Supporting Polar Code Implementation & Compliance

2nd Meeting of the Arctic Shipping Best Practice Information Forum

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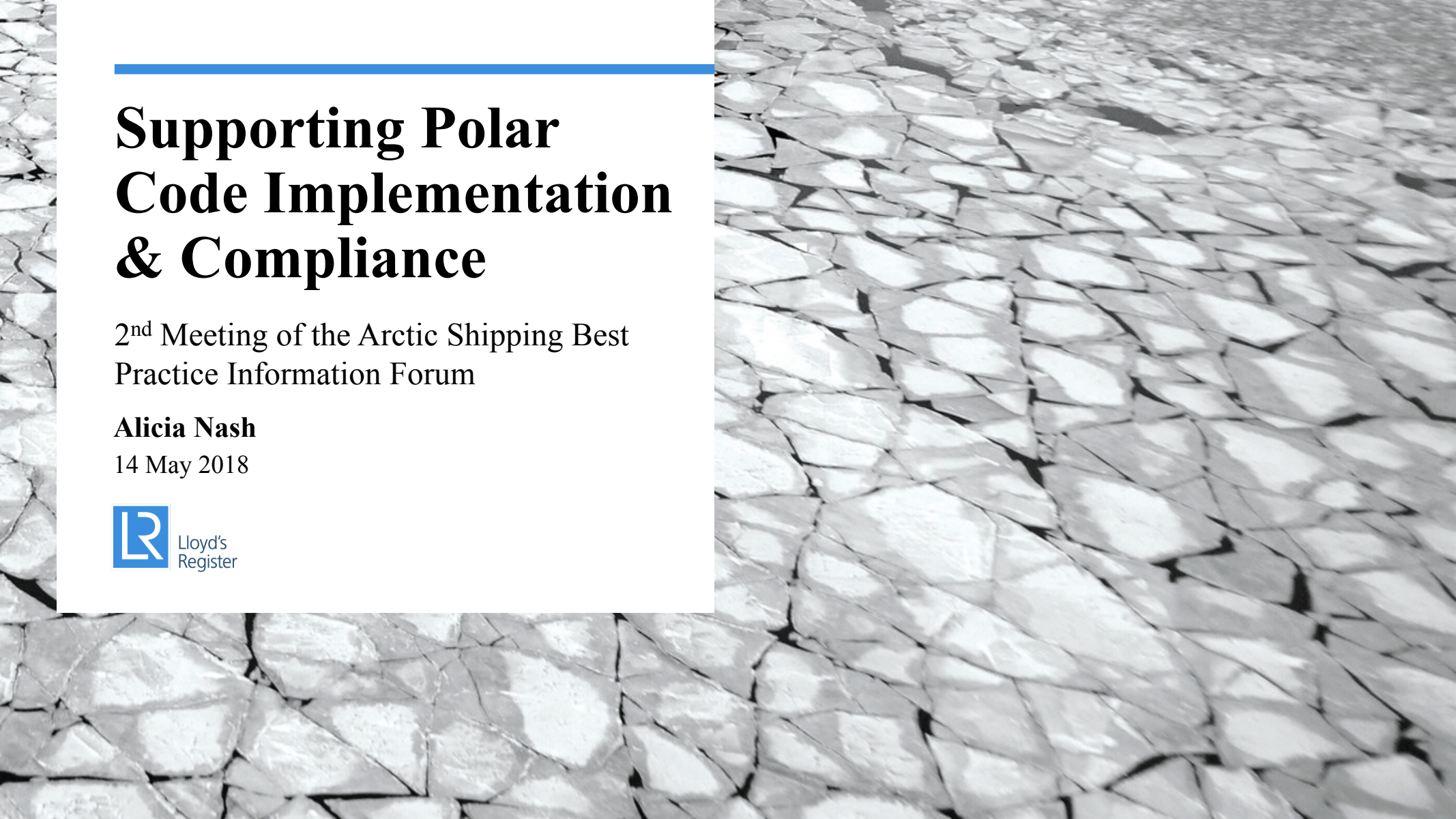
14 May 2018

Lloyd's Register



Overview of Contents

- Lloyd’s Register’s Polar Code Certification Activity
- Steps to Polar Code Certification
- LR Resources & Web Portal Submissions
- Challenges
- Summary

Lloyd's Register's Polar Code Certification Activity

- Approximately seven Polar Ship Certificates issued to date.
- 22 ongoing polar compliance assessments being completed by technical support offices globally.
- The vessels vary from new/existing and Cat B & C (PST/no PST).
- Currently PSCs are only issued for Cat C existing vessels

Steps to Polar Code Certification

- Confirm operating envelope
- Anticipate the operational limitations
- Pre-Audit the ship (gap analysis – for existing ships)
- Undertake Operational Assessment
- Update procedures (create PWOM)
- Install / upgrade equipment or systems(where appropriate)
- Submit the Operational Assessment report, PWOM, Ship Plans/Particulars and Equipment List
- Compliance assessment (and survey)
- Certification

LR Resources & Web Portal Submissions

Operating Envelope Guidance and Template

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Polar Code
Operating Envelope

Guidance note and template

Introduction

What is the operating envelope?
The operating envelope represents the quantification of the range of conditions that the ship itself could be subjected to during its intended polar operations. This is necessary for the design or enhancement of the hull structure, as well as the selection or upgrade of equipment, and the definition of training requirements or additional training for crew (as per the Polar Water Operational Manual).

Why is the operating envelope important?
The operating envelope identifies what conditions the ship is intended to operate in: they are the basis for applying the requirements of the Polar Code and effectively set limitations for ship operation. If the operating envelope is too broad, requirements for the ship, equipment and systems will be overly onerous. If the operating envelope is too narrow, the ship may be overly restricted in terms of permissible operations in polar waters.

Do I need an operating envelope?
The Polar Code does not require an operating envelope to be explicitly written. However, implicitly the operating envelope needs to be determined so that the ship's characteristics – such as the ice class; or the specification of equipment for low temperature – can be defined. The operating envelope and this template are a recommended means of approaching this definition activity in a structured manner.

Establishing the Operating Envelope

To establish the ship's operating envelope, use the following questions as a guide:

Area

What polar region will I be operating in, or do I anticipate operating in?
The area will be used to identify relevant ice, temperature and metocean data. It will also be used to determine the remoteness of the intended operations and the proximity of search and rescue (SAR) support infrastructure. Latitude will be used to determine whether the ship will be exposed to extended periods of darkness.

Examples: Arctic, High Arctic, Antarctic, Antarctic Peninsula or specific routes, port calls, shuttle service trade

Establish: Operating area, latitude range, routing

Operating Envelope Template

We've created a template to help you through the process. Populate the template to develop an operating envelope. If there are multiple operations you can use multiple tables to collate data and then take the most onerous case across all operations.

Attach supporting information on SAR, temperature and ice conditions where possible. This is not a requirement but will be useful if the operating envelope is to be reviewed or revised during the later operational assessment.

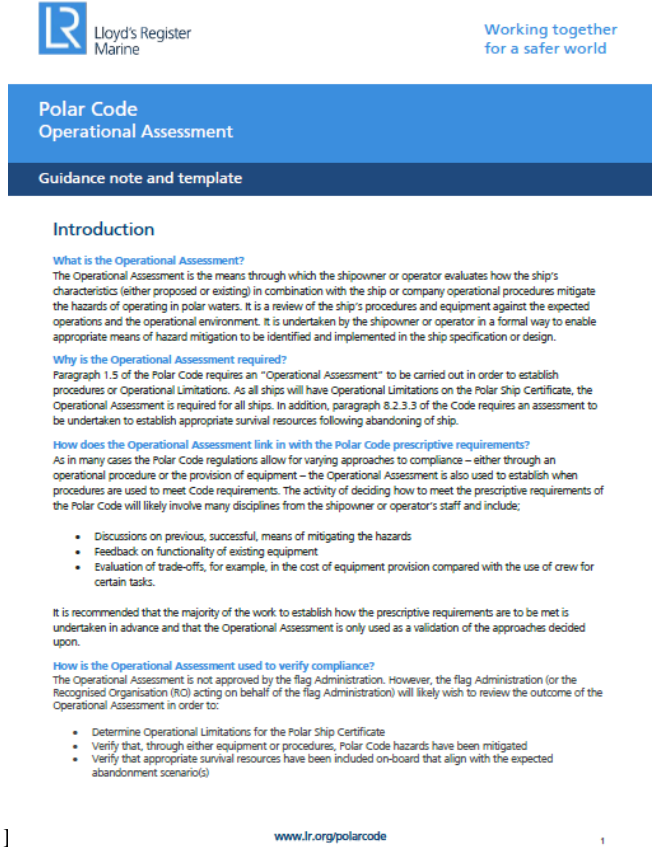
Area	
Polar region (general routing description):	
Target port of call:	
Latitude range:	
Latitude range increased for place of refuge:	
SAR presence on route:	

Example: Summertime Trade to Baffin Island

Area	
Polar region (general routing description):	*Labrador Sea, Davis Strait, Baffin Bay, Milne Port*
Target port of call:	*Milne Port, Baffin Island*
Latitude range:	*Max. latitude expected on approach to Milne Inlet 73° north*
Latitude range increased for place of refuge:	*No, places of refuge are further south*
SAR presence on route:	*Description of nearest SAR bases: Canadian Coast Guard Search and Rescue – JRCC Halifax (Southern Baffin Island and Eastern Approach) and JRCC Trenton (Northern Baffin Island and Western Approach) See Attachment 1*
Season	
Operating season:	*Mid-July to mid-October*
Operating season extension/margin:	*+10 days margin (assume to late October)*

LR Resources & Web Portal Submissions

Operational Assessment Guidance and Template



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Polar Code
Operational Assessment

Guidance note and template

Introduction

What is the Operational Assessment?
The Operational Assessment is the means through which the shipowner or operator evaluates how the ship's characteristics (either proposed or existing) in combination with the ship or company operational procedures mitigate the hazards of operating in polar waters. It is a review of the ship's procedures and equipment against the expected operations and the operational environment. It is undertaken by the shipowner or operator in a formal way to enable appropriate means of hazard mitigation to be identified and implemented in the ship specification or design.

Why is the Operational Assessment required?
Paragraph 1.5 of the Polar Code requires an "Operational Assessment" to be carried out in order to establish procedures or Operational Limitations. As all ships will have Operational Limitations on the Polar Ship Certificate, the Operational Assessment is required for all ships. In addition, paragraph 8.2.3.3 of the Code requires an assessment to be undertaken to establish appropriate survival resources following abandoning of ship.

How does the Operational Assessment link in with the Polar Code prescriptive requirements?
As in many cases the Polar Code regulations allow for varying approaches to compliance – either through an operational procedure or the provision of equipment – the Operational Assessment is also used to establish when procedures are used to meet Code requirements. The activity of deciding how to meet the prescriptive requirements of the Polar Code will likely involve many disciplines from the shipowner or operator's staff and include;

- Discussions on previous, successful, means of mitigating the hazards
- Feedback on functionality of existing equipment
- Evaluation of trade-offs, for example, in the cost of equipment provision compared with the use of crew for certain tasks.

It is recommended that the majority of the work to establish how the prescriptive requirements are to be met is undertaken in advance and that the Operational Assessment is only used as a validation of the approaches decided upon.

How is the Operational Assessment used to verify compliance?
The Operational Assessment is not approved by the flag Administration. However, the flag Administration (or the Recognised Organisation (RO) acting on behalf of the flag Administration) will likely wish to review the outcome of the Operational Assessment in order to:

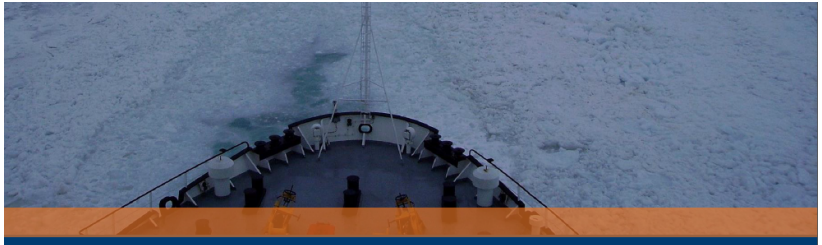
- Determine Operational Limitations for the Polar Ship Certificate
- Verify that, through either equipment or procedures, Polar Code hazards have been mitigated
- Verify that appropriate survival resources have been included on-board that align with the expected abandonment scenario(s)

www.lr.org/polarcode 1

Hazard identified	Polar Code requirement / mitigation requirement	Polar Code reference	Risk Control measure applied	Control Measure description *Equipment specification	Control Measure description *Operational procedure	Description of alternative arrangement if applicable
ICE INGESTION	seawater supplies for machinery systems shall be designed to prevent ingestion of ice , or otherwise arranged to ensure functionality.	*6.3.1.3*	✓	*Ice Class sea chest provided with baffle plate, CW recirculation and steam. See Sea Chest Arrangement Drawing.*	*PWOM includes advice on clearing of sea chests. See PWOM Division 2, Chapter 5.2*	
SNOW ACCUMULATION	Machinery installations and associated equipment shall be protected against the effect of snow accumulation,	*6.3.1.1*	✓	*Deck side steam provided to enable clearing of ice and snow. Intake louvres have trace heating. See Winterisation Arrangement Plan.*	*PWOM includes advice to crew on the effect of ice accretion. Procedures include clearing ice and snow using steam hoses. See PWOM Division 2, Chapter 5.1*	
SNOW INGESTION	Machinery installations and associated equipment shall be protected against the effect of snow ingestion.	*6.3.1.1*	✓	*Deck side steam provided to enable clearing of ice and snow. Intake louvres have trace heating. See Winterisation Arrangement Plan.*	*PWOM includes advice to crew on the effect of ice accretion. Procedures include clearing ice and snow using steam hoses. See PWOM Division 2, Chapter 5.1*	
LOW TEMPERATURE	Machinery installations and associated equipment shall be protected against the effect of freezing and increased viscosity of liquids,	*6.3.1.1*	✓	*Exposed machinery installations limited. Low temperature grease provided for exposed machinery installations. See Winterisation Arrangement Plan.*	*PWOM includes advice on hazards associated with increased viscosity of liquids. See PWOM Division 2, Chapter 5.3*	
LOW TEMPERATURE	Machinery installations and associated equipment shall be protected against the effect of seawater intake temperature	*6.3.1.1*	✓	*CW recirculation in sea chest with temperature controlled valve / monitoring provided. See CW system diagram.*	*PWOM includes advice on sea chest temperature management. See PWOM Division 2, Chapter 5.2*	
LOW TEMPERATURE	Working liquids shall be maintained in a viscosity range that ensures operation of the machinery.	*6.3.1.2*	✓	*Exposed machinery installations limited. Low temperature grease provided for exposed machinery installations. See Winterisation Arrangement Plan.*	*PWOM includes advice on hazards associated with increased viscosity of liquids. See PWOM Division 2, Chapter 5.3*	
ADDITIONAL HAZARD						

LR Resources & Web Portal Submissions

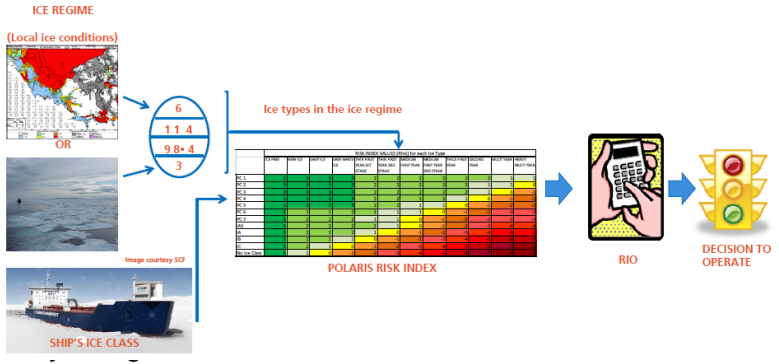
Guidance on using POLARIS and setting Operational Limitations



Arctic Technology Knowledge Sharing

How to use POLARIS
Release date: 10 March 2016

What is POLARIS? – Inputs and outputs



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Polar Code
Limitation Wording for the Polar Ship Certificate

Guidance note

Introduction

What are operational limitations?
Environmental conditions in polar regions vary significantly based on location and season, as do the risks associated with operating there. In order to identify, from a regulatory perspective, the limitations that the ship has when operating in these conditions, the Polar Code requires operational limitations to be determined in the operational assessment and included on the Polar Ship Certificate. The limitations are primarily linked with ship characteristics that have been selected by the owner/operator, implemented in the ship design, and described on the Certificate (e.g. polar service temperature (PST), ice class).

Three limitations are included on the Certificate:

- ice conditions
- low temperature
- high latitude

Why are operational limitations important?
As the operational limitations are included on the Polar Ship Certificate, they are a direct and tangible means upon which operations should be planned and made. The operational limitations themselves are the foundation for enabling the owner/operator and other interested parties – such as the administration, national authorities, other regulators, charterers and insurers – to understand what capabilities the ship has to operate safely in polar environments. Therefore, exceeding these limitations may, in practice, have implications in terms of the validity of insurance and the assignment of responsibility in the case of accidents.

Who sets operational limitations?
The selection of the ship characteristics should be validated against the operating envelope (the intended environmental conditions) as part of the operational assessment. This ensures that there is evidence of due process on the part of the owner/operator in identifying suitable ship characteristics for the intended environmental conditions. As a result of this validation process, the ship characteristics (either existing or proposed for a new design) may be used to anticipate what form the wording of the limitations will take on the Certificate. This is a useful exercise to undertake, as it means that the owner/operator can anticipate the content of the Certificate and propose what limitations the ship should have. Although it is the responsibility of the flag administration or their recognised organisation to enter appropriate limitations on the Certificate, it is the responsibility of the owner/operator to undertake the operational assessment and set ship characteristics that will enable the ship to function safely in the operating envelope. Consequently, it is the owner/operator who proposes the operational limitations as part of the output of the operational assessment.

It is, therefore, recommended that, at the conclusion of the operational assessment, the following guidance is used to propose limitation wording for the Certificate that aligns with the outcome of the assessment.

Operational Limitations on the Polar Ship Certificate

The following section contains background information and recommended wording to be used when proposing operational limitations for the Polar Ship Certificate.

Ice Conditions

Operational limitations for ice conditions are set based on the ship's ability to function safely in ice. Because the distribution of ice within regions and during seasons varies, so too do the concentrations of different ice types within an ice regime; therefore, it is not practical to use an ice type or thickness as a limitation. Instead, the Polar Code requires that a methodology be utilised to determine a set of operational limitations for operating in ice. Guidance on such methodologies is contained within MSC.Circ.1519 – *Guidance on methodologies for assessing operational capabilities and limitations in ice*. This circular also contains, as a footnote to paragraph 3.4, a description explaining how the link between this methodology and the Certificate should be made. As such, this may be considered standard wording for use on all Polar Ship Certificates. The content of the footnote is repeated below, alongside an example. It is recommended that limitations for ice conditions follow the same format as described in MSC.Circ.1519 and described below when being proposed as outcomes of the operational assessment.

Ice Conditions	
Where operation is only anticipated in ice-free waters (section 2.2 of the Certificate):	*Limited to ice-free waters*
For all other operations in open water and ice conditions:	*Limited to operation in polar waters in accordance with the outcome of the accepted system for determining operational limitations appropriate to the ice strengthening applied* *Name of system:.....e.g. AIRSS, POLARIS, Ice Certificate* *Reference document number:.....e.g. PWOM section number/Ice Certificate report number*
Example where POLARIS is the system used and is described as part of the PWOM content (section 1.1):	*Limited to operation in polar waters in accordance with the outcome of the accepted system for determining operational limitations appropriate to the ice strengthening applied* *Name of system: POLARIS* *Reference document number: PWOM section 1.1*

Temperature

Operational limitations for temperature are set based on the ship's ability (in terms of equipment, systems and materials) to function safely in low air temperatures. Because temperatures vary seasonally and geographically, the Polar Code makes a differentiation between ships that are intended to operate in low air temperatures and ships that are not. Ships that are intended to operate in areas where the lowest mean daily low temperature (MDLT) is –10°C or warmer during the season of operation are not considered as operating in low air temperature. This is indicated in section 2.3 of the Polar Ship Certificate. Where ships are intended to operate in areas where the lowest MDLT is colder than –10°C during the season of operation, a PST should be specified by the owner/operator, based on an examination of temperature data for the area of operation. The PST should be set a minimum of 10°C lower than the lowest MDLT for the area and season of operation identified in the operating envelope. Validation of this specified temperature

LR Resources & Web Portal Submissions

Guidance on Part IIA Compliance for Existing Ships

Lloyd's Register Marine

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Meeting the Polar Code on 1 January 2017: Guidance for Existing Ships

Guidance note

Introduction

What is the Polar Code?

The IMO's International Code for Ships Operating in Polar Waters (the Polar Code) sets additional requirements, above those currently in SOLAS and MARPOL, which address the additional hazards to ships operating in polar waters. Because the Polar Code provides additional requirements to SOLAS and MARPOL, the Code is divided into two mandatory parts: Part IA addresses safety measures (additional requirements to SOLAS) and Part IIA addresses pollution prevention measures (additional requirements to MARPOL). In addition, there are two complementary guidance parts (Parts IB and IIB).

Part I of the Code applies to all ships carrying SOLAS certificates and operating in polar waters. Part II of the Code applies to all ships operating in polar waters (including, for example, offshore rigs). Polar waters are defined in Figure 1 below.

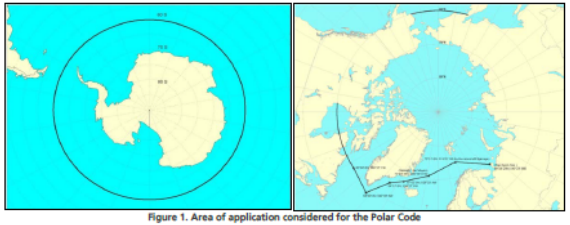


Figure 1. Area of application considered for the Polar Code

When do existing ships need to comply with the Polar Code?

As the Polar Code is implemented through amendments to SOLAS and MARPOL, the application of the Polar Code's Part IA and Part IIA varies. Existing ships (ships with a keel lay date earlier than 1 January 2017) have until their first intermediate or renewal SOLAS survey (Safety Construction survey), whichever comes first after 1 January 2018, to comply with Part IA (the safety part). Existing ships must, however, comply with Part IIA (the pollution prevention part) when operating in polar waters (as defined in Figure 1) on or after 1 January 2017.

Guidance on Part IIA, Chapter 1 – Prevention of Pollution by Oil

The following section includes:

- a summary of the key operational requirements from Part IIA Chapter 1 of the Polar Code,
- commentary on the certification associated with these requirements, and
- recommended actions to ensure a ship's documentation aligns with the requirements.

However, it remains the responsibility of the shipowner/operator to review the Polar Code and implement changes to the ship's documentation in line with company procedures.

Operational Requirements for Existing Ships

Ships, when operating in polar waters on or after 1 January 2017, are prohibited from discharging oil or oily mixtures (a mixture with any oil content) into the sea. The Polar Code extends the oil and oily mixture discharge prohibition that was in place for the Antarctic special area in MARPOL Annex I to also include Arctic areas.

Appropriate operational procedures, in the form of the shipboard oil pollution emergency plan (SOPEP) or shipboard marine pollution emergency plan (SMPEP), should be updated before entry into polar waters on or after 1 January 2017 to reflect these additional operational requirements. If the ship has previously been operating in Antarctic waters (or any other special area designated under Regulation 1 of MARPOL Annex I), it is anticipated that the ship will already have appropriate operational procedures in place, aligned with the discharge prohibitions for special areas. In such a case, existing procedures may be amended to consider the Arctic, in addition to the Antarctic, as having the same special area status with respect to oil and oily mixture discharge prohibition.

Certification and Documentation Requirements

International Oil Pollution Prevention Certificate

The Polar Code amendments to MARPOL Annex I include an additional section on Form A and Form B. The text is as follows:

New section to be added to International Oil Pollution Prevention (IOPP) Certificate Form A:

8 Compliance with part II-A – chapter 1 of the Polar Code
8.1 The ship is in compliance with additional requirements in the environment-related provisions of the introduction and section 1.2 of chapter 1 of part II-A of the Polar Code.

New section to be added to IOPP Certificate Form B:

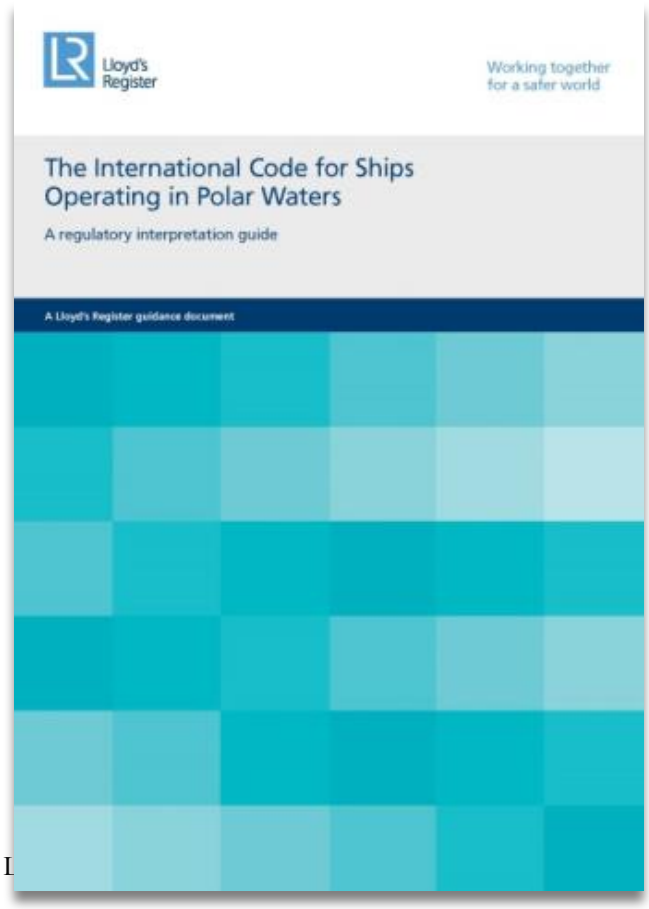
11 Compliance with part II-A – chapter 1 of the Polar Code
11.1 The ship is in compliance with additional requirements in the environment-related provisions of the introduction and section 1.2 of chapter I of part II-A of the Polar Code.

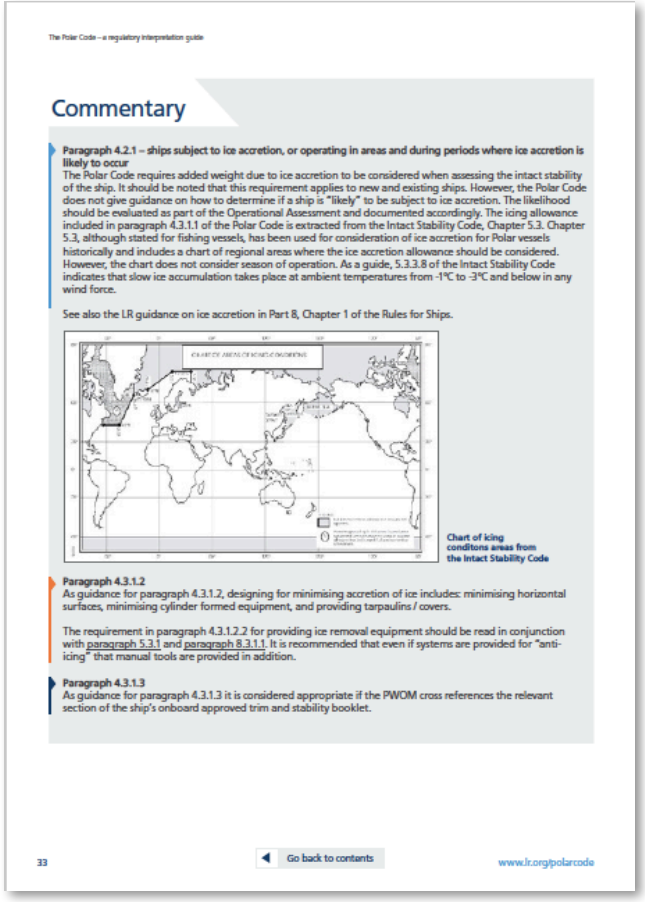
The following should be noted with respect to the amendments to IOPP Form A and Form B:

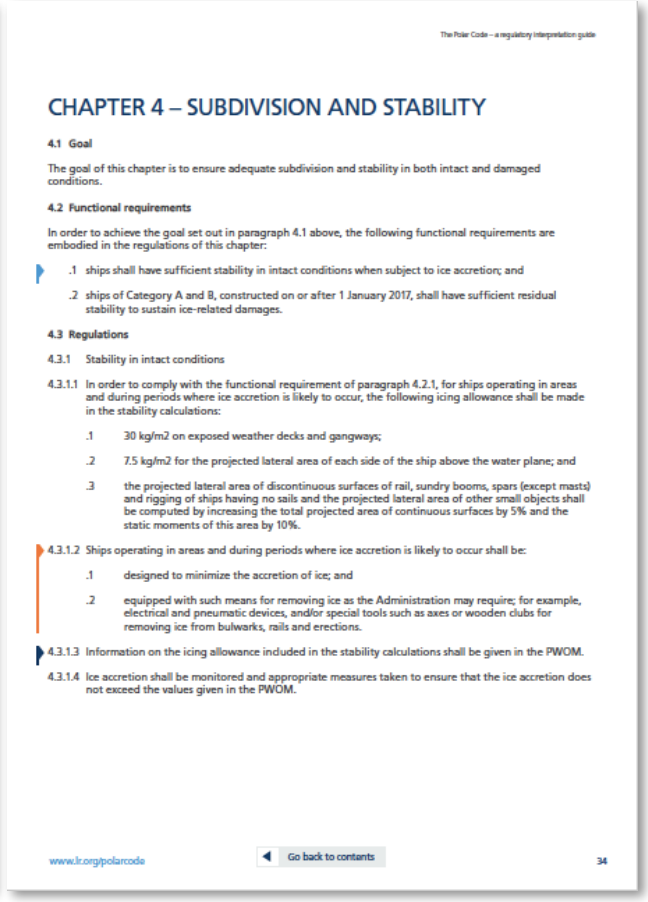
- The amendments only reference Section 1.2 of Chapter I of Part IIA of the Polar Code.
- Section 1.2 of Chapter I is only applicable to Category A and B ships with a keel lay date on or after 1 January 2017.
- Consequently, the amendments for Form A and Form B do not affect existing ships.

LR Resources & Web Portal Submissions

Regulatory Interpretation Guide to the Polar Code







LR Resources & Web Portal Submissions

Examples from the Portal:

CHAPTER 1:

CHAPTER SUMMARY

Chapter 1 provides the overall structure and framework for Part I of the Polar Code, as well as additional definitions not noted in the introduction, the requirements for the issuance of Polar Ship Certificates and surveys, and the general criteria for determining ship performance standards and operational assessments. These are clearly set out in the Chapter 1 wording below, and in the Part 1B Additional Guidance.

SUBMISSIONS

Lloyd's Register (LR)

Hyperlink 1: The Polar Code by Lloyds
Lloyd's provides information and assistance for users to comply with the Polar Code. Lloyd's interactive toolkit allows users to work through the Code on their own terms and download Lloyd's register free guidance, templates and examples to help understand and meet compliance needs.

Hyperlink 2: Lloyd's Polar Code Resources
Lloyd's also provides guidance documents on; the Operational Assessment, setting operational limitations (limitation wording), determining the Operating Envelope and LR's How to use POLARIS.

Hyperlink 3: The Polar Code: A Regulatory Interpretation Guide
This document provides Lloyd's Register guidance on all aspects of the Polar Code (chapter by chapter). For Chapter 1, see the LR Regulatory Guide pages 21 to 26.

Lloyd's Register website.

PART IIA - POLLUTION PREVENTION MEASURES - CHAPTER 1:

CHAPTER SUMMARY

In Arctic waters any discharge into the sea of oil or oily mixtures from any ship shall be prohibited. Operations in Polar Waters, in accordance with MARPOL Annex I, must take into account procedures for oil or oily mixtures which must be documented in the Oil Record Books, manuals and the shipboard oil pollution emergency plan or the shipboard marine pollution emergency plan. Additionally, there are specific structural requirements for ships operating in Polar Waters. See full text of Chapter 1 below.

Additional Guidance for Chapter 1 (Part II-B):
The additional guidance advises operators on the selection of stern tube lubricants, such as non-toxic biodegradable lubricants or water-based systems, and make structural and engineering suggestions. See full text of additional guidance.

SUBMISSIONS

Lloyd's Register

Hyperlink 1: The Polar Code: A Regulatory Interpretation Guide
This document provides Loyd's Register guidance on all aspects of the Polar Code (chapter by chapter). For Part IIA Chapter 1, see pages 81 to 82.

Hyperlink 2: Meeting the Polar Code on 1 January 2017: Guidance for Existing Ships (Part IIA)
This document includes information on what steps operators need to take to ensure compliance when operating in polar waters on or after 1 January 2017, when the Polar Code entered into force.

Lloyd's website

Challenges

- Output of the Operational Assessment not captured in the PWOM
- PWOM standard template
- Interpreting the Code (goal based requirements)

Summary

- LR resources are available at www.lr.org/polarcode and now on the Arctic Shipping Best Practice Information Forum.
- Challenges exist with implementation and compliance of the Code but together with clients we are working towards solutions to make the process as smooth as possible.

Thank you

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