.1 above, the voyage plan shall take into account the potential hazards of the intended voyage.

11.3 Requirements

In order to comply with the requirements of paragraph 11.2, the master shall consider a route through polar waters taking into account the following:

.1 the procedures required by the PWOM;

.2 any limitations of the hydrographic information and aids to navigation available;

.3 current information on the extent and type of ice and icebergs in the vicinity of the intended route;

.4 statistical information on ice and temperatures from former years;

.5 places of refuge;

.6 current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals including seasonal migration areas[12];

.7 current information on relevant ships' routing systems, speed recommendations and vessel traffic services relating to known areas with densities of marine mammals including seasonal migration areas[13];

.8 national and international designated protected areas along the route; and

.9 operation in areas remote from SAR capabilities[14].

[11.4 Reporting

Prior to entering Polar waters, ships should report to a recognized position report system accessible by search and rescue authorities.]

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12 Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

13 Refer to MEPC/Circ.674 on Guidance document for minimizing the risk of ship strikes with cetaceans.

14 Refer to MSC.1/Circ.1184 on Enhanced contingency planning guidance for passenger ships operating in areas remote from SAR facilities and A.999(25) *on Guidelines on voyage planning for passenger ships operating in remote areas.*

CHAPTER 12 –MANNING AND TRAINING FAMILIARITY

12.1 Goal

The goal of this chapter is to ensure that ships are appropriately manned by adequately qualified, trained and experienced personnel.

12.2 Functional requirements

12.2.1 In order to achieve the goal set out in paragraph 12.1.1 above, the following functional requirement is embodied in the regulations of this chapter:

.1 Companies shall ensure that masters, chief mates and officers in charge of a navigational watch on board ships operating in polar waters shall have completed training to attain the abilities that are appropriate to the capacity to be filled and duties and responsibilities to be taken up, taking into account the provisions given in the STCW Convention and Code, as amended.

12.3 Regulations

12.3.1 In order to meet the functional requirements of 12.2.1 above while operating in polar waters, masters, chief mates and officers in charge of a navigational watch shall be qualified in accordance with chapter V of the STCW Convention and Code, as amended as follows:

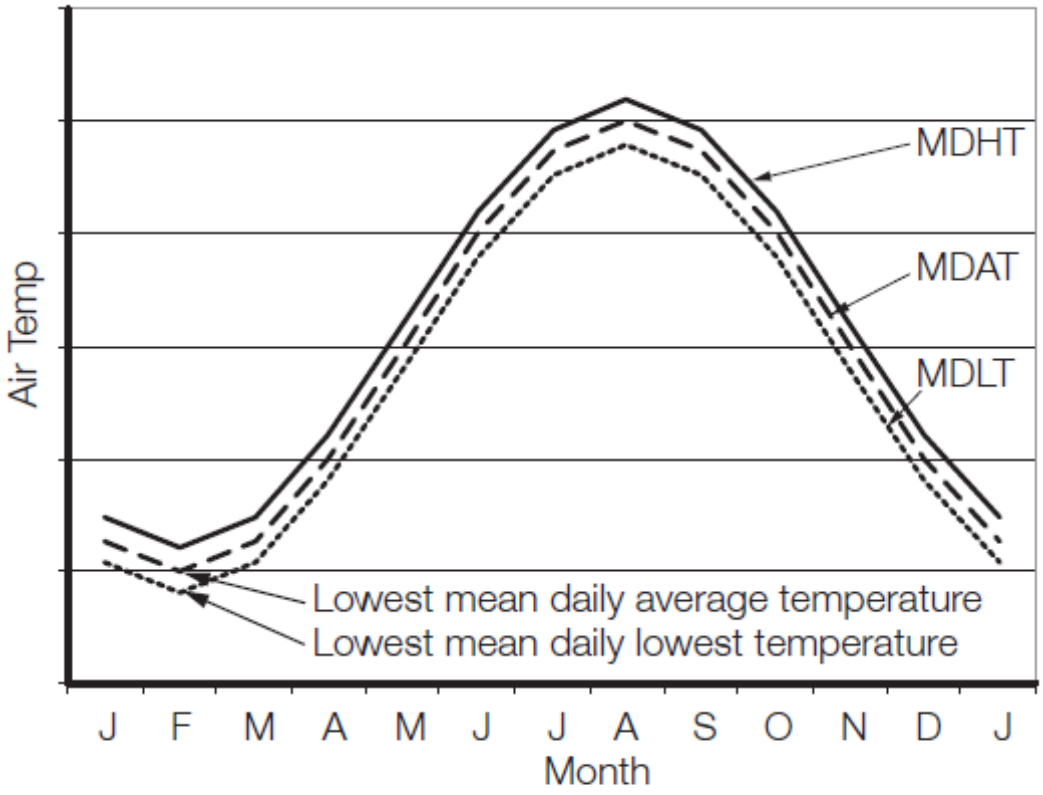
Ice conditions	Tankers	Passenger ships	Other
Ice Free	Not applicable	Not applicable	Not applicable
Open waters	Basic training for master, chief mate and officers in charge of a navigational watch	Basic training for master, chief mate and officers in charge of a navigational watch	Not applicable
Other waters	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch	Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch.

12.3.2 Every crew member shall be made familiar with the procedures and equipment contained or referenced in the Polar Water Operational Manual relevant to their assigned duties.

PART I-B

ADDITIONAL GUIDANCE REGARDING THE PROVISIONS OF THE INTRODUCTION AND PART I-A

1 ADDITIONAL GUIDANCE TO THE DEFINITIONS IN THE INTRODUCTION SECTION 2



Definitions used in the figure above

MDHT – Mean Daily High Temperature

MDAT – Mean Daily Average Temperature

MDLT – Mean Daily Low Temperature

Guidance instructions for determining MDLT:

1 Determine the daily low temperature for each day for a 10 year period.

2 Determine the average of the values over the 10 year period for each day.

3 Plot the daily averages over the year.

4 Take the lowest of the averages for the season of operation.

2 ADDITIONAL GUIDANCE TO CHAPTER 1 (GENERAL)

[1 Limiting Ice Capabilities for the Polar Ship Certificate

This guidance is intended to support the assignment of limiting ice capabilities on the Polar Ship Certificate. The basic information covered by the Certificate may be extended by other information included in the ship's Polar Waters Operational Manual, as described in guidance to chapter 2.

Limiting capabilities for structural safety for operations in level continuous ice can be set in accordance with figure 1 and table 1. For operation in other ice conditions, an equivalent ice thickness should be used to establish a threshold for safe operation, in accordance with an operator guidance system acceptable to the Administration.

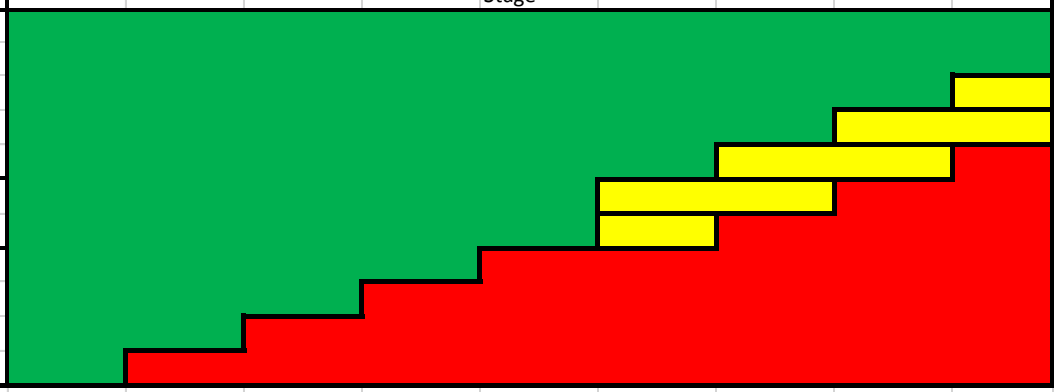
		Upper Limit of Ice Thickness (cm)								
		10	15	30	50	70	120	200	300	
Category	**Ice Class**	New	Young/ Grey	Young/ Grey White	Thin/ First Stage	Thin/ Second Stage	Medium	Thick	Old/ up to 3m	Old/ > 3m
A[1]	PC1									
	PC2									
	PC3									
	PC4									
	PC5									
B[1]	PC6									
	PC7									
C[2]	1B									
	1C									
	II									
	O/W									
		Within capability								
		Marginal capability								
		Outside standard capability								
Notes	1 - Equivalencies can be used as provided for in Part I-B									
	2 - Baltic ice classes shown can be substituted using the equivalencies provided in HELCOM 25/7									

Figure 1: Continuous Ice Capability for Structural Safety

Table 1: Continuous Ice Capabilities and Codes for Structural Safety

Category	Ice Class	Limiting Ice Thickness (m)	Threshold ice Thickness for Low Speed Operation (m)	Code
A[1]	PC1	Any ice		A1
	PC2	Any ice		A2
	PC3	Ice >3m	Any ice	A3
	PC4	2.00	3.00	A4
	PC5	1.20	3.00	A5

Category	Ice Class	Limiting Ice Thickness (m)	Threshold ice Thickness for Low Speed Operation (m)	Code
B[1]	PC6	0.70	2.00	B1
	PC7	0.70	1.20	B2
C[2]	1B	0.50		C1
	1C	0.30		C2
	1D	0.15		C3
	O/W	0.10		C4

Notes 1 - Equivalencies can be used as provided for in part I-B
2 - Baltic ice classes shown can be substituted using the equivalencies provided in HELCOM 25/7

The Certificate should refer to the Capability Code included in the final column of table 1. Transit in ice thicknesses between the upper and lower values should be undertaken only at speeds limited to:

5 kts, for category A ships

3 kts, for category B ships

0 kts, for category C ships

or as defined by an operator guidance system acceptable to the Administration. These speeds should be adhered to irrespective of the propulsive icebreaking capabilities of the ship.

Ships equipped with ice load measurement and monitoring systems can utilize these systems to calibrate safe operating speeds, subject to the acceptance of the Administration.
All of the guidance above relates to operation in strong ice. For operations in decayed ice, operator guidance can modify the capability levels.]

2 Performance standards

A system previously accepted based on manufacturer certifications, classification society certifications and/or satisfactory service of existing systems may be acceptable for installation on new and existing ships if no performance or testing standards are accepted by the Organization.

3 ADDITIONAL GUIDANCE TO CHAPTER 2 (POLAR WATER OPERATIONAL MANUAL (PWOM))

3.1 Recommendation on the content of the polar water operatiopnal manual

The Polar Waters Operational Manual (PWOM) is intended to address all aspects of operations addressed by chapter 2 of part 1-A of the Polar Code. When appropriate information, procedures or plans exist elsewhere in a ship's documentation, the PWOM itself does not need to replicate this material but may instead cross-reference the relevant reference document.

A model Table of Contents is found in appendix 2.

The model follows the general structure of chapter 2. Not every section outlined below will be applicable to every polar ship. Many category C ships that undertake occasional or limit polar voyages will not need to have procedures for situations with a very low probability of occurrence. However, it may still be advisable to retain a common structure for the PWOM as a reminder that if assumptions change then the contents of the manual may also need to be updated. Noting an aspect as "not applicable" also indicates to the Administration that this aspect has been considered and not merely omitted.

3.2 Guidance on navigation with icebreaker assistance

When navigation with icebreaker assistance, the following should be considered:

.1 while approaching to a starting point of the ice convoy to follow the icebreaker/icebreakers or in case of the escorting by icebreaker of one ship to the point of meeting with icebreaker, the ship should establish radio communication on the VHF channel 16 and act in compliance with icebreaker's instructions;

.2 the icebreaker rendering the icebreaker assistance of ship ice convoy should command ships in the ice convoy;

.3 position of a ship in the ice convoy should be determined by the icebreaker rendering the assistance;

.4 ship within the ice convoy, in accordance with the instructions of the icebreaker rendering the assistance, should establish communication with the icebreaker by VHF channel indicated by the icebreaker;

.5 the ship, while navigating in the ice convoy, should ensure: compliance with the instructions of the icebreaker;

.6 position in the ice convoy, speed and distance to a ship ahead should be as instructed by the icebreaker;

.7 the ship should immediately notify the icebreaker of any difficulties to maintain the position within the ice convoy, speed and/or distance to any other ship in the ice convoy; and

.8 the ship should immediately report to the icebreaker of any damage.

3.3 Guidance on the development of contingency plans

In developing the ship's contingency plans ships should consider damage control measures arrangements for emergency transfer of liquids and access to tanks and spaces during salvage operations.

See also additional guidance to chapter 9.

4 ADDITIONAL GUIDANCE TO CHAPTER 3 (SHIP STRUCTURE)

Method for determining equivalent ice class

1 The guidance presented below is intended to assist in determining equivalency with standards acceptable to the Organization, as referenced in chapters 3 and 6 of the Code.

The methodology is consistent with guidance developed by the Organization[15] while allowing for the use of a simplified approach.

2 The basic approach for considering equivalency for Categories A and B can be the same for both new and existing ships. It involves comparing other ice classes to the IACS Polar Classes. For ice classes under category C, additional information on comparisons of strengthening levels is available for the guidance of owners and Administrations[16]. The responsibility for generating the equivalency request and supporting information required rests with the owner/operator. Review/approval of any equivalency request will be undertaken by the flag State Administration, or by a recognized organization acting on its behalf under the provisions of the RO Code. Several classification societies have developed easy-to-use tools for determination of compliance with the IACS Polar Class structural requirements, as have some administrations and other third parties.

3 The scope of a simplified equivalency assessment [(referring to paragraph 6.1 to 6.3 below)] is expected to be limited to materials selection, structural strength of the hull and propulsion machinery.

4 If there is not full and direct compliance, then an equivalent level of risk can be accepted in accordance with guidance provided by the Organization. An increase in the probability of an event can be balanced by a reduction in its consequences. Alternatively, a reduction in probability could potentially allow acceptance of more serious consequences. Using a hull area example, a local shortfall in strength level or material grade could be accepted if the internal compartment is a void space, for which local damage will not put the overall safety of the ship at risk or lead to any release of pollutants.

5 For existing ships, service experience can assist in risk assessment. As an example, for an existing ship with a record of polar ice operations a shortfall in the extent of the ice belt (hull areas) may be acceptable if there is no record of damage to the deficient area; i.e. a ship that would generally meet PC 5 requirements but in limited areas is only PC 7 could still be considered as a category A, PC 5 ship. In all such cases, the ship's documentation should make clear the nature and scope of any deficiencies.

6 The process includes the following stages of assessment:

.1 Select the target Polar Class for equivalency.

.2 Compare materials used in the design with minimum requirements under the IACS Polar Class URs; identify any shortfalls.

.3 Compare strength levels of hull and machinery components design with requirements under the IACS Polar Class URs; quantify levels of compliance.

7 Where gaps in compliance are identified in steps 1 to 3, additional steps are necessary to demonstrate equivalency, as outlined below:

.4 Identify any risk mitigation measures incorporated in the design of the ship (over and above the requirements of the Code and IACS URs).

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15 Refer to the G*uidelines for the approval of alternatives and equivalents as provided for in various IMO instruments* (MSC.1/Circ.1455).

16 Refer to the annex to HELCOM Recommendation 25/7, Safety of Winter Navigation in the Baltic Sea Area, available at www.helcom.fi

.5 Where applicable, provide documentation of service experience of existing ships, in conditions relevant to the target ice class for equivalency.

.6 Undertake an assessment, taking into account information from steps 1 to 5, as applicable, and on the principles outlined in paragraphs 2 to 6 above.

8 Documentation provided with an application for equivalency should identify each stage that has been undertaken, and sufficient supporting information to validate assessments.

9 Where a ship in categories A or B is provided with an equivalency for ice class by its flag State, this should be noted in its Polar Ship Certificate.

5 A**DDITIONAL GUIDANCE TO CHAPTER 4 (STABILITY AND SUBDIVISION)**

No additional guidance

6 ADDITIONAL GUIDANCE TO CHAPTER 5 (WATERTIGHT AND WEATHERTIGHT INTEGRITY)

No additional guidance.

7 ADDITIONAL GUIDANCE TO CHAPTER 6 (MACHINERY INSTALLATIONS)

Refer to additional guidance to chapter 3.

8 ADDITIONAL GUIDANCE TO CHAPTER 7 (FIRE SAFETY/PROTECTION)

No additional guidance.

9 ADDITIONAL GUIDANCE TO CHAPTER 8 (LIFE-SAVING APPLIANCES AND ARRANGEMENTS)

9.1 Sample personal survival equipment

When considering resources to be included with the personal survival equipment, the following should be taken into account:

Suggested Equipment
Protective clothing (hat, gloves, socks, face and neck protection, etc.)
Skin protection cream
Thermal protective aid
Sunglasses
Whistle
Drinking mug
Penknife
Polar survival guidance
Emergency food
Carrying bag

9.2 **Sample group survival equipment**

When considering resources to be included in the group survival equipment, the following should be taken into account:

Suggested Equipment
Shelter – tents or storm shelters or equivalent – sufficient for maximum number of persons
Thermal protective aids or similar – sufficient for maximum number of persons
Sleeping bags – sufficient for at least one between two persons
Foam sleeping mats or similar – sufficient for at least one between two.
Shovels – at least 2
Sanitation (e.g. toilet paper)
Stove and fuel – Sufficient for maximum number of persons ashore and maximum anticipated time of rescue
Emergency food – Sufficient for maximum number of persons ashore and maximum anticipated time of rescue
Flashlights – one per shelter
Waterproof and windproof matches – two boxes per shelter
Whistle
Signal mirror
Water containers & water purification tablets
Spare set of personal survival equipment
Group survival equipment container (waterproof and floatable)

10 ADDITIONAL GUIDANCE TO CHAPTER 9 (SAFETY OF NAVIGATION)

10.1 Radars equipped with enhanced ice detection capability should be promoted used, in particular, in shallow waters.

10.2 As the chart coverage of polar waters in many areas may not currently be adequate for coastal navigation, navigational officers should:

.1 exercise care to plan and monitor their voyage accordingly, taking due account of the information and guidance in the appropriate nautical publications;

.2 be familiar with the status of hydrographic surveys and the availability and quality of chart information for the areas in which they intend to operate;

.3 be aware of potential chart datum discrepancies with GNSS positioning; and

.4 aim to plan their route through charted areas and well clear of known shoal depths, following established routes whenever possible.

10.3 Any deviations from the planned route should be undertaken with particular caution. For example, and when operating on the continental shelf:

.1 the echo-sounder should be working and monitored to detect any sign of unexpected depth variation, especially when the chart is not based on a full search of the sea floor.

.2 Independent cross-checking of positioning information (e.g. visual and radar fixing and GNSS) should be undertaken at every opportunity. Mariners should ensure to report to the relevant charting authority (Hydrographic Office) any information that might contribute to improving the nautical charts and publications.

11 ADDITIONAL GUIDANCE TO CHAPTER 10 (COMMUNICATION)

No additional guidance

12 ADDITIONAL GUIDANCE TO CHAPTER 11 (VOYAGE PLANNING)

In developing and executing a voyage plan ships should consider the following:

.1 In the event that marine mammals are encountered, any existing best practices should be considered to minimize unnecessary disturbance.

.2 Planning to minimize the impact of the ship's voyage where ships are trafficking near areas of cultural heritage and cultural significance.

See also additional guidance to chapter 9.

13 ADDITIONAL GUIDANCE TO CHAPTER 12 (MANNING AND TRAINING FAMILIARITY)

No additional guidance

[PART II-A
POLLUTION PREVENTION MEASURES [ENVIRONMENTAL PROTECTION MEASURES]

CHAPTER 1 – PREVENTION OF OIL POLLUTION

1.1 Application

1.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[1.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of 1.4.2.2 by [date to be determined]].

1.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from oil from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

1.3 Functional requirements

In order to achieve the goal set out in paragraph 1.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 Plans, manuals, records and procedures and means shall be provided to avoid environmental impact from oil or oily mixtures during normal operation.

.2 Ships shall be designed and have plans to minimize the risk of any environmental impact from oil or oily mixtures in case of an emergency situation, in particular one that may lead to an oil spill in ice-covered waters.

1.4 Requirements

1.4.1 In order to comply with the functional requirements in paragraph 1.4.1 above, the following apply:

.1 any manuals and records required by MARPOL Annex I shall take into account operation in polar waters; and

.2 any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.

1.4.2 In order to comply with the functional requirements in paragraph 1.4.1.2 above, the following apply:

.1 the shipboard oil pollution emergency plan required by MARPOL Annex I shall take into account operation in polar waters; and

.2 for categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of oil or oily mixtures shall be separated from the outer shell by a distance not less than 760 mm. Where this is not practicable, this requirement needs not to be met for tanks containing oil or oily mixtures carried in way of the machinery space with an individual capacity of 20 m^3 or less.

CHAPTER 2 – PREVENTION OF POLLUTION FROM NOXIOUS LIQUID SUBSTANCES

2.1 Application

2.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[2.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exception of 2.4.2.2 by [date to be determined]].

2.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts from noxious liquid substances from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

2.3 Functional requirements

In order to achieve the goal set out in paragraph 2.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 records, manuals and means shall be provided to avoid environmental impact from noxious liquid substances during normal operation; and

.2 ships shall be designed and have plans to minimize the risk of environmental impact from noxious liquid substances in case of an emergency situation.

2.4 Requirements

2.4.1 In order to comply with the functional requirements in paragraph 2.3.1 above, the following apply:

.1 the cargo record book and the Procedure and Arrangement Manual required by MARPOL Annex II shall take into account operation in polar waters; and

.2 any discharge into the sea of noxious liquid substances, or mixtures containing these substances, is prohibited.

2.4.2 In order to comply with the functional requirements in paragraph 2.4.2 above, the following apply:

.1 the shipboard marine pollution emergency plan for noxious liquid substances required by MARPOL Annex II shall take into account operation in polar waters; and

.2 for categories A and B ships, constructed on or after [date of entry into force], all tanks used for carriage of noxious liquid substances shall be separated from the outer shell by a distance not less than 760 mm.

CHAPTER 3 – PREVENTION OF POLLUTION BY HARMFUL SUBSTANCES IN PACKAGED FORM

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CHAPTER 4 – PREVENTION OF POLLUTION BY SEWAGE FROM SHIPS

4.1 Application

4.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[4.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code with the exceptions of 4.4.1.2 by [date to be determined]].

4.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by sewage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

4.3 Functional requirements

In order to achieve the goal set out in paragraph 4.3 above, ships shall be operated to minimize the risk of environmental impact by discharge of sewage from ships.

4.4 Requirements

4.4.1 In order to comply with the functional requirements in paragraph 4.4 above, the following apply:

.1 Subject to the provisions of MARPOL Annex IV, regulation 3, discharges of sewage within polar waters are subject to the following additional requirements in accordance with standards [approved by the Administration based upon guidelines developed by] [acceptable to] the Organization[17]:

.1 discharges of sewage that is comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 3 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;

.2 discharges of sewage that is not comminuted and disinfected and permitted under MARPOL Annex IV, regulation 11.1.1 shall be at a distance of more than 12 nautical miles from any ice shelf or land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10; and

.3 discharges of sewage permitted under MARPOL Annex IV, regulation 11.1.2 or MARPOL Annex IV, regulation 11.3 shall be as far as practicable from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.

[17] Refer to resolution MEPC.2(VI), resolution MEPC.159(55) or resolution MEPC.227(64) as applicable.

.2 Discharge of sewage into the sea is prohibited from cargo ships of category A and B, constructed on or after [date of entry into force],and passenger ships constructed on or after [date of entry into force] except when such discharges have been treated by means of a type-approved sewage treatment plant based upon guidelines developed by the Organization[18]. Such discharges shall be, as far as practicable, from the nearest land, any ice shelf, land-fast ice or areas of ice concentration exceeding 1/10.

.3 Notwithstanding the requirements of paragraph 4.5.1, ships that operate in areas of ice concentrations exceeding 1/10 for extended periods of time may discharge sewage if such sewage has been treated by means of a [type-approved] sewage treatment plant [approved] based upon guidelines developed by the Organization[22]. Such discharge shall be subject to the approval of the Administration, [and shall be noted in the Polar Ship Certificate with supplemental operational information in the Polar Water Operations Manual.] (Note: TYPE-approval based upon guidelines is questioned)

CHAPTER 5 – PREVENTION OF POLLUTION BY GARBAGE

5.1 Application

5.1.1 Unless expressly provided otherwise, ships operating in polar waters shall comply with the provisions included in this chapter.

[5.1.2 Ships built prior to [date of entry into force] shall meet the requirements of the Code by [date to be determined]].

5.2 Goal

The goal of this chapter is to provide for means to reduce and to the extent practicable prevent harmful environmental impacts by discharge of garbage from ships, taking into account the particular environmental conditions and resilience capabilities in polar waters.

5.3 Functional requirements

In order to achieve the goal set out in paragraph 5.3 above, the following functional requirements are embodied in the regulations of this chapter as appropriate:

.1 records and, plans shall facilitate the minimization of environmental impact by garbage; and

.2 ships shall be operated to minimize the risk of environmental impact by garbage.

5.4 Requirements

5.4.1 In order to comply with the functional requirements in paragraph 5.4.1 above, any plans and records required by MARPOL Annex V shall take into account operation in polar waters.

[18] Refer to the *2012 Guidelines on implementation of effluent standards and performance tests for sewage treatment plants* (resolution MEPC.227(64)).

5.4.2 In order to comply with the functional requirements in paragraph 5.4.2 above, ships to which the requirements of MARPOL Annex V, regulation 6 do not apply shall comply with the following:

.1 discharge of food waste is only permitted when the ship is en route and as far as practicable from the nearest land, but in any case not less than 12 nm from the nearest land, nearest ice shelf, or nearest land-fast ice and shall be as far as practicable from areas of ice concentration exceeding 1/10;

.2 food waste shall be comminuted or ground and shall be capable of passing through a screen with openings no greater than 25 mm. Food wastes shall not be contaminated by any other garbage type;

.3 food waste shall not be discharged onto the ice; and

.4 discharge of animal carcasses within Arctic waters is prohibited.]

[PART II-B

**[INFORMATION AND ADDITIONAL GUIDANCE TO PART II-A]
[RECOMMENDATORY MEASURES]**

GENERAL INFORMATION

Different from the Arctic, the Antarctic has been specifically regulated under various MARPOL Annexes prior to the entry into force of the Polar Code. Upon entry into force of the Polar Code, there will still be some differences in the environmental protection requirements for ships operating in the Antarctic and ships operating in the Arctic:

MARPOL Annex I

1 The Antarctic area was designated a special area under MARPOL Annex I.

2 Discharge requirements are contained in regulations 15 and 34 of the Annex.

3 Regulation 15.4 provides that any discharge into the sea of oil or oily mixtures from any ship shall be prohibited.

4 Requirements on the reception facilities in special areas are contained in regulation 38.

5 Regulation 43 prohibits the use or carriage of [certain] oils in the Antarctic area.

MARPOL Annex II

Regulation 13.8.2 prohibits any discharge into the sea of noxious liquid substances or mixtures containing such substances.

MARPOL Annex V

1 The Antarctic area was designated a special area under MARPOL Annex V.

2 Discharge requirements for special areas are contained in regulation 6 of the Annex. Regulation 6.1.1 also provides that discharge of introduced avian products, including poultry parts, is not permitted in the Antarctic area unless it has been treated to make sterile.

MARPOL Annex VI

MARPOL VI exempts cargo ships having icebreaking capacity from EEDI requirements.

[1 Additional guidance to chapter 1
(Note: This part is proposed deleted)

In addition to the provisions contained in chapter 1 of this Code, ships shall comply with regulation 43 of MARPOL Annex I, which prohibits the use or carriage of heavy fuel oil in Antarctic area. [Ships may, on a voluntary basis, not use or carry heavy fuel oil in Arctic area.]

2 Additional guidance to chapter 5

To meet the discharge requirements of MARPOL Annex V, due consideration should be given to resolution MEPC.219(63) *2012 Guidelines for the implementation of MARPOL Annex V* and resolution MEPC.220(63) *2012 Guidelines for the development of garbage management plans*. Given that the discharge of animal carcasses is prohibited, consideration should be given to the management, treatment, and storage of animal carcasses and, as appropriate, any future guidelines developed by the Organization.

3 Miscellaneous additional guidance

3.1 Until the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) enters into force, the ballast water management provisions of the ballast water exchange standard, set out in regulation D-1, or the ballast water performance standard, set out in regulation D-2 of the BMW Convention should be considered as appropriate. The provisions of the *Guidelines for ballast water exchange in the Antarctic treaty area* (resolution MEPC.163(56)) should be taken into consideration.

3.2 In selecting the ballast water management system, attention should be paid to limiting conditions specified in the appendix of the Type Approval Certificate and the temperature under which the system has been tested, in order to ensure its suitability and effectiveness in polar waters.

3.3 Non-toxic biodegradable lubricants or water-based systems should be considered for stern tube bearings, stern seals, and other lubricated components located outside the underwater hull.

3.4 In order to minimize the risk of invasive aquatic species transfers via biofouling, measures should be considered to minimize the risk of more rapid degradation of anti-fouling coatings associated with polar ice operations. Reference is made in particular to resolution MEPC.207(62), *2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species.*

Table: Example of matters related to anti-fouling systems taken into consideration by some ice going ships (This table is used by some operators of ice going ships)

	Hull	**Sea Chest**
Year round operation in ice-covered polar waters	Abrasion resistant low friction ice coating No anti-fouling system	Abrasion resistant coating Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Intermittent operation in ice-covered polar waters	Abrasion resistant low friction ice coating In sides above bilge keel max thickness of anti-fouling system 75 µm [to protect hull between application of anti-fouling system and next anticipated voyage to ice-covered waters]. In bottom area thickness to be decided by ship owner. Composition of anti-fouling system should be decided	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.
Category B & C vessels	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.	Compliant with the AFS Convention. Thickness of anti-fouling system to be decided by ship owner.

]

APPENDIX 1

Form of Certificate for Ships operating in Polar Waters

POLAR SHIP CERTIFICATE

This Certificate is a supplement to the Passenger Ship Safety Certificate/Cargo Ship Safety Construction Certificate[19]

(Official seal)

(State)

Issued under the provisions of the

International Convention for the Safety of Life at Sea, 1974

under the authority of the Government of

(name of the State)

by _____
(person or organization authorized)

Name of ship……
Distinctive number or letters……..
Port of registry……..
Gross tonnage……..
IMO Number[20] ….....

[19] Delete as appropriate.

[20] In accordance with *IMO ship identification number scheme* adopted by the Organization by resolution A.600(15).

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the *Safety of Life at Sea*.

2 That the survey showed that the ship complied with the requirements of chapter XIV of the International Convention for the Safety of Life at Sea, 1974.

Category A/B/C[21] ship as follows:

Ship type: tanker/passenger ship/other[30]

[Ship intended to operate in ice: Yes/No[1]]

[Ship restricted to operate in ice free waters Yes/No[1]]

Ship intended to operate in low air temperature: Yes/No[1]

Polar Service Temperature: ……..°C

Maximum expected time of rescue

Ice Class and Ice Waterline Extent

Ice class	**Maximum draft**		**Minimum draft**	
	Aft	Fwd	Aft	Fwd

[Other operational limitations for inclusion in the supplement have been determined Yes/No[1]]

3 The ships was/was not[3] subjected to an alternative design and arrangements in pursuance of regulations(s) XIV/4 of the Safety of Life at Sea Convention.

4 Document of approval of alternative design and arrangements for [structural integrity] machinery and electrical installations/fire protection/life-saving appliances and arrangements[3] is/is not[3] appended to this Certificate.

This certificate is valid until . . . .

Completion date of the survey on which this certificate is based:. . . . .
(dd/mm/yyyy)

Issued at . . . .
(Place of issue of certificate)

. . . .

(*Date of issue)* *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

21 Delete as appropriate.

Record of Additional Equipment and operational limitations for the Polar Ship Certificate[22]

This record shall be permanently attached to the
Polar Ships Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH CHAPTER XIV OF
THE INTERNATIONAL CONVENTION FOR THE SAFETY
OF LIFE AT SEA, 1974

1 Particulars of ship:

Name of ship:……
Distinctive number or letters:……..

2 Record of equipment

2.1 *Life-saving appliances*

1	Immersion suits with insulation:	.....
1.1	for crew	.....
1.2	for passengers	.....
2	Thermal protective aids	.....
3	Personal and Group Survival Equipment	.....
3.1	Personal survival equipment – for number of persons	.....
3.2	Group survival equipment – for number persons	.....
[3.3	Capacity of liferafts in compliance with chapter 9 of the Code	.....
3.4	Capacity of lifeboats in compliance with chapter 9 of the Code]	.....

[2.2 *Navigation equipment*

1	Independent echo-sounding devices	.....
2	Remotely rotatable, narrow-beam search lights controllable from the bridge – Yes/No	.....
3	Manually initiated flashing red light visible from astern – Yes/No[1]	.....
4	Two or more non-magnetic independent means to determine and display heading – Yes/No[1]	.....
5	GNSS compass or equivalent – Yes/No[1]	.....

2.3 *Communication equipment*

1	All rescue boats and lifeboats capable of transmitting and receiving GMDSS compatible communications – Yes/No[1]	.....
2	All other survival craft equipped with equipment suitable for distress alerting and Locating – Yes/No[1]]	.....

[22] This equipment is in addition to other equipment required under the SOLAS Convention and recorded under the relevant SOLAS certificates.

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at……
(Place of issue of the Record)

…….. ……..
(Date of issue) *(Signature of duly authorized official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

[Record of Operational limitations]

Appendix 2

Model Table of Contents for the Polar Water Operational Manual (PWOM)

PART I

SAFETY MEASURES

1 – Operational capabilities and limitations

Chapter 1 Operation in ice

1.1 Operator guidance for safe operation

Guidance: The PWOM should establish the means by which decisions as to whether ice conditions exceed the ship's design limits should be made, taking into account the operational limitations on the Polar Ship Certificate. An appropriate decision support system, such as the Canada's Arctic Ice Regime Shipping System, and/or the Russian Ice Certificate as described in the Rules of Navigation on the water area of the Northern Sea Route, can be used... Bridge personnel should be trained in the proper use of the system to be utilized. For ships that will operate only in ice-free waters, procedures to ensure that will keep the ship from encountering ice should be established.

1.2 Icebreaking capabilities

Guidance: The PWOM should provide information on the ice conditions in which the ship can be expected to make continuous progress. This may be drawn, for example from numerical analysis, model test or from ice trials. Information on the influence of ice strength for new or decayed ice and of snow cover may be included.

1.3 Manoeuvring in ice

1.4 Special features

Guidance: [Where applicable, the manual PWOM include the results of any equivalency analyses made to determine Polar Ship category/ice class.] The manual should also provide information on the use of any specialized systems fitted to assist in ice operations.

Chapter 2 Operation in low air temperatures

2.1 System design

Guidance: The PWOM should list all ship systems susceptible to damage or loss of functionality by exposure to low temperatures, and the measures to be adopted to avoid malfunction.

Chapter 3 Communication and navigation capabilities in high latitudes

Guidance: The PWOM should identify any restrictions to operational effectiveness of communications and navigational equipment that may result from operating in high latitudes.

Chapter 4 Voyage duration

Guidance: The PWOM should provide information on any limitations on ship endurance such as fuel tankage, fresh water capacity, provision stores, etc. This will normally only be a significant consideration for smaller ships, or for ships planning to spend extended periods in ice.

Division 2 – Ship operations

Chapter 1 Strategic planning

Assumptions used in conducting the analyses referred to below should be included in the Manual.

1.1 Avoidance of hazardous ice

Guidance: For ships operating frequently in polar waters, the PWOM should provide information with respect to periods during which the ship should be able to operate for intended areas of operation. Areas that pose particular problems, e.g. chokepoints, ridging, as well as worst recorded ice conditions should be noted. Where the available information is limited or of uncertain quality, this should be recognized and noted as a risk for voyage planning.

1.2 Avoidance of hazardous temperatures

Guidance: For ships operating frequently in polar waters, the PWOM should provide information with respect to, the daily mean daily low temperature as well as the minimum recorded temperature for each of the days during the intended operating period. Where the available information is limited or of uncertain quality, this should be recognized as a risk for voyage planning.

1.3 Voyage duration and endurance

Guidance: Procedures to establish requirements for supplies should be established, and appropriate safety levels for safety margins determined taking into account various scenarios, e.g. slower than expected steaming, course alterations, adverse ice conditions, places of refuge and access to provisions. Sources for and availability of fuel types should be established, taking into account long lead times required for deliveries.

1.4 Human resources management

Guidance: The PWOM should provide guidance for the human resources management, taking into account the anticipated ice conditions and requirements for ice navigation, increased levels of watch keeping, hours of rest, fatigue and a process that ensures that these requirements will be met.

Chapter 2 Arrangements for receiving forecasts of environmental conditions

Guidance: The PWOM should set out the means and frequency for provision of ice and weather information. Where a ship is intended to operate in or in the presence of ice, the manual should set out when weather and ice information is required and the format for the information.

When available, the information should include both global and localized forecasts that will identify weather and ice patterns/regimes that could expose the ship to adverse conditions.

The frequency of updates should provide enough advance notice that the ship can take refuge or use other methods of avoiding the hazard if the conditions are forecast to exceed its capabilities.

The PWOM may include use of a land based support information provider an effective method of sorting through available information, thereby providing the ship only with information that is relevant, reducing demands on the ship's communications systems. The manual may also indicate instances in which additional images should be obtained and analysed, as well as where such additional information may be obtained.

2.1 Ice information

Guidance: The PWOM should include or refer to guidance on how radar should be used to identify ice floes, how to tune the radar to be most effective, instructions on how to interpret radar images, etc. If other technologies are to be used to provide ice information, their use should also be described.

2.2 Meteorological information

Chapter 3 Verification of hydrographic, meteorological and navigational information

Guidance: The PWOM should provide guidance on the use of hydrographic information as further described in the additional guidance to chapter 10.

Chapter 4 Operation of Special Equipment

4.1 Navigation systems

4.2 Communications systems

Chapter 5 Procedures to maintain equipment and system functionality

5.1 Icing prevention and de-icing

Guidance: The PWOM should provide guidance on how to prevent or mitigate icing by operational means, how to monitor and assess ice accretion, how to conduct de-icing using equipment available on the ship, and how to maintain the safety of the ship and its crew during all of these aspects of the operation.

5.2 Operation of seawater systems

Guidance: The PWOM should provide guidance on how to monitor, prevent or mitigate ice ingestion by seawater systems when operating in ice or in low water temperatures. This may include recirculation, use of low rather than high suctions, etc.

5.3 Procedures for low temperature operations

Guidance: The PWOM should provide guidance on maintaining and monitoring any systems and equipment that are required to be kept active in order to ensure functionality; e.g. by trace heating or continuous working fluid circulation.

Division 3 – Risk management

Chapter 1 Risk mitigation in limiting environmental condition

1.1 Measures to be considered in adverse ice conditions

Guidance: The PWOM should contain guidance for the use of low speeds in the presence of hazardous ice. Procedures should also be set for enhanced watchkeeping and lookout manning in situations with high risks from ice, e.g. in proximity to icebergs, operation at night, and other situations of low visibility. When possibilities for contact with hazardous ice exist, procedures should address regular monitoring, e.g. soundings/inspections of compartments and tanks below the waterline.

1.2 Measures to be considered in adverse temperature conditions

Guidance: The PWOM should contain guidance on operational restrictions in the event that temperatures below the ships polar service temperature are encountered or forecast. These may include delaying the ship, postponing the conduct of certain types of operation, using temporary heating, and other risk mitigation measures.

Chapter 2 Emergency response

Guidance: In general, where the possibility of encountering low air temperatures, sea ice, and other hazards is present, the PWOM should provide guidance on procedures that will increase the effectiveness of emergency response measures.

2.1 Damage control

Guidance: the PWOM should consider damage control measures arrangements for emergency transfer of liquids and access to tanks and spaces during salvage operations.

2.2 Firefighting

2.4 Escape and evacuation

Guidance: Where supplementary or specialized lifesaving equipment is carried to address the possibilities of prolonged durations prior to rescue, abandonment onto ice or adjacent land, or other aspects specific to polar operations, the PWOM should contain guidance on the use of the equipment and provision for appropriate training and drills.

Chapter 3 Coordination with emergency response services

3.1 Ship emergency response

Guidance: The PWOM should include procedures to be followed in preparing for a voyage and in the event of an incident arising.

3.2 Salvage

Guidance: The PWOM should include procedures to be followed in preparing for a voyage and in the event of an incident arising.

3.3 Search and rescue

Guidance: The PWOM should contain information on identifying relevant Rescue Coordination Centres for any intended routes, and should require that contact information and procedures be verified and updated as required as part of any voyage plan.

Chapter 4 Procedures for maintaining life support and ship integrity in the event of prolonged entrapment by ice.

Guidance: Where any ship incorporates special features to mitigate safety or environmental risks due to prolonged entrapment by ice, the PWOM should provide information on how these are to be set up and operated. This may include, for example, adding additional equipment to be run from emergency switchboards, draining systems at risk of damage through freezing, isolating parts of HVAC systems, etc.

4.1 System configuration

4.2 System operation

Division 4 – Joint operations

Chapter 1 Escorted operations

Guidance: The PWOM should contain or reference information on the rules and procedures set out by coastal States who require or offer icebreaking escort services. The manual should also emphasize the need for the master to take account of the ship's limitations in agreeing on the conduct of escort operations.

Chapter 2 Convoy operations

[PART II

POLLUTION PREVENTION MEASURES [ENVIRONMENTAL PROTECTION MEASURES]

Division 1 – Waste Stream Management

Guidance: Procedures for waste stream management should normally be included in other documentation required to be carried on board.

Chapter 1 – Prevention of Oil Pollution

1.1 Discharge of oil and oily mixtures

Chapter 2 – Prevention of Pollution from Noxious Liquid Substances

Chapter 3 – Prevention of Pollution by Harmful Substances in Packaged Form

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Chapter 4 – Prevention of Pollution by Sewage from Ships

Chapter 5 – Prevention of Pollution by Garbage

Division 2 – Incident Response

1.2 Spill Response

Guidance: Procedures for pollution response should normally be included in other documentation required to be carried on board. .]