



## **The Nautical Institute**

# Ice Navigator Accreditation Standard

for the Ice Navigator Training and Certification Scheme

**Version 1, July 2017**

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# Definitions

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<i>Accreditation</i>	<p>The systematic verification of the processes, procedures, methods and techniques employed to deliver maritime training in accordance with standards that the NI and industry stakeholders have defined, co-developed and approved</p> <p>Accredited providers will have demonstrated that their training meets the standard required for NI accreditation. Award of accreditation is valid for a period of not more than three years</p>
<i>Assessment</i>	<p>A training provider's evaluation of a Scheme participant's progress</p>
<i>Audit</i>	<p>The Nautical Institute's evaluation of a training centre's ability to deliver the Scheme according to the Standard</p>
<i>Certification</i>	<p>Formal confirmation that a participant in the Scheme has successfully completed both the theory and practical aspects of the course and has reached the required level of competency in ice navigation</p>
<i>Course</i>	<p>A programme of learning devised and conducted by a training centre</p>
<i>Grandfathering</i>	<p>Recognition of prior experience in ice navigation</p>
<i>Ice conditions</i>	<p>Conditions that require the assistance of an icebreaker, or navigation requiring the avoidance of concentrations of ice that might endanger the ship</p>
<i>May</i>	<p>An optional aspect</p>
<i>Participant</i>	<p>An individual undergoing training on the Scheme</p>
<i>Scheme</i>	<p>The Nautical Institute Ice Navigator Training and Certification Scheme</p>
<i>Shall, must</i>	<p>Something that The Nautical Institute deems to be essential</p>
<i>Should</i>	<p>Something that The Nautical Institute recommends</p>
<i>Standard</i>	<p>The Nautical Institute Ice Navigator Accreditation Standard, which is embodied in this document. It sets out what is required of a training centre in terms of training provision, staff and staff competency, facilities, equipment, documentation and the audit, complaints and appeals processes</p>
<i>Verify</i>	<p>Prove the truth of a matter by presentation of evidence or testimony; to check the accuracy of something</p>



# Introduction to the Nautical Institute Ice Navigator Accreditation Standard

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## 1.1 Background

The IMO has identified special considerations for ships operating in the remote and environmentally sensitive Polar regions. This has resulted in changes to legislation and requirements for vessels operating in these areas. The Nautical Institute supports this work and through the development of this Standard seeks to prepare Masters and navigating officers more effectively for navigating in areas of ice.

The Nautical Institute has drawn upon expertise in the training and operational maritime communities to develop this Standard, which seeks to codify the training requirements for those navigating in ice-infested waters.

This Standard sits alongside and seeks to complement work, especially by the IMO, in areas such as STCW and the Polar Code.

## 1.2 The Polar Code

Part 1-A Safety, Chapter 12 Manning and Training, outlines the training and certification needed for bridge watchkeeping officers, Masters and Chief Officers on vessels operating within Polar waters (as defined by the Code) according to the vessel type and actual or expected operating conditions. The definitions divide vessel types into passenger, tanker or other, and the operating conditions as ice-free, open waters and other waters. Depending on the combination of these factors, bridge watchkeeping officers, Masters and Chief Officers may be required to have completed either basic Polar waters or advanced Polar waters training.

## 1.3 STCW

Amendments to STCW set out the details of knowledge, understanding and proficiency (KUP) that apply to both the basic and the advanced training required under the Polar Code and the necessary sea experience in Polar waters. This KUP is required only for Polar waters, not for other regions that are subject to seasonal ice conditions. Experience of operating vessels in ice-covered waters is not necessarily required, as STCW states that navigating in Polar waters or equivalent approved seagoing service may also count as acceptable experience.

## 1.4 Ice Navigator Training and Certification Scheme

The Nautical Institute Ice Navigator Training and Certification Scheme has been developed to focus on actual shiphandling and operation of vessels in ice regimes wherever they may be encountered. Specific ice experience is essential to ensure that ships' officers are competent in handling their ships in ice-covered waters. The Ice Navigator Scheme builds upon the basic requirements of the Polar Code and accompanying STCW amendments with additional elements so as to ensure ships' officers are not only trained but also experienced in ice-covered waters.

The Nautical Institute (NI) has developed this Accreditation Standard to be fully compliant with the relevant sections of the Polar Code, which should be read in conjunction with this Standard. The

Standard identifies the skills and experience expected of an Ice Navigator in any region including, but not limited to, Polar regions.

The Scheme and the Standard have been developed and kept up to date with the full engagement and co-operation of stakeholders from industry and training institutions.

This document provides guidance on the Nautical Institute Ice Navigator Training and Certification Scheme for providers that wish to be accredited to deliver training. Upon completion of training, NI-certified Ice Navigators will have demonstrated competence in navigation and will have undertaken the training specified in this Standard.

## **1.5 The role of The Nautical Institute**

The NI helps create consensus between stakeholders, administers the accreditation of Ice Navigator training centres and the certification of Ice Navigators in accordance with the criteria established in collaboration with them.

## **1.6 Overview of the Scheme**

The Nautical Institute Ice Navigator Scheme requires candidates to complete the following elements.

### **1.6.1 Ice Navigator Training Level 1**

Training consisting of basic familiarisation in ice operations for junior officers sailing in ice-infested waters. Junior officers are required to navigate under supervision of a Level 2 Ice Navigator.

### **1.6.2 Ice Navigator Training Level 2**

Advanced training required for the Master, chief mate or Ice Navigators for all vessels operating in Polar waters and other waters (as defined by the IMO) and other regions where ice may be encountered. This training is required for those who have to make command level decisions on routing and tactics.

To be certificated by The Nautical Institute, the officer must hold a valid STCW certificate of competency recognised by a White List maritime administration. See Appendix H for more details of the certification requirements.

### **1.6.3 Ice experience**

Operational sea time on board while the vessel is operating in ice conditions that require manoeuvring, or passage in convoy, with or without icebreaker assistance.



# Training Standard

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## 2.1 Scheme overview

The training centre will be accredited for both Level 1 and Level 2. When a centre applies for accreditation it must submit all required materials for both courses.

The NI requires accredited centres to have an approved simulator to support the delivery of the course, to complement the sea time experience and provide practical elements of the course. The centre must demonstrate how the practical elements are integrated into the overall learning programme.

Where the simulator is to be used for assessment the centre must demonstrate how exercises are to be developed and used for assessment.

## 2.2 Theory training

Knowledge, experience and competence in each of the following areas is considered necessary for the proper discharge of the essential safety and pollution prevention functions assigned to the Ice Navigator and Master.

### 2.2.1 Subject areas

1. Knowledge of international ice nomenclature
2. Knowledge of ice physics, growth and characteristics
3. Preparation for operations in sea ice
4. Skills required for operations in sea ice
5. Knowledge of hazards inherent in ice operations including provisions for search and rescue
6. Analysis of received weather and ice information
7. Practical training and supplementary training.

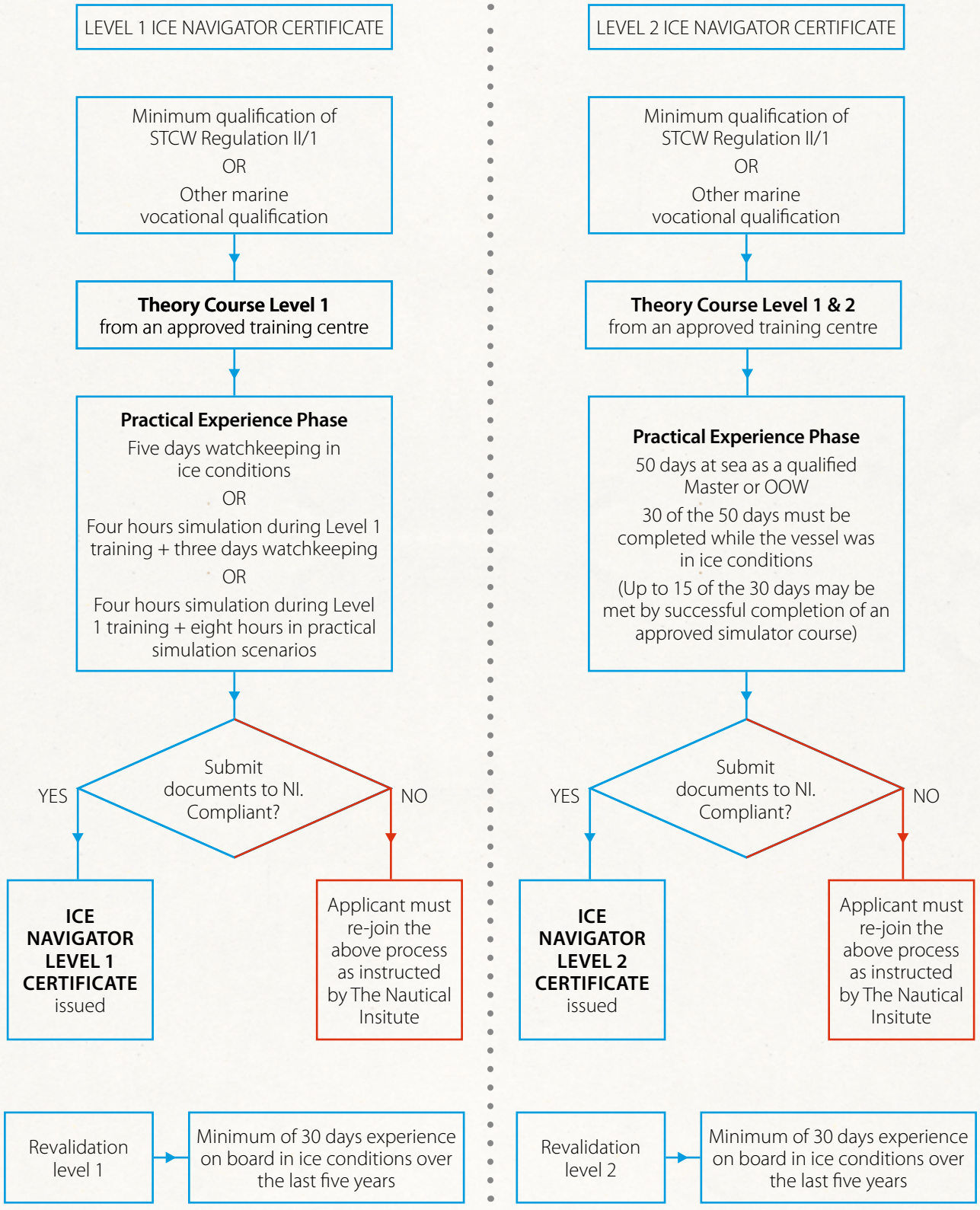
Details of the content are given in Section A5.

## 2.3 Practical and supplementary training

After successfully completing the formal training, the candidate should work as an Ice Navigator under supervision of a competent person for a period to ensure they become fully conversant with the practical requirements for operating safely in ice.

Methods for demonstrating competence and criteria for evaluating competence for Ice Navigators are detailed in Section A5.

## NEW ENTRANTS PATHWAY





# Accreditation

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## 3.1 What is accredited?

Ice Navigator Course Level 1 and Ice Navigator Course Level 2 involve both theory and practice on a specialist ice simulator and cover:

- Principles of ice navigation
- Elements of the Ice Navigator course content
- Practical operation of bridge equipment in the simulator related to ice navigation
- Environmental information, sensors and related equipment
- Ice navigator operations.

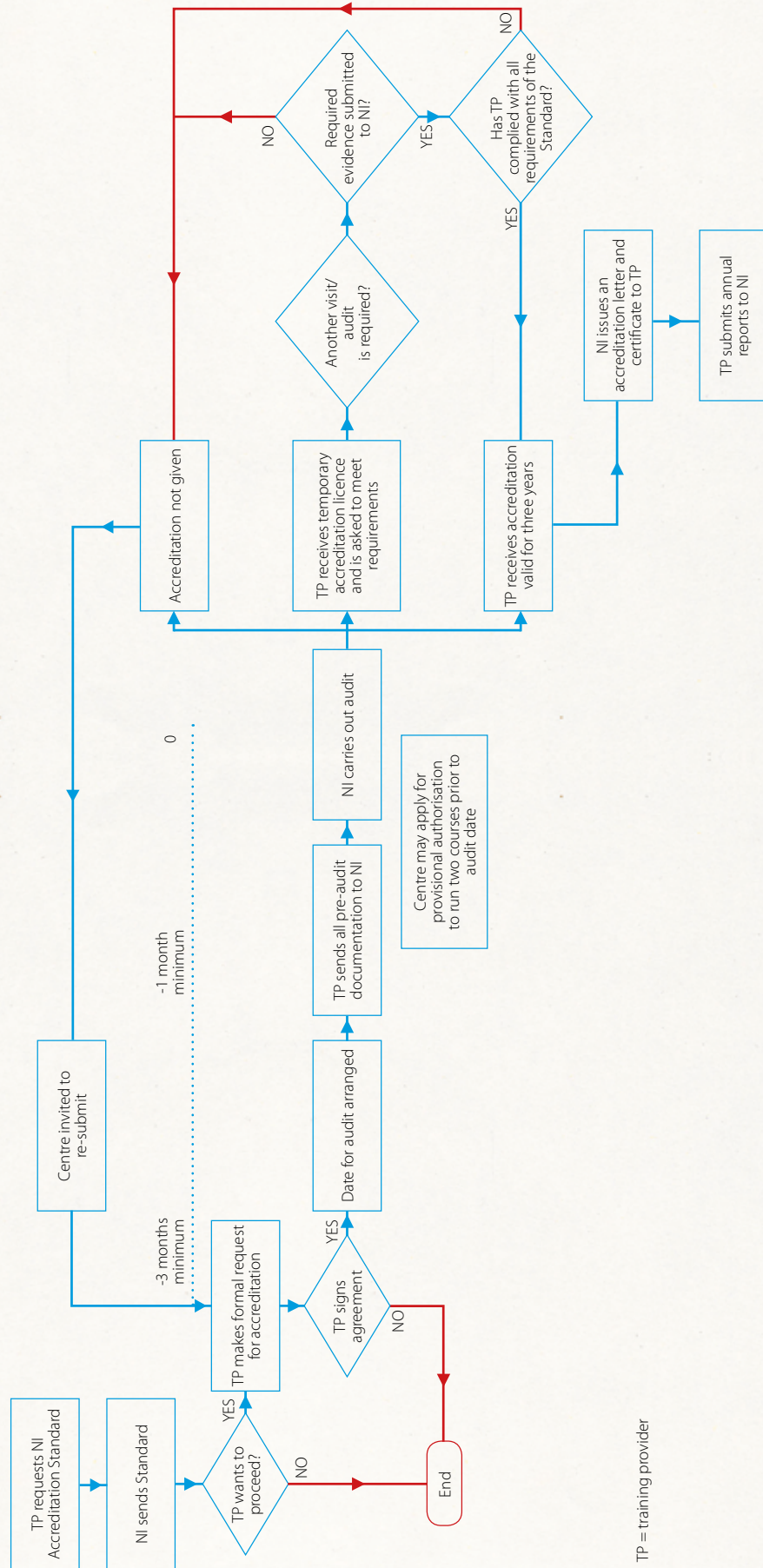
While assessing the suitability of a training centre to deliver the above courses, the NI's auditors will check the centre's administrative and record-keeping processes, the training and experience of the instructors, the physical environment of the centre and the simulators and other classroom equipment used to deliver courses.

## 3.2 Overview of the Nautical Institute accreditation process

For detailed information relating to the NI's accreditation process for training centres, please refer to Appendix G.



# NAUTICAL INSTITUTE ACCREDITATION PROCESS



TP = training provider



# Appendix A: Training methodology

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## A1 General

The centre must define its training methodology and establish the framework within which the course will be delivered.

It must define key elements of delivery and assessment including:

- Length of course
- Delivery techniques
- Assessment strategy
- Key resource requirements
- Entry prerequisites
- Required reading
- Attendance requirements
- Reference texts and reading list detailed in Appendix J.

## A2 Course documentation – instruction manuals

### A2.1 Instructor's manual

Each course must be supported by an instructor's manual. The manual provides a means of tracking changes to the documentation used in delivering training, acts as a reference for all trainers at a particular centre to train to the same standard and informs new instructors when they join the centre.

The instructor's manual for each course should contain as a minimum:

- A statement of the centre's teaching methodology
- Course overview and purpose
- Course aims and objectives
- Course timetable with breakdown of the time assigned for each module and coffee and lunch breaks
- Materials and other equipment required for each course module
- Copies of slide presentations
- Copies of student handouts
- Explanation of the centre's assessment system including master copies of the form or forms that will be used to provide written evidence of each student's performance on individual simulator exercises and for the course overall.

In addition, where a simulator is used:

- Details of the simulator equipment used for the course including a plan of the simulator layout
- The model the centre uses for planning a simulator exercise
- Lesson plans for each module and exercise with the objectives to be achieved by the exercise stated
- Practical exercises (both student and instructor versions).

In most cases, training organisations hold copyright of their training materials and prefer to have control of all manuals on site. The NI supports this approach and requires the centre co-ordinator maintain at least one controlled master copy of the instructor's manual for each course taught. This master copy may be kept electronically.

## **A2.2 Student manual**

The student manual for each course should contain as a minimum:

- Course overview and purpose
- Course timetable
- Course aims, objectives and competencies
- Explanation of the way they will be assessed
- Health and safety information for the particular centre
- Complaint and appeal procedures
- Learning materials.

Centres are encouraged to make some or all of the manual available to students digitally. The centre co-ordinator must maintain at least one controlled master copy of the student's manual for each course taught. This master copy may be kept electronically.

Material given to students should contain examples of ice navigation incidents that have occurred and an overview of the certification process for the Ice Navigator Scheme. It should include links to relevant industry and government websites that contain information about ice navigation.

Note: instructor and student manuals must include the date and version number as part of the quality management system and for document control.

## **A3 Ice navigator courses**

### **A3.1 Minimum entry requirements**

Participants must hold or be studying towards a deck officer qualification awarded by a White List administration. Deck cadets are permitted to participate in the Scheme but must complete the shipboard experience elements after qualifying as a navigating officer.

### **A3.2 Number of hours**

#### ***A3.2.1 Theory Part 1 – Training Level 1***

A minimum of 28 hours is required for Training Level 1. The time assigned to use of the simulator for application of the learning should be around 50% of the course. Time on board a vessel may be used to replace simulator time, but care must be taken to ensure sufficient time is assigned to complete the learning objectives. Four hours of simulator time may count as two days towards the time required for practical experience.

#### ***A3.2.2 Theory Part 2 – Training Level 2***

A minimum of 28 hours is required for Training Level 2. The time assigned to use of the simulator for application of the learning should be around 50% of the course. Time on board a vessel may be used to replace simulator time, but care must be taken to ensure sufficient time is assigned to complete the learning objectives.

Where additional time is required to run exams or deal with paperwork for either of these courses, this time shall be added to the 28 hours.

### **A3.3 Ratio of participants, instructors and equipment**

The number of participants on the training courses must be regulated such that each participant obtains sufficient support in the learning environment. To achieve this, the NI allows a maximum of eight participants per class being taught by one instructor and three per group in a simulator, with each group assigned to one instructor.

### **A3.4 Delivery method**

At the start of the course the Ice Navigator Scheme will be outlined, including maintenance of records and the requirements to qualify as an Ice Navigator.

### **A3.5 Assessment**

Training centres must design an effective assessment protocol for the practical elements of the course. The assessment strategy should include elements of formative assessment to assist in the development of participants.

In order to be awarded a certificate of completion for the Ice Navigator Course the trainee must pass an online assessment at the training centre.

Students who fail the first attempt are allowed to have another two attempts. The second attempt must be undertaken within 96 hours of the first attempt. The third attempt must be undertaken within six months of the first attempt. A student who fails these three initial attempts is required to repeat the course and undertake the assessment.

## **A4 Practical experience**

### **A4.1 Level 1 – Number of hours**

- Five days at sea OR
- Four hours from Level 1 training simulation and three days watchkeeping in ice conditions OR
- Four hours from Level 1 training, plus eight hours in a practical simulation scenario for navigators.

Where a centre intends to offer a course specifically to deliver practical experience for the Ice Navigator, the course must be developed recognising that it may be used to offset experience in ice.

### **A4.2 Level 2 – Number of days**

The Ice Navigator should be qualified to complete sea time as Master or deck officer in charge of watch while holding a II/1, II/2 or II/3 Deck qualification under the STCW Regulations, or an approved equivalent qualification.

The candidate must complete 50 days at sea in the capacity of Master or deck officer in charge of watch.

Of the 50 days at sea, 30 days must have been completed while the vessel was in ice conditions that required the assistance of an icebreaker, or manoeuvring in ice to avoid concentrations of ice that might have endangered the ship. The remaining time may be in any kind of service and is specified to ensure that the qualified officer has this minimum level of experience in the industry.

### **A4.3 Grandfathering**

Documented verifiable evidence of a minimum 20 days operating in ice or evidence of relevant shore-based training, plus a minimum of 10 days operating in ice will be considered equivalent to a Level 1 qualification.

Documented verifiable evidence of a minimum 90 days operating in ice or evidence of relevant shore-based training, plus a minimum of 50 days operating in ice will be considered equivalent to a Level 2 qualification.

The Nautical Institute will consider all of the available evidence presented in the assessment of eligibility for the award of an Ice Navigator Certificate.

Further details of the evidence that must be submitted are shown in Appendix H.

## A5 Table of competency

### A5.1 Level 1: Basic

1. Knowledge of international ice nomenclature		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Forms of ice                             <ul style="list-style-type: none"> <li>Sea ice</li> <li>Glacial ice (land origin)</li> <li>New ice</li> <li>Nilas</li> <li>Pancake</li> <li>Young</li> <li>First-year ice</li> <li>Old/multi-year ice</li> <li>Floating ice</li> <li>Fast ice</li> </ul> </li> <li>● Consolidation                             <ul style="list-style-type: none"> <li>Consolidated ice</li> <li>Very close ice</li> <li>Close ice</li> <li>Open ice</li> <li>Very open ice</li> <li>Open water</li> <li>Bergy water</li> </ul> </li> <li>● Ice surface features                             <ul style="list-style-type: none"> <li>Level ice</li> <li>Hummocked ice</li> <li>Rafted ice</li> <li>Ridge</li> <li>Snow-covered ice</li> </ul> </li> <li>● Stages of melting                             <ul style="list-style-type: none"> <li>Puddle</li> <li>Thaw holes</li> <li>Dried ice</li> <li>Rotten ice</li> </ul> </li> <li>● Ice motion                             <ul style="list-style-type: none"> <li>Diverging</li> <li>Compacting</li> <li>Sheering</li> </ul> </li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Ice conditions identified correctly</li> <li>● Ice chart information identified and interpreted correctly</li> <li>● Information used for passage planning</li> </ul>

2. Knowledge of ice physics, growth and characteristics		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Ice physics</li> <li>● Ice formation, growth, melt</li> <li>● Ice types (1.0)</li> <li>● Stages of development</li> <li>● Concentration (10ths)</li> <li>● Ice reporting and coding WMO symbols</li> <li>● Signs of ice and water Ice blink Water sky Frost smoke</li> <li>● Effects of wind and current on ice</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Growth, movement and degradation of ice understood</li> <li>● Ability to understand ice symbology and make a report</li> </ul>

3 Preparations for operations in sea ice		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● <b>Vessel construction</b> Hull designs Ice belts Propulsion types Rudder types Propeller and rudder protection Effects of ice pressure Monitoring of ice pressure on hull</li> <li>● <b>Passage planning</b> Infrastructure Information sources Weather information Ice charts Types and frequency Broadcasts and forecasts Onboard display Strategic Tactical</li> <li>● <b>Real-time display</b> Radar Visual ECDIS</li> <li>● <b>Limitations on equipment</b></li> <li>● <b>Position-fixing</b> Lack or degradation of nav aids</li> <li>● <b>National/regional/local regulations</b></li> <li>● <b>Deck preparations</b></li> <li>● <b>Engine room preparations</b> Lifesaving and firefighting equipment preparations</li> <li>● <b>Crew preparation</b> Personal protective equipment Safe working practices</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Vessel ice class identified and icebreaking abilities of vessel are known</li> <li>● Understanding of areas of navigation permitted given vessel's ice class and type</li> <li>● Ability to collect and identify sources of information and plan a passage taking into account potential and actual ice conditions</li> <li>● Ability to use onboard display equipment effectively</li> <li>● Understand preparations of deck, engine room, LS and FF equipment for cold weather</li> <li>● Crew awareness and preparation for cold weather operations</li> </ul>



4. Skills required for operations in sea ice		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Damage caused by ice</li> <li>● Use of ice pilots/advisers</li> <li>● Bridge operations                             <ul style="list-style-type: none"> <li>Watches</li> <li>Use of searchlights and night vision equipment</li> </ul> </li> <li>● Manoeuvring in ice                             <ul style="list-style-type: none"> <li>Approaching ice</li> <li>Entering ice</li> <li>Transiting ice</li> </ul> </li> <li>● Safe speed</li> <li>● Turning and backing</li> <li>● Avoiding besetment</li> <li>● Freeing beset vessel</li> <li>● Icebreaker and convoy operations                             <ul style="list-style-type: none"> <li>Icebreaker requirements</li> <li>Icebreaker capabilities</li> <li>Icebreaker communication</li> <li>Icebreaker operating protocols and methods</li> <li>Safe speeds and distances</li> <li>Convoy operations with and without icebreaker</li> </ul> </li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved simulator training</li> <li>● Approved on-the-job training and experience (OJT log)</li> <li>● Approved training ship experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Ship operated in safe manner under prevailing ice conditions</li> <li>● Icebreaker abilities are identified</li> <li>● Contact made with icebreaker and VTS</li> <li>● Icebreaker orders are complied with</li> </ul>

5. Knowledge of hazards inherent in ice operations		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Human factors                             <ul style="list-style-type: none"> <li>Cold fatigue</li> <li>Medical/first aid aspects</li> <li>Crew welfare</li> <li>Wind effect</li> </ul> </li> <li>● Oil spill/pollution in ice</li> <li>● Firefighting in ice</li> <li>● Structural failure/flooding</li> <li>● Abandoning in ice</li> <li>● Safety and security in ice including the protection of wildlife</li> <li>● Introduction to MARPOL requirements</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Understanding of effects and mitigation of cold temperatures on human performance</li> <li>● Understanding of the difficulties and issues involved in dealing with pollution, towing, salvage, firefighting, damage control and survival in ice conditions</li> <li>● Contingency planning with respect to risk evaluation addressed as appropriate</li> </ul>

**A5.2 Level 2: Advanced**

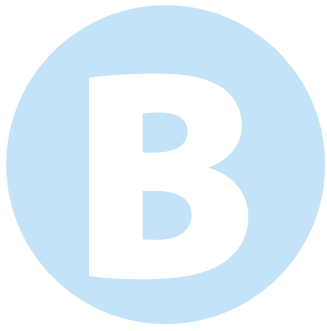
<b>1. Knowledge of international ice nomenclature</b>		
<b>Knowledge, understanding and proficiency</b>	<b>Methods demonstrating competence</b>	<b>Criteria for evaluating competence</b>
<ul style="list-style-type: none"> <li>● Ice distribution                             <ul style="list-style-type: none"> <li>Ice field</li> <li>Small ice field</li> <li>Medium ice field</li> <li>Large ice field</li> <li>Ice massif</li> <li>Floe</li> <li>Large floe</li> <li>Belt</li> <li>Tongue</li> <li>Strip</li> <li>Bight</li> <li>Ice jam</li> <li>Ice edge</li> <li>Jammed brash barrier</li> <li>Fast ice edge</li> <li>Ice boundary</li> <li>Fast ice boundary</li> </ul> </li> <li>● Terms applicable to ice navigation                             <ul style="list-style-type: none"> <li>Beset</li> <li>Ice-bound</li> <li>Ice under pressure</li> <li>Nip</li> <li>Difficult area</li> <li>Easy area</li> <li>Lead</li> <li>Flaw lead</li> </ul> </li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Ice conditions identified correctly</li> <li>● Ice chart information identified and interpreted correctly</li> <li>● Information used for passage planning</li> </ul>

<b>2. Knowledge of ice physics, growth and characteristics</b>		
<b>Knowledge, understanding and proficiency</b>	<b>Methods demonstrating competence</b>	<b>Criteria for evaluating competence</b>
<ul style="list-style-type: none"> <li>● Ice reporting and coding                             <ul style="list-style-type: none"> <li>Canadian symbols</li> <li>Baltic symbols</li> <li>Other</li> </ul> </li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Growth, movement and degradation of ice understood</li> <li>● Ability to understand ice symbology and make a report</li> </ul>

3. Preparations for operations in sea ice		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● <b>Vessel construction</b> Ice classes and notations Ice passport Sea suction/water intake Superstructure insulation Special systems</li> <li>● <b>Shore/vessel collaboration</b></li> <li>● <b>Commercial awareness</b></li> <li>● <b>Insurance P&amp;I, hull and machinery</b></li> <li>● <b>Passage planning</b> Environmental issues Low sulphur fuels Sensitivity     Sewage, greywater     Garbage, food waste Seasonal issues affecting conditions such as freezing spray, fog, icefog etc Demographic issue     Indigenous peoples Ice imagery interpretation     Visual     Radar     Thermal</li> <li>● <b>Reporting requirements</b> Suspension of traffic schemes NORDREG GOFREP AUSREP</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Vessel ice class identified and icebreaking abilities of vessel are known</li> <li>● Understanding of areas of navigation permitted given vessel's ice class and type</li> <li>● Ability to collect and identify sources of information and plan a passage taking into account potential and actual ice conditions</li> <li>● Ability to use onboard display equipment effectively</li> <li>● Understand preparations of deck, engine room, LS and FF equipment for cold weather</li> <li>● Crew awareness and preparation for cold weather operations</li> </ul>

4. Skills required for operations in sea ice		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Vessel interaction with ice</li> <li>● Influence of ice concentration and thickness on ship speed</li> <li>● Influence of surface features, hummocking, ridging, rafting</li> <li>● Manoeuvring in ice                             <ul style="list-style-type: none"> <li>Use of leads and cracks</li> <li>Design ice speed                                     <ul style="list-style-type: none"> <li>Attainable</li> <li>Admissible</li> <li>Safe</li> </ul> </li> <li>Coefficient of difficulty</li> <li>Breaking out of channel</li> </ul> </li> <li>● Berthing and unberthing                             <ul style="list-style-type: none"> <li>Approach using ice as cushion</li> <li>Approach using tugs as cushion</li> <li>Use of thrusters                                     <ul style="list-style-type: none"> <li>Anchoring in ice/use of ice anchors</li> </ul> </li> </ul> </li> <li>● Deck operations in cold                             <ul style="list-style-type: none"> <li>Ballast tank monitoring</li> <li>FW tanks at ship's side</li> <li>Monitoring exposed piping</li> <li>Sea bay and sea chest vent pipes and other vents</li> <li>Draught and trim according to ice class</li> <li>Use of heat traces and anti-freezing compounds</li> <li>Liquid cargo handling precautions</li> </ul> </li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Ship operated in safe manner under prevailing ice conditions</li> <li>● Icebreaker abilities are identified</li> <li>● Contact made with icebreaker and VTS</li> <li>● Icebreaker orders are complied with</li> </ul>

5. Knowledge of hazards inherent in ice operations		
Knowledge, understanding and proficiency	Methods demonstrating competence	Criteria for evaluating competence
<ul style="list-style-type: none"> <li>● Superstructure/deck icing Effects on stability and trim Prevention and removal Factors affecting accretion</li> <li>● Towing/salvage in ice</li> <li>● Conducting drills in ice/cold</li> <li>● Maintenance and preparation of FF and LS equipment</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>● Approved training</li> <li>● Approved simulator training</li> <li>● Approved computer-based training</li> <li>● Approved on-the-job training and experience (OJT log)</li> </ul>	<ul style="list-style-type: none"> <li>● Understanding of effects and mitigation of cold temperatures on human performance</li> <li>● Understanding of the difficulties and issues involved in dealing with pollution, towing, salvage, firefighting, damage control and survival in ice conditions</li> <li>● Contingency planning with respect to risk evaluation addressed as appropriate</li> </ul>



# Appendix B: Instructor requirements

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## **B1 Certification**

To become an Ice Navigator instructor, an NI Ice Navigator Level 2 certificate is required.

An Ice Navigator instructor must hold a teaching or trainer certificate. These qualifications shall focus on teaching methodology and assessment.

The Nautical Institute will accept the train the trainer qualification of IMO 6.09 and IMO 6.10 as a teaching certificate.

An Ice Navigator instructor must have undertaken a training programme and passed the assessment undertaken by the training centre, in line with the table of competences. The training programme and table of competences are described in Sections A5.1 and A5.2 above.

## **B2 Practical experience**

An Ice Navigator instructor must have a minimum of 90 days documented experience on board a vessel operating in sea ice conditions as a certified Ice Navigator in the four years before starting to teach.

## **B3 Employment**

A centre may employ instructors on a rotation or on-call basis. All instructors must present their teaching certificate and training programme and be approved by the NI.

Centres that have instructors on a rotation or on-call basis must have a full-time Ice Navigator teaching team leader or supervisor, who will be responsible for updating and reviewing the material annually.

The Ice Navigator teaching team leader or supervisor must work full time at the centre (or group in the case of a satellite centre) and also be responsible for all other instructors and their continuing training development. A full-time instructor is one who is employed by the training centre and is responsible for the daily management of the Ice Navigator course and for delivering or supervising the delivery of Ice Navigator training at the facility.

Training centres are allowed to use instructors from another institution. These instructors must meet the requirements set out in Sections B1 and B2 above.

## **B4 Review, appraisal and feedback**

The centre should hold meetings twice a year with all instructors to review course performance, align instructors with course content and to update them on new standards and industry requirements. Such meetings should be documented, as the minutes will be required as evidence during NI audits.

All training centres must develop and carry out an annual appraisal (performance assessment) for instructors, which shall be recorded in writing.

The annual appraisal of all Ice Navigator instructors must include comments submitted on the feedback form by course participants and by the teaching team leader. Appraisal should consist of

watching the instructor during lectures, noting instructor attendance at conferences or seminars, courses and training, and evidence of competences or other features that show continuous professional development. Appraisal can be done by third parties external to the centre who are qualified to assess the teaching methodology and instructor's skill.

### **B5 State-approved instructors**

Under the grandfather clause for instructors, training centres that have had their Ice Navigator instructors previously approved by national authorities will have their status reviewed by The Nautical Institute on a case-by-case basis. A key component of this assessment will be evidence of previous experience operating a vessel in sea ice conditions.

### **B6 New instructors**

A candidate must complete the Ice Navigator instructor training within four years of starting it.

The training centre must inform The Nautical Institute as soon as a new instructor has completed the training programme and requests an approval letter. The onus is on the training centre to ensure that the person it trains also complies with the other requirements of an instructor as laid down in this Standard.

### **B7 Penalties for non-compliance**

A training centre that does not report a change of instructor to the NI, or that uses an instructor who has not been approved by the NI, or that does not meet all the requirements for instructors may have its accreditation cancelled, pending a full audit.

### **B8 Minimum qualifications**

In light of the 2010 Manila Amendments to the STCW Convention and Code, the NI requires that an instructor of the Ice Navigator Scheme:

- hold at least one of the following qualifications: STCW Regulations II/1, II/2 or II/3 Deck
- have served a minimum of 90 days as a Master or person in charge of the deck watch. Of these 90 days, 30 must have been completed while the vessel was in ice conditions that required the assistance of an icebreaker or navigation to avoid concentrations of ice that might have endangered the ship
- be knowledgeable about the requirements for preparing vessels for operating in low air temperatures
- know in detail about modern variations of ice class and the equipment needed when navigating in ice
- have up-to-date knowledge about the correct way to prepare crew for working conditions and safety in ice conditions and low air temperatures
- have a complete knowledge of the need to ensure compliance with pollution prevention requirements
- have a current relevant teaching qualification or have successfully completed a train-the-trainer course, including the application of simulators in training, and meets the requirements of STCW Regulations I/6 and I/12.

## B9 Training programme for new instructors

No instructor should teach an Ice Navigator course accredited by the NI until they have completed that course as a student, unless they have been approved under the grandfathering arrangements or can demonstrate similar relevant experience. A new instructor should complete a specific Ice Navigator course (ie either Level 1 or Level 2) at least once in order to become familiar with the course content and the equipment used.

Subsequently, new instructors will deliver all elements of the shore-based courses under supervision. They should teach each element at least once under supervision. The rate at which new material is covered should be based on the instructor's competence, agreed with the supervising instructor or instructors.

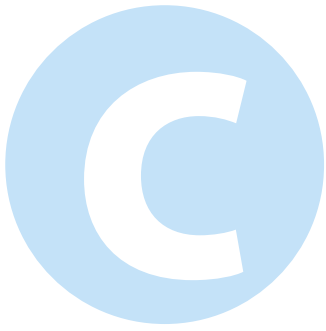
## B10 Specification of the minimum standard of competence for Ice Navigator instructors

B10.1 General			
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Nautical Institute Training Scheme	Displays: <ul style="list-style-type: none"> <li>● Knowledge of NI Ice Navigator Scheme</li> <li>● Structure of Scheme</li> <li>● Knowledge of requirements and guidelines</li> <li>● Knowledge of certification requirements</li> </ul>	Examination and assessment of evidence from approved training programme	Has general understanding of NI Ice Navigator Scheme
Training centre procedures and quality management	Displays knowledge and understanding of individual training centre procedures and quality management systems		Follows procedures and demonstrates general understanding of quality management procedures
Training centre training materials and documentation	Displays: <ul style="list-style-type: none"> <li>● Knowledge of centre training materials and documentation</li> <li>● Ability to use training materials</li> </ul>		Delivers training materials competently
Training centre equipment	Sets up and operates centre equipment effectively		Sets up Ice Navigator equipment Operates and demonstrates use of equipment



<b>B10.2 Theory sessions</b>			
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ice Navigator principles	Communicates course aims and objectives effectively	Observation of competent delivery	Delivers subject matter and training materials competently
Elements of Ice Navigator course content	Communicates course aims and objectives effectively		
Practical operation of Ice Navigator equipment	Communicates course aims and objectives effectively		
Environmental sensors	Communicates course aims and objectives effectively		
Power generation and supply	Communicates course aims and objectives effectively		
Ice Navigator operations	Communicates course aims and objectives effectively		

<b>B10.3 Practical sessions</b>			
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Delivery of additional theory and review materials	Communicates course aims and objectives effectively	Observation of competent delivery	Delivers subject matter and training materials competently
Equipment/simulator set-up	Sets up and operate centre equipment effectively		Sets up simulation scenarios
Exercise set-up and briefing	Able to transmit relevant information to students		Communication is clear, concise and acknowledged by the participant
Delivery of exercise outcomes	Displays knowledge of: <ul style="list-style-type: none"> <li>● Planning, conduct and execution of Ice Navigator operations</li> <li>● Common Ice Navigator operational faults</li> <li>● Ice Navigator procedures</li> <li>● Various types of Ice Navigator emergencies</li> </ul>		Delivers or facilitates scenario exercises competently
Debrief exercises	Transmits relevant information to students		Identifies that exercise conforms with industry practice Effectively debriefs participants after the exercise



# Appendix C: Classroom requirements

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## **C1 Accommodation and transport**

Some training centres provide accommodation and transport for students. Where this is the case, the centre should provide evidence that it has given course participants appropriate information about these facilities.

In cases where the training centre includes hotel reservation and transport as part of the training package, this should be clearly stated in the company's agreement with course participants.

Where accommodation and transport are not part of the course package provided by the centre, no documentation will be required. However, a clearly defined booking system for courses must be in place and form part of the administrative procedures (see Section E2 below).

## **C2 Infrastructure**

The training centre shall provide and maintain the necessary infrastructure, including:

- Buildings, workspace and associated utilities
- Process equipment (both hardware and software)
- Supporting services, such as transport, communications, health and safety.

The centre must create clear site plans showing the facilities, rooms and emergency exits. These site plans are to be displayed in a common area accessible to staff and course participants.

### **C2.1 Environmental conditions**

#### *C2.1.1 Temperature and ventilation*

The temperature of the classroom should be between 18° and 24° Celsius, with humidity between 40% and 60%. An air conditioning unit or fan that is able to control temperature and humidity may be required.

#### *C2.1.2 Lighting*

Lighting should be designed for the tasks that individuals are carrying out within that environment. Windows should be fitted with blinds to avoid glare affecting display screen users.

If the normal lighting system fails, emergency lights should come on to illuminate escape routes from occupied buildings and to enable certain activities to continue. Emergency lights must be powered by a source independent of that supplying the normal lighting.

#### *C2.1.3 Noise*

Poor acoustic conditions in the classroom that increase noise levels are likely to force instructors to strain their voices and may make it harder for participants to concentrate. Sound levels should be kept to a minimum and must comply with local regulations.

Where noise levels exceed 85 decibels, sound insulation, reverberation and indoor noise level controls will be required.

## **C2.2 Health and safety**

### *C2.2.1 Electrical safety*

Sufficient electrical outlets should be available to enable electrical equipment to be positioned and used safely.

The location of electrical equipment depends on the length of cables and the availability of sockets for telephones, television aerials and power. The location of the equipment must not present a hazard to users or equipment. Regular visual checks of plugs, leads and other electrical equipment should be undertaken.

Desks should incorporate cable management and may be modular to allow flexible arrangement. Cables should be kept tight and, where possible, concealed.

### *C2.2.2 Fire warnings and exits*

A fire alarm is required to ensure swift evacuation of the premises in an emergency. Before classes start, course participants should be notified about possible tests and how and where they should proceed when the alarm sounds.

Gangways and emergency exits must be clearly marked and kept free of obstructions at all times.

Appropriate fire-fighting and first aid equipment should be kept close to hand and identified with clear signage.

## **C2.3 Classroom**

A suitable classroom is required, furnished with desks or tables and adjustable chairs.

Each participant should be allocated a minimum workspace area of 2m<sup>2</sup>.

Every classroom should include a wall-mounted clock to ensure accurate timekeeping during exercises and examinations.

Every classroom should be provided with a whiteboard and/or flip chart.

### *C2.3.1 Visual aids*

Ice and related charts are to be displayed in the classroom and must be visible to course participants.

### *C2.3.2 Technical equipment*

The training centre should have the equipment specified in Appendix D (below) for the Ice Navigator training courses it provides.

Additional rooms may be used if the class is split into groups or for work in the simulator.

When conducting the simulator exercises, the instructor should be positioned in a separate room.

The main teaching room should be provided with a whiteboard, a flip chart or multimedia facilities.

### ***C2.3.3 Projection equipment***

A maximum of 1,500 ANSI lumens is generally considered adequate for projection equipment in most classroom environments, except in the most extreme ambient lighting conditions. In bright daylight the room should be darkened by means of window blinds rather than by increasing the brightness of the projector.

## **C2.4 Furniture**

### ***C2.4.1 Chairs and desks***

The furniture in the classroom must be positioned to allow easy access to all equipment.

A classroom must have chairs on which the seat height and back position are adjustable in relation to the equipment. Course participants need to be able to sit at the recommended height, so that their eyes are level with the top of the screen. To achieve the correct posture when working, the lower arms should be roughly horizontal, knees should fit comfortably under the desk with the thighs roughly horizontal, and the back should be kept straight.

Desks should provide enough space for paper, books and other materials, and permit space for more than one user at a time; there should also be room to allow the instructor easy access.

The centre should make its purchasing decisions based on a clear understanding of the teaching methods in use, the way participants interact with their environment, and the role the furniture is intended to perform.

Desks and chairs are to be kept in good condition and undergo periodical maintenance. The centre shall keep records of this maintenance.

The centre shall periodically conduct a risk assessment of the premises.

### ***C2.4.2 Computers and workstations***

Monitors should tilt and swivel to suit the requirements of individual users.

The top of the screen should be roughly at eye level.

Screens should be positioned to reduce reflection and glare from lights and windows, with blinds used where necessary. Screens should be adjustable for brightness and contrast as light levels change through the day.

Screens should be cleaned regularly.

Users should have the option of using the keyboard flat or tilted.

### ***C2.4.3 Computers and workstations for online assessment***

The following is required:

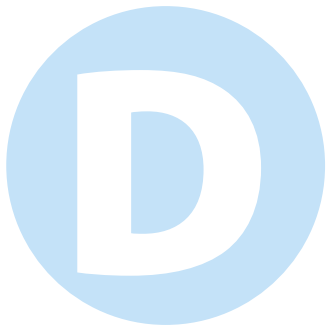
- One computer/workstation per course participant (1:1 ratio)
- Space of at least 1m between each workstation
- Compliance with the above-mentioned health and safety requirements regarding computer equipment
- Internet connection for all computers.

## **C2.5 Domestic arrangements**

The training centre must provide course participants with domestic facilities such as toilets, kitchen/s and/or refreshments.

### *C2.5.1 Toilets*

Separate toilets should be provided for each gender, with clear signage. Toilets are to be routinely cleaned and maintained, and a record of cleaning and maintenance must be kept.



# Appendix D: NI Ice Navigator simulator and equipment specifications

Centres intending to deliver training for Ice Navigators must be equipped with a full mission Class A ship's bridge simulator suitable for the purpose.

The following minimum specification must be satisfied.

Item	NI requirement	Remarks
1	Equipment and consoles are to be installed, mounted and arranged in a ship-like manner	
2	The simulator must have a minimum fixed field of view of 240° with scanning capability for 360°	
3	The simulator shall be installed with ship-like indicators, displays, alarm panels, control panels and communication systems	
4	The own-ship capability of the simulator must realistically replicate at least one ice class vessel	
5	The simulator must allow for the development of scenarios including exercises in ice that simulate environmental conditions with a realistic effect on own ship and target ships	
6	The simulator must provide for simulation of different ice conditions with appropriate visual representation	
7	The simulator must provide for a dual-redundancy bridge capability by way of ECDIS and radars and a full suite of navigation equipment as would be expected on a SOLAS vessel operating in ice conditions	
8	The simulator must provide for the use of ice charts on the ECDIS	
9	The simulator must provide for realistic effects when working in ice both alone and in convoy	
10	The simulator must provide for realistic effects when breaking through ice and when acting in icebreaker mode	
11	The navigation instruments must realistically demonstrate the effects of operating in or near an area of ice	
12	The simulator must be able to record and replay exercises	
13	The simulator must realistically allow for hull friction and other forces when navigating in an ice field	



# Appendix E: Administration requirements

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## **E1 General**

The centre shall have a licence document from the appropriate local or national authorities showing that it is legally permitted to operate as a training centre.

Before an accreditation visit takes place, The Nautical Institute must be provided with a copy of any joint-venture agreement between a training centre and one or more satellite centres or between two independent companies.

Each centre must have a stamp with that centre's name and logo, which is to be used for stamping relevant documentation. An Ice Navigator training centre that is part of a joint venture must have a stamp that incorporates the names of both organisations. A centre that operates as a satellite centre must have its own stamp.

## **E2 Course booking system**

The course booking procedure should be clearly documented. Such documentation should set out all the booking phases provided to participants before they begin the course.

The training centre must ask each course participant (other than cadets) for their certificate of competence (CoC) before accepting that student on to the Ice Navigator Course and the Ice Navigator Scheme. The centre shall keep in its files a copy of each participant's STCW CoC, which must be made available for audit.

An out-of-date CoC should not prevent a candidate from starting the Ice Navigator Scheme. However, the training centre should advise the candidate that they may find it difficult to obtain the sea service required by the Scheme if they hold an invalid CoC.

The centre should ensure the CoC number is accurately noted in the participant's record.

## **E3 Process and procedures**

### **E3.1 Communication**

The training centre must establish appropriate communication processes to ensure timely exchange of information among instructors and between management and instructors.

The training centre must have an effective means of communicating with course participants in relation to:

- Course information
- Enquiries, including amendments
- Feedback, including complaints.

General information must be displayed in an area accessible to all participants such as the reception area or a kitchen. The centre should display such information on a wall board.



## **E4 Human resources**

### **E4.1 General**

The training centre shall have an organogram that shows the departmental and personnel structure of the organisation, including roles.

The centre shall maintain records of the instructors' CVs, including photographic ID, and their education, training, skills and experience.

### **E4.2 Competence**

The centre shall have a system in place to:

- Determine the necessary competence for personnel performing the training
- Provide training or take other actions to satisfy these needs
- Evaluate the effectiveness of the actions taken
- Ensure that its personnel are aware of the value of their activities and the way those activities contribute to enhancing the quality of the course.

### **E4.3 Appraisals**

The centre shall put in place an appraisal system to assess staff skills and competence. It shall keep records of the way the system has been implemented, including actions taken for staff improvement.

## **E5 Feedback system**

### **E5.1 Participant focus**

The centre's senior management shall determine participants' requirements and endeavour to meet them.

#### *E5.1.1 Participant feedback*

The centre shall use feedback forms as a means of assessing the general quality of the course, its content, the teaching method, instructors' effectiveness, the facilities and infrastructure, and the helpfulness and professionalism of the staff. The feedback about each instructor and related course information shall be used to inform that individual's annual appraisal and, where appropriate, to help improve course structure and teaching methods and effectiveness.

### **E5.2 Annual review**

The centre shall establish management reviews, monitoring and customer feedback systems to ensure the continuing suitability, adequacy and effectiveness of the course. This review shall include assessing the scope for improvement and enhancing the quality of the Ice Navigator Scheme, including policies and objectives.

The review documents must include information on:

- Result of audits
- Customer feedback
- Process performance and equipment conformity

- Status of preventive and corrective actions
- Follow-up actions from previous management reviews
- Changes that could affect the quality management system
- Recommendations for improvement.

The outputs expected from the reviews include:

- More effective documentation and communication
- Improved pass marks from participants
- Fewer customer complaints.

## **E6 Complaints and appeals**

The centre shall have documented processes and procedures in place to deal with complaints and to enable appeals (see Appendix I below).

## **E7 Document control**

### **E7.1 General**

Company policies should be set out in the staff handbook.

Procedures must be documented to show effective planning, operation and control of the centre's processes. Each document, form, slide and item of teaching material should be given a version number and date so that it is easily traceable and can be replaced when required. Documents such as attendance lists and exercises shall also include the name and signature of the instructor who is teaching the course.

### **E7.2 Control of documents**

#### *E7.2.1 NI documents, circulars and official messages*

All NI documents received must be available to staff at any time.

#### *E7.2.2 Control procedures*

Documented procedures must be established to define the controls needed to:

- Approve documents before issue
- Review, update and reissue documents
- Ensure that changes and the current revision status of documents are identified
- Ensure that up-to-date versions of applicable documents are available where needed
- Ensure that documents remain legible and easily identifiable
- Prevent the unintended use of obsolete documents and to identify them clearly if they need to be retained.

#### *E7.2.3 Control of records*

Records shall be established and maintained to provide evidence that the centre is compliant with the Ice Navigator Accreditation Standard and to ensure the effective operation of the quality management system. Records must remain legible, readily identifiable and retrievable. A documented procedure shall be established to define the controls needed to identify, store, protect, retrieve, determine retention time and dispose of records. Documents are to be stored for the time determined by local regulations or for three years from the date of the NI audit, whichever is the longer.

## **E8      Equipment maintenance records**

The training centre shall follow manufacturers' guidance on periodic maintenance of the equipment and systems (hardware and software) needed for the Ice Navigator Scheme. A qualified technician is to periodically review the maintenance arrangements and document this accordingly. A copy of the maintenance contract (if held) and a record of the maintenance carried out must be available when the centre is audited.



# Appendix F: Training provider annual report

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## F1 General

Centres are not audited every year, so The Nautical Institute requires each accredited training centre to submit an annual report. The deadline for submission of this report is 31 January each year.

The table below sets out the minimum information to be included in the annual report.

## F2 Content of annual report

### F2.1 Confirmations

1. Date report submitted to the NI
2. Year to which report refers
3. Training centre name in full (the official registered name)
4. Contact address
5. Date of last audit
6. Accreditation/reaccreditation certificate number and expiry date
7. Contact person:
  - a. Name
  - b. Position in the company
  - c. Date of birth
  - d. Nationality
  - e. NI customer number
  - f. Ice Navigator certificate number (if applicable)
  - g. Email address
  - h. Alternative email address
  - i. Telephone number (landline)
  - j. Telephone number (mobile/cellphone)

### F2.2 Changes since last annual report

8. Changes made to the administration or commercial set-up since the last report
9. Changes made to address, telephone number etc
10. Changes made to classrooms and other facilities, simulator, equipment

### F2.3 Instructors and logbook signatories

11. Changes made in past year affecting instructors, CVs, training programmes
12. List of current NI-approved instructors, with dates of approval letters
13. List of current signatories, with names and signature samples, noting any changes to staff since the last report and providing names and signatures of all new staff members

**F2.4 Course participants, details of courses and results**

14. List of all accredited Ice Navigator courses run between 1 January and 31 December, including for each the date and name of instructor/s.\* Also, list the following details for all participants\*:
  - a. Name
  - b. Date of birth
  - c. Nationality
  - d. Results and marks achieved
  - e. Certificate number (if any)
15. Summary of feedback and evaluation received from participants on all accredited Ice Navigator courses\*

**F2.5 Remarks and comments**

16. List of all other courses held at the centre
17. Evidence that the annual review has been conducted as required by the Standard
18. Outline of planned future developments
19. Comments for NI evaluation

\* *This material may be sent as an attachment in a tabulated format*



# Appendix G: The Nautical Institute accreditation process

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## **G1 Training provider requests Accreditation Standard**

Anyone interested in opening an Ice Navigator training centre may request a copy of this document, which is also available on the NI Alexis Platform website, <http://www.nialexisplatform.org/>.

## **G2 The Nautical Institute sends the Standard to the provider**

## **G3 Provider decides to pursue accreditation**

The training provider should contact the accreditation team at The Nautical Institute and follow up this initial contact with a formal written request for accreditation.

## **G4 Formal request for accreditation**

The formal written request should contain:

- Details of the centre
- Details of the contact person at the centre
- The name of the course or programme (Theory Levels 1 and 2, and/or Practical Training)
- Each instructor's CV, photograph and Ice Navigator certificate
- Each instructor's training programme, signed off by an experienced training Ice Navigator instructor.

## **G5 Timing**

Centres must apply for accreditation before the date requested for audit. This is so pre-assessment queries can be resolved and travel booked in good time.

## **G6 Accreditation agreement**

The training provider must sign an accreditation agreement with The Nautical Institute.

## **G7 Audit date**

The NI and the training centre will agree a date for the audit. The choice of date will be influenced by the availability of auditors and the training centre's schedule of courses.

The audit, whether for first-time accreditation or for reaccreditation, must take place as a Level 2 Course is being run. If a full class of participants is not available, suitably qualified individuals may sit the course at the time of the audit to enable the auditor to check on the simulator equipment, teaching methodology and other elements of the course.

## **G8 Auditors**

A trained auditor reporting back to the NI's administrative staff will audit the centre's administrative and management and course delivery procedures. Additional specialist auditors may be asked to assist, if appropriate.

Auditors will:

- Review and report on the materials submitted by training centres.
- Participate in accreditation visits and related activities in accordance with the guidelines, policy and procedures specified by the NI.
- Maintain confidentiality with respect to information gained from centres during the accreditation process. They will not discuss the training centre's activities, duplicate training materials received from the centre or discuss confidential information without the centre's permission.
- Return all training materials received from a centre either to the centre itself or the NI.
- Act in the best interests of The Nautical Institute and in accordance with the highest professional standards.

## **G9 Documents required before the audit**

The training centre must provide the NI with the following documents a minimum of *one month* before the audit is scheduled to take place:

- Instructor's manual for each course, including course timetable, lesson plans for each module and copies of PowerPoint presentations
- Course handouts and other course materials
- Licence to operate a training centre from the relevant local or national authority
- Instructors' CVs, including photographs and Ice Navigator certificates
- Each instructor's training programme, signed off by an experienced training Ice Navigator instructor
- A copy of the train the trainer qualification or teaching certificate
- Health and safety information
- Attendance list, feedback forms and methods for assessing course participants
- Example certificates
- Administration procedures to cover registration, booking and other administrative arrangements
- Management review policy
- Performance appraisal policy for instructors
- Complaints policy
- Control of documents policy.

To maintain a high audit standard, the NI auditors need time to review the documents before arriving at the centre. If the documents are not received in good time, the NI may cancel the arranged audit. Should this occur, the training centre will be required to reimburse the NI for all consequential losses, including travel, accommodation costs etc.

## **G10 Audit plan**

In most cases, the audit will run to the following schedule:

**Pre-audit**      The NI reviews all materials the training provider has submitted

**Audit Day 1**    Opening meeting. One auditor assesses the centre's administrative and record-keeping systems and facilities, and the second auditor assesses the technical aspects and observes course delivery

**Audit Day 2** Auditors assess any outstanding items and observe course delivery. The audit findings are discussed at a closing meeting

**Post-audit** The auditors document and discuss all their audit findings with the NI Accreditation Team. The team decides the accreditation status of the training provider and advises the centre of their decision by email, followed up with a formal letter.

## **G11 Decision to accredit**

The NI will send the training centre formal written accreditation at one of the following three levels.

### **G11.1 Accredited**

The centre is accredited to deliver courses for three years and will be required to submit annual reports to the NI throughout this period (see Appendix F)

### **G11.2 Accredited subject to minor or major improvements**

#### *G11.2.1 Minor improvements*

The centre must make the minor improvements identified. During this time the centre will usually be allowed to continue delivering courses. Depending on the nature of the improvements to be made, the NI may require the centre to provide written and/or photographic evidence of the improvement. In certain instances, the auditor/s may need to undertake a follow-up visit.

Once the improvements have been completed and validated, the centre will be accredited to deliver courses for three years from the date the initial audit was carried out. It will have to submit annual reports to the NI throughout this period.

#### *G11.2.2 Major improvements*

The centre must make significant improvements, during which time it may have to suspend delivery of courses. In most cases where major improvements are required, a follow-up audit will be conducted at the expense of the training centre. Once the improvements have been completed and validated, the centre will be accredited to deliver courses, although this may be for a shorter period than the usual three years. During this accreditation period the training provider will be required to submit annual reports to the NI.

### **G11.3 Failure**

Reasons will be given, along with an invitation to resubmit.

## **G12 Withdrawal of accreditation**

Accreditation may be cancelled or withdrawn for the following reasons:

- Failure to settle the accreditation/reaccreditation invoice within 90 days
- Failure to be reaccredited within three months of the expiry date of the existing accreditation (unless agreed in advance with the NI)
- Bankruptcy, receivership or liquidation of the accredited training provider or its parent organisation



- Failure to notify the NI of a significant change to the centre's management, training delivery or instructors
- Misrepresentation, misuse, abuse or misdemeanour by the training provider in connection with the accreditation
- Failure to comply with the NI's policies for accreditation and certification
- Failure to submit an annual report
- Engaging in any illegal activity
- End of partnership or joint venture between two accredited organisations
- Invoices still outstanding after 90 days.

### **G13 Recognition and certification**

Once the training provider has been successfully accredited, The Nautical Institute will issue a certificate. The centre will then be authorised to add the NI's logo and the words *Accredited by The Nautical Institute* to its course literature.

### **G14 Cost of audit**

The NI will carry out the audit at full cost recovery plus administrative overheads. Typically, costs may be broken down as follows:

Pre-course audit, reviewing documentation	1 person-day
Course audit	2 person-days
Simulator audit (where applicable)	1 person-day
Travel and accommodation	as applicable
Expenses, taxis etc	as applicable
Follow-up action, providing certification etc	1 person-day
Any local tax	as applicable

### **G15 Changes to location or simulator**

If a training centre changes its location or premises, or its simulator, it must notify the NI without delay. A date will be arranged for a new audit, which will be carried out at the training centre's expense.

### **G16 Spot audits**

The Nautical Institute retains the right to visit any accredited training centre to carry out a spot audit in order to maintain accreditation standards. This will be carried out at the training centre's expense.

### **G17 Bribery Act 2010**

The Nautical Institute, being a charity registered in the United Kingdom, is subject to the UK Bribery Act 2010.

This Act of Parliament entered into force on 1 July 2011. It provides for criminal sanctions in the case of bribery of a foreign public official or the failure of a commercial organisation to prevent bribery being undertaken on its behalf.

The penalties on conviction under the Act are a maximum of 10 years' imprisonment together with an unlimited fine. The Act also provides for the confiscation of property (under the proceeds of Crime

Act 2002) and disqualification of directors (under the Company Directors Disqualification Act 1986).

The Act has a near-universal jurisdiction, allowing for the prosecution of any company or individual with links to the UK, regardless of where the crime was committed.

## **G18 Harmonisation of standards**

The policy of the NI is:

- To ensure that courses conducted by different establishments for the same purpose meet the same standards
- When blended learning or other techniques are used as a means of preparation or delivery, the programmes are harmonised with the course objectives
- When courses cover different disciplines, the appropriate people with the required experience and qualifications are employed for each section.



# Appendix H: Certification

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## **H1 Minimum qualification requirement**

In line with the 2010 Manila Amendments to the STCW Convention and Code, The Nautical Institute has implemented the following entry requirements for the Ice Navigator Training and Certification Scheme.

The minimum qualification is set at STCW Regulation II/1 Officer in Charge of a navigational watch on ships of 500grt or more. Deck cadets on an approved training scheme may be allowed to start the Scheme, but must gain the required shipboard experience after getting the qualification identified in this section.

Alternative appropriate marine vocational qualifications (MVQs) will be considered on a case-by-case basis. The NI defines an MVQ as *a non-STCW certificate of competency issued by a White List maritime administration for use in the administration's local waters only.*

On completion of the required training and experience and upon application with appropriate evidence and payment of the relevant fee, The Nautical Institute will issue its Ice Navigator certificate at either Level 1 or Level 2, as appropriate. The certificate will be valid for five years.

### **H1.1 Revalidation of a Level 1 certificate**

For a certificate to be revalidated to Level 1, the holder must provide evidence of a minimum of 30 days' experience on board in ice conditions.

Those unable to provide continuing evidence of 30 days or more must begin the Scheme again.

### **H1.2 Revalidation of a Level 2 certificate**

For a certificate to be revalidated to Level 2, the holder must provide evidence of a minimum of 30 days' experience on board in ice conditions over the preceding five years. Where this has not been achieved the candidate may receive a Level 1 Certificate.

### **H1.3 Progression and validity**

Candidates for Ice Navigator qualifications may use sea service or training that has occurred within the previous five years. Activities that took place more than five years before submission will be regarded as expired under the Scheme, other than provisions made under grandfathering arrangements.

A candidate who has not attained the required level of sea experience in ice conditions may count time served in Polar waters (as defined by the IMO) for up to 50% of the total time required. Alternatively, they may count a repeat of the Level 2 course training as equivalent to 50% of the required experience.

## **H2 STCW limitations on the reverse of the Ice Navigator certificate**

The following endorsement will be used on all Ice Navigator certificates:

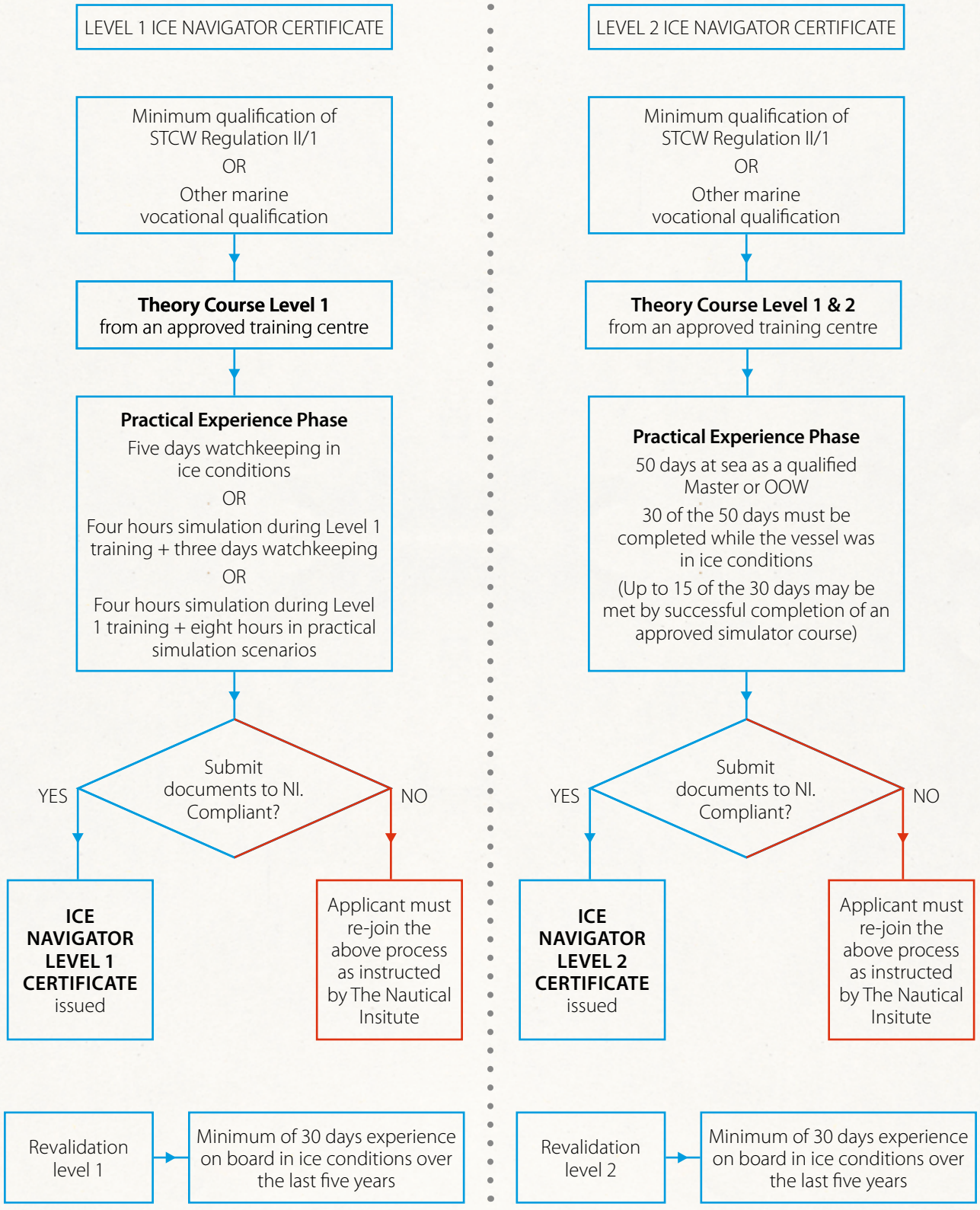
*Valid within the privileges of the Certificate of Competency held by the officer.*

This endorsement means that the holder may use the Ice Navigator certificate only within the limits allowed by their certificate of competency or proficiency. This is to allow operators who possess non-STCW local certificates of competency or proficiency to operate as an Ice Navigator on vessels to the limits allowed on those certificates, ie within restricted areas or limits from the coast of the issuing state on vessels of a certain size only.

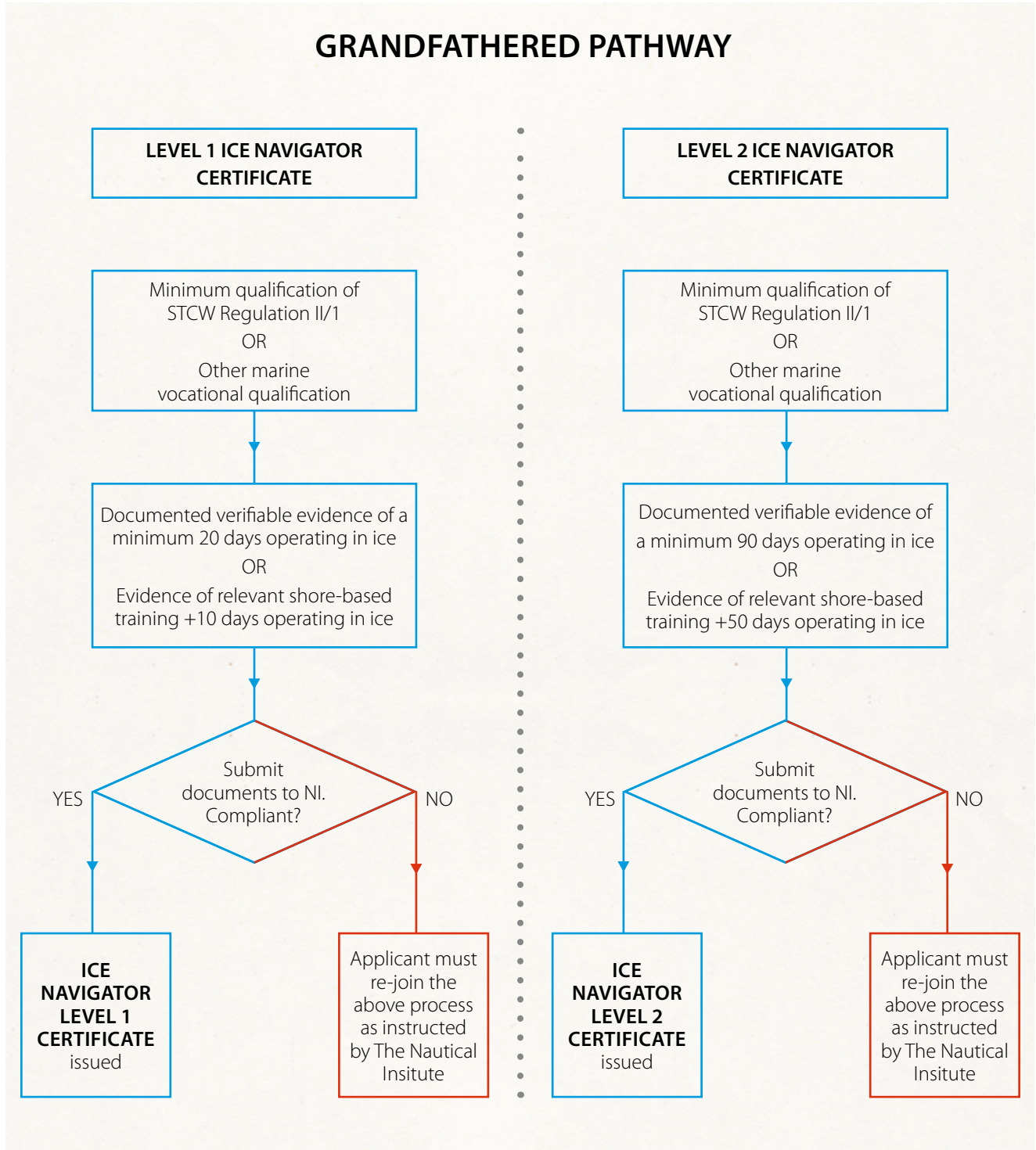
## **H3 Arrangements for initial certification**

Note: where a Level 1 course includes time in a simulator, up to four hours simulator time may be claimed as equivalent to two days of the overall five-day requirement.

## NEW ENTRANTS PATHWAY



#### H4 Arrangements for grandfathered certification



## H5 New participants

### H5.1 Level 1 Ice Navigator certificate

Evidence required	Acceptable evidence	Remarks
STCW qualification min II/1 Cadets may begin the Scheme but must complete seagoing portions of the training after gaining their STCW qualification	STCW certificate from White List country (copy accepted), Deck Cadet certificate	
Level 1 Theory Course completed	Level 1 Theory Course certificate from accredited training centre	Provided by training centre upon successful completion of Level 1 course
Practical experience: five days at sea	Logbook or journal with recorded watchkeeping days (see H5.3 for table of information required)	All entries must be signed off by the Master or an officer qualified as Ice Navigator Level 2  The Nautical Institute will also accept an addendum to the sea service testimonial confirming the practical experience gained in ice, provided this is signed by the Master
Practical experience: four hours from Level 1 training simulation and three days watchkeeping in ice conditions	Course certificate from accredited training centre, logbook or journal with recorded watchkeeping days (see H5.3 for table of information required)	Certificate provided by training centre upon successful completion of four hours training for that training carried out on shore  All seagoing watchkeeping entries must be signed off by the Master or an officer qualified as Ice Navigator Level 2
Practical experience: four hours from Level 1 training simulation and eight hours in practical training simulation scenarios	Course certificate from accredited training centre, certificate of training from simulation centre	Certificates provided by training or simulation centre upon successful completion of training requirements
Confirmation of evidence	Statutory declaration from applicant that all evidence is true and accurate, seaman's discharge book or sea service letter	All entries in the journal or logbook must be signed by the Master or an officer qualified as Ice Navigator Level 2
ID and other documents	Copy of driving licence or of personal details page in passport	To verify identity and name for certificate printing
Application document	Signed application document	To be provided by the NI

**H5.2 Level 2 Ice Navigator certificate**

Evidence required	Acceptable evidence	Remarks
STCW qualification min II/1	STCW certificate from White List country (copy accepted)	
Level 2 Theory Course completed	Level 2 Theory Course certificate from accredited training centre	Provided by training centre upon successful completion of Level 2 course
<p>Practical experience: 50 days at sea as Master or OOW. Of these, 30 days must be completed in ice conditions.</p> <p>Of the 30 days, up to 15 days may be met by successful completion of an approved ice navigation simulator course.</p> <p>The remaining 20 days may be sea service in any capacity and region provided this is as a qualified officer for this level</p>	Logbook or journal with recorded days (see H5.3 for table of information required)	<p>All entries must be signed off by the Master or an officer qualified as Ice Navigator Level 2</p> <p>The Nautical Institute will also accept an addendum to the sea service testimonial confirming the practical experience gained in ice, provided this is signed by the Master</p>
Confirmation of evidence	Statutory declaration from applicant that all evidence is true and accurate, seaman's discharge book or sea service letter	All entries in the journal or logbook must be signed by the Master or an officer qualified as Ice Navigator Level 2
ID and other documents	Copy of driving licence or of personal details page in passport	To verify identity and name for certificate printing
Application document	Signed application document	To be provided by the NI

**H5.3 Table of information required**

Participants should ensure that they record their experience in an appropriate journal or log. This should include the following information:

Date started ice navigation activities	
Date completed ice navigation activities	
Number of days in ice	
Vessel name	
IMO number and ice class	
Location	
Ice coverage and type	
Type of activity (eg transit, icebreaker escort)	
Verification signature from Master or Chief Officer or navigator qualified Ice Navigator Level 2	



## H6 Grandfathered route for those with prior experience

Applicants will be required to submit a body of evidence sufficient to demonstrate their experience of navigating in ice.

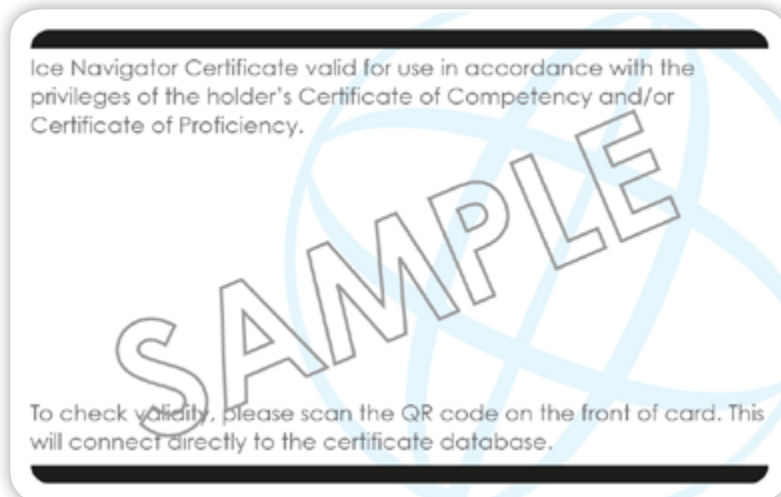
### H6.1 Level 1 Ice Navigator certificate

Evidence required	Acceptable evidence	Remarks
STCW qualification min II/1	STCW certificate from White List country (copy accepted)	
Evidence of a minimum of 20 days operating in ice	Master's log stating weather and ice conditions/icebreaker operations, plus crew lists, officer's logbook stating watchkeeping and ice conditions signed by Master	Copies of personal experience logs will usually be accepted.  Evidence and records supported by discharge book entries, sea service testimonials and other supporting evidence will be considered as part of the evaluation by the NI
Evidence of shore-based training and 10 days operating in ice conditions	Certificate of course completion or training from accredited training provider, Master's log stating weather and ice conditions/icebreaker operations, plus crew lists, officer's logbook stating watchkeeping and ice conditions signed by Master	Copies of personal experience logs will usually be accepted.  Evidence and records supported by discharge book entries, sea service testimonials and other supporting evidence will be considered as part of the evaluation by the NI
Confirmation of evidence	Statutory declaration by applicant that all evidence is true and accurate, and testimonial letter from an NI Member or Fellow attesting to the applicant's skills and experience and stating that to the best of their knowledge the evidence submitted is correct and that the applicant is entitled to the qualification applied for	Applicants who cannot satisfy the NI testimonial requirement should ask The Nautical Institute for advice
ID and other documents	Copy of driving licence or of personal details page in passport	To verify identity and name for certificate printing
Application document	Signed application document	To be provided by the NI

**H6.2 Level 2 Ice Navigator certificate**

Evidence required	Acceptable evidence	Remarks
STCW qualification min II/1	STCW certificate from White List country (copy accepted)	
Evidence of a minimum of 90 days operating in ice	Master's log stating weather and ice conditions/icebreaker operations, plus crew lists, officer's logbook stating watchkeeping and ice conditions signed by Master	Copies of personal experience logs will usually be accepted.  Evidence and records supported by discharge book entries, sea service testimonials and other supporting evidence will be considered as part of the evaluation by the NI
Evidence of shore-based training and 50 days operating in ice conditions	Certificate of course completion or training from accredited training provider, Master's log stating weather and ice conditions/icebreaker operations, plus crew lists, officer's logbook stating watchkeeping and ice conditions signed by Master	Copies of personal experience logs will usually be accepted.  Evidence and records supported by discharge book entries, sea service testimonials and other supporting evidence will be considered as part of the evaluation by the NI
Confirmation of evidence	Statutory declaration by applicant that all evidence is true and accurate, and testimonial letter from an NI Member or Fellow attesting to the applicant's skills and experience and stating that to the best of their knowledge the evidence submitted is correct and that the applicant is entitled to the qualification applied for	Applicants who cannot satisfy the NI testimonial requirement should ask The Nautical Institute for advice
ID and other documents	Copy of driving licence or of personal details page in passport	To verify identity and name for certificate printing
Application document	Signed application document	To be provided by the NI

## H7 Sample certificate





# Appendix I: Complaints and appeals procedure

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## **I1 General enquiries**

General enquiries and correspondence concerning the Ice Navigator Accreditation Standard should be directed to The Nautical Institute as below:

Accreditation and Training Department  
The Nautical Institute  
202 Lambeth Road, London SE1 7LQ  
United Kingdom

Email: [accreditations@nautinst.org](mailto:accreditations@nautinst.org)  
Tel: +44 (0)207 928 1351

## **I2 Complaints**

Complaints and disputes about the Ice Navigator Accreditation Standard should be directed to The Nautical Institute by emailing [john.lloyd@nautinst.org](mailto:john.lloyd@nautinst.org). The NI aims to acknowledge receipt within five working days and to respond within a further 10 working days. Matters escalated beyond the Accreditation and Training Department will be dealt with in accordance with the process set out in Section I3 below.

In all matters, the decisions supported by the Independent Appeal Panel will be considered final. Training centres should make every effort to ensure that all points raised at the closing meeting of the audit (see Section G10) are understood and any questions are discussed and uncertainties clarified.

Any complaints or appeals raised as a result of the accreditation visit will undergo a resolution procedure, which may entail a further visit to the centre with three auditors. The cost of this visit will be borne by the training centre as set out in the accreditation agreement.

## **I3 Accreditation appeal process**

### **I3.1 Guide to the appeal process**

Ice Navigator stakeholders (industry and training bodies) will put forward names of up to five of their members (with CVs and contact details), from whom the NI will compose the Independent Appeal Panel.

If the Independent Appeal Panel is required to adjudicate, the NI will select three names from the list of potential panel members, avoiding any obvious conflicts of interest. The NI will check the selected panel members' availability to work on the appeal case and establish whether there are any conflicts of interest before sharing any detailed information on the case with them.

The selected panel members will be required to sign a confidentiality agreement with the NI in which they agree not to share data outside the investigation and appeal process.

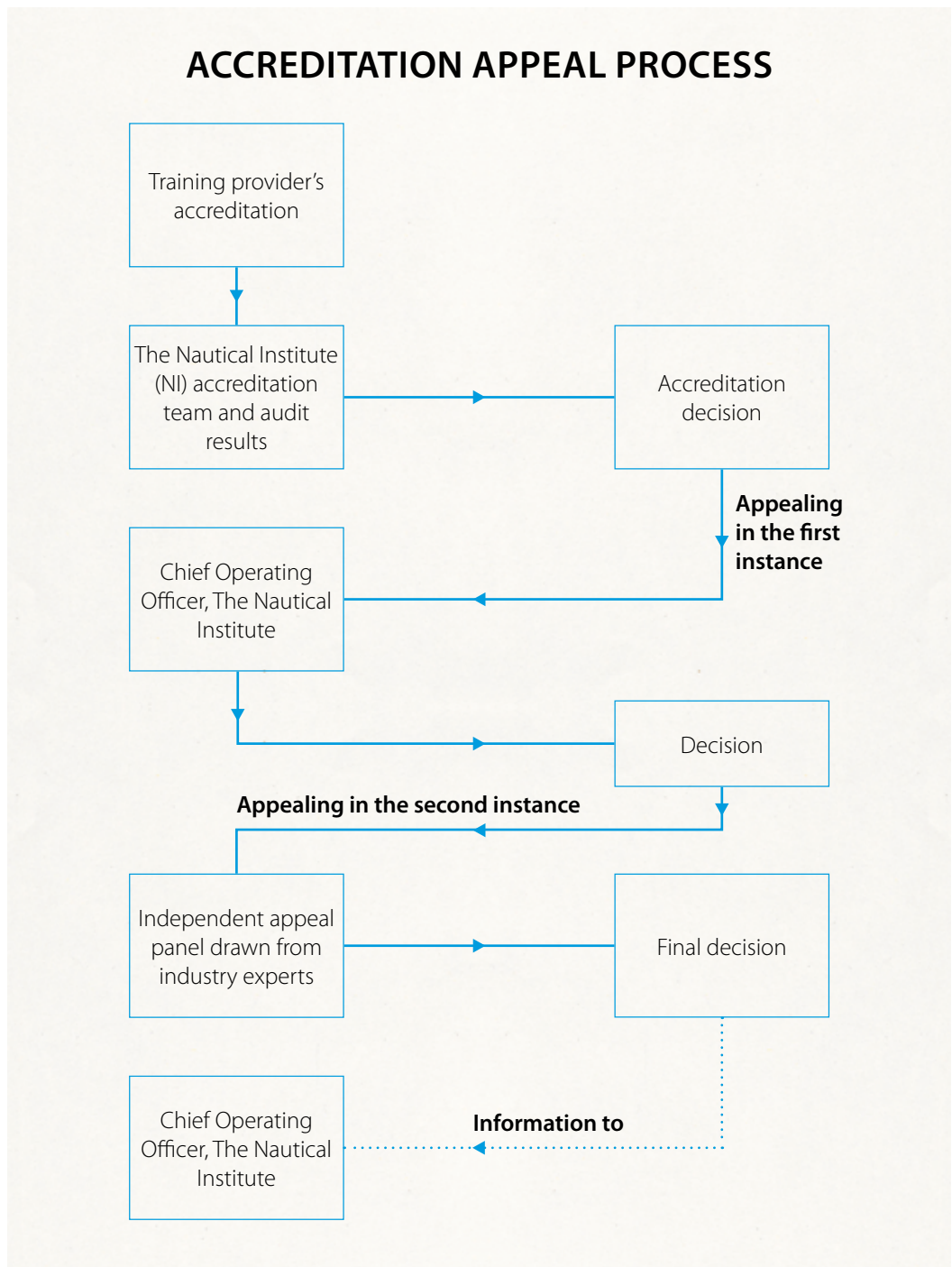
The NI will confirm the panel composition and share the documents of the case with panellists.

From the date they receive the case documents, the panellists have 45 days in which to assess the material and provide the NI with a report and final case decision.

The panel may meet physically or communicate by electronic means, whichever the panellists deem most appropriate.

Panellists should appoint a chairman from among their number and appoint a different panellist to take notes and compile the final report.

The panellists may decide any other administrative matters among themselves.





# Appendix J: Reading list

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The centre must have sufficient learning and reference resources to support the delivery of the course. The following list is provided for guidance.

During audit, the centre will have to show how it uses the resources in support of student learning.

Publications marked \* are available from The Nautical Institute online bookshop, <http://www.nautinst.org/en/shop/index.cfm>.

Editions and dates given are believed to be correct at the time of compilation of this list. Most of the listed publications are available both as hard copy documents and as downloadable PDFs.

## J1 General

American Bureau of Shipping (2015), *Guide for vessels operating in low temperature environments*. ABS

\* Buysse, Capt Johan (2007), *Handling ships in ice*. The Nautical Institute, ISBN 978 1 870077 84 2. New edition due 2017

Fisheries & Oceans Canada (2012), *Ice navigation in Canadian waters*. Canadian Coast Guard, ISBN 978 1 100 20610 3. Available as PDF download: <http://www.ccg-gcc.gc.ca/folios/00913/docs/ice-navigation-dans-les-galces-eng.pdf>

Smith, Orson P (2007), *Observers guide to sea ice*. NOAA Ocean Service. Available as PDF download: [http://response.restoration.noaa.gov/sites/default/files/Sea\\_Ice\\_Guide.pdf](http://response.restoration.noaa.gov/sites/default/files/Sea_Ice_Guide.pdf)

\* Snider, Capt Duke (2012), *Polar ship operations*. The Nautical Institute, ISBN 978 1 906915 18 6. New edition due 2017

The Swedish Club (2014), *Ice – advice for trading in Polar regions*. The Swedish Club. Available as PDF download: <http://www.swedishclub.com>

Transport Canada (2011), *Winter navigation on the River and the Gulf of St. Lawrence: practical notebook for marine engineers and deck workers*, TP 14335 E. Transport Canada. Available on web: [https://maddenmaritime.files.wordpress.com/2016/12/tp14335e\\_winter\\_navigation\\_river\\_-and\\_gulf\\_of\\_st\\_lawrence.pdf](https://maddenmaritime.files.wordpress.com/2016/12/tp14335e_winter_navigation_river_-and_gulf_of_st_lawrence.pdf)

United Kingdom Hydrographic Office (2016), *The mariner's handbook*, 11th edn. UKHO

World Meteorological Organization (1970), *Sea-ice nomenclature: Terminology, codes and illustrated glossary*. (There is also an updated version compiled by Dr A V Bushuyev, [http://www.aari.ru/gdsidb/docs/wmo/nomenclature/WMO\\_Nomenclature\\_draft\\_version1-0.pdf](http://www.aari.ru/gdsidb/docs/wmo/nomenclature/WMO_Nomenclature_draft_version1-0.pdf))

## J2 IMO publications

*Guidance on methodologies for assessing operational capabilities and limitations in ice*. MSC.1/Circ.1519, June 2016

*International Code for Ships Operating in Polar Waters* (Polar Code)

\* *International Convention for the Prevention of Pollution from Ships, 1973/1978*, consolidated edn, 2011 (MARPOL 73/78)

\* *International Convention for the Safety of Life at Sea, 1974*, as amended (SOLAS 1974)

\* *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as amended* (STCW Code)

\* *International Safety Management Code* (ISM Code), IMO-117E

## **J3 Regional guides**

### **J3.1 Antarctic**

National Geospatial-Intelligence Agency (2017), *Sailing directions (planning guide & enroute) Antarctica*, Pub 200. NGA. Available as PDF download:  
[http://msi.nga.mil/MSISiteContent/StaticFiles/NAV\\_PUBS/SD/Pub200/Pub200bk.pdf](http://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS/SD/Pub200/Pub200bk.pdf)

Secretariat of the Antarctic Treaty. Madrid Protocol, other regulations and annexes relating to Antarctica. Available at: [http://www.ats.aq/index\\_e.htm](http://www.ats.aq/index_e.htm)

United Kingdom Hydrographic Office (2014), *Admiralty sailing directions: Antarctic pilot*, NP9, 8th edn. UKHO

### **J3.2 Baltic**

Finnish Transport Agency (annual), *Finland's winter navigation/Suomen talvimerenkulku/Finlands vintersjöfart*. FTA. Available as PDF download:  
<http://www.liikennevirasto.fi/web/en/merchant-shipping/winter-navigation#.WUgDG5LyuUI>

Swedish Maritime Administration (annual), *Winter navigation*. SMA. Available as PDF download:  
<http://www.sjofartsverket.se/winternavigation>

United Kingdom Hydrographic Office (2014), *Admiralty sailing directions: Baltic pilot*, NP19, 16th edn. UKHO

United Kingdom Hydrographic Office (2016), *Admiralty sailing directions: Baltic pilot*, NP20, 13th edn. UKHO

### **J3.3 Canada - Arctic**

Canadian Hydrographic Service, *Sailing directions Arctic*:  
ARC400E *Northern Canada (general information)* (2009)  
ARC401E *Hudson Strait, Hudson Bay and adjoining waters* (2011)  
ARC402 *Eastern Arctic* (2014)  
ARC403E *Western Arctic* (2011)  
ARC404 *Great Slave Lake and Mackenzie River* (2012)

Environment and Climate Change Canada (2005), *Manual of Standard Procedures for Observing and Reporting Ice Conditions (MANICE)*. Available at:  
<http://www.ec.gc.ca/Glaces-Ice/default.asp?lang=En&n=2CE448E2-1&printfullpage=true>

Fisheries & Oceans Canada (annual), *Annual notice to mariners* (NOTMAR). Canadian Coast Guard. Available as PDF download:  
<https://www.notmar.gc.ca/publications/annual-annuel/annual-notices-to-mariners-eng.pdf>

Transport Canada (1995), *Equivalent standards for the construction of Arctic class ships*, TP 12260. Minister of Supply and Services, Canada. Available as PDF download: [https://www.tc.gc.ca/media/documents/marinesafety/tp12260e\\_1.pdf](https://www.tc.gc.ca/media/documents/marinesafety/tp12260e_1.pdf)

Transport Canada (1997), *Arctic waters oil transfer guidelines*, TP 19783. Transport Canada. Available as PDF download: <https://www.tc.gc.ca/media/documents/marinesafety/tp10783e.pdf>

Transport Canada (1998), *Arctic Ice Regime Shipping System (AIRSS) standards*, TP 12259E. Transport Canada. Available as PDF download: <https://www.tc.gc.ca/media/documents/marinesafety/tp12259e.pdf>

Transport Canada (2005), *Guidelines for the operation of passenger vessels in Canadian Arctic waters* TP 13670. Transport Canada. Available as PDF download: <https://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf>

Transport Canada (2003), *Arctic Ice Regime Shipping System pictorial guide*, TP 14044E. Transport Canada. Available as PDF download: [https://www.tc.gc.ca/media/documents/marinesafety/tp14044e\\_airss\\_guide.pdf](https://www.tc.gc.ca/media/documents/marinesafety/tp14044e_airss_guide.pdf)

Transport Canada, *Ship safety bulletins*:

02/1978 *Navigating in ice – Owners' and Masters' Instructions* (1978)

07/1980 *The hazard of navigating in old (multi-year) ice* (1980)

06/1990 *Navigating in the vicinity of ships being escorted by an icebreaker* (1990)

11/1992 *Ice Navigation In Canadian Waters*, TP 5064 (1992)

05/1997 *The Arctic Ice Regime Shipping System (AIRSS)* (1997)

04/2009 *IACS Unified Requirements for Polar Class Ships – Application in Canadian Arctic Waters* (2009)

United Kingdom Hydrographic Office (2012), *Admiralty sailing directions: Arctic pilot, vol 3*, NP12, 9th edn. UKHO

### **J3.4 Canada – Great Lakes and coastal**

Canadian Hydrographic Service, *Sailing directions Atlantic*:

ATL100E *General information* (2007)

ATL101E *Newfoundland – Northeast and East Coasts* (2013)

ATL102E *Newfoundland – East and South Coasts* (2008)

ATL103E *Newfoundland – Southwest Coast* (2010)

ATL104E *Cape North to Cape Canso (including Bras d'Or Lake)* (2010)

ATL105E *Cape Canso to Cape Sable (including Sable Island)* (2014)

ATL106E *Gulf of Maine and Bay of Fundy* (2001)

ATL107E *Saint John River* (2009)

ATL108E *Gulf of St. Lawrence (southwest portion)* (2006)

ATL109E *Gulf of St. Lawrence (northeast portion)* (2006)

ATL110E *St. Lawrence River – Cap Whittle/Cap Gaspé to Les Escoumins* (1992)

ATL111E *St. Lawrence River – Ile Verte to Quebec* (1992)

ATL112E *St. Lawrence River – Cap-Rouge to Montreal* (1992)

ATL120E *Labrador, Camp Islands to Hamilton Inlet (including Lake Melville)* (2004)

ATL121E *Labrador, Hamilton Inlet to Cape Chidley (including Button Islands and Gray Strait)* (2016)

Canadian Hydrographic Service, *Sailing directions Central (Great Lakes)*:

CEN100E *General Information, Great Lakes* (1996)

CEN 101E *St. Lawrence River, Montreal to Kingston* (2010)

CEN 102E *Lake Ontario* (1996)

CEN 103E *Welland Canal and Lake Erie* (1996)

CEN 104E *Detroit River, Lake St. Clair, St. Clair River* (1996)

CEN 106E *Georgian Bay* (2015)



CEN 107E *North Channel of Lake Huron* (2000)  
CEN 108E *Rideau Canal and Ottawa River* (2003)

Transport Canada (2015), *Joint industry government guidelines for the control of oil tankers and bulk chemical carriers in ice control zones of eastern Canada*, TP 15163 E. Transport Canada. Available at: <https://www.tc.gc.ca/eng/marinesafety/tp-tp15163-appendix-a-4038.htm>

### **J3.5 Denmark and Greenland**

National Geospatial-Intelligence Agency (2014), *Sailing directions (enroute) Greenland and Iceland*, Pub 181, 12th edn. NGA. Available as PDF download: [http://msi.nga.mil/MSISiteContent/StaticFiles/NAV\\_PUBS/SD/Pub181/Pub181bk.pdf](http://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS/SD/Pub181/Pub181bk.pdf)

United Kingdom Hydrographic Office (2013), *Admiralty sailing directions: Arctic pilot, vol 2*, NP11, 11th edn. UKHO

United Kingdom Hydrographic Office (2012), *Admiralty sailing directions: Arctic pilot, vol 3*, NP12, 9th edn. UKHO

### **J3.6 Norway and Svalbard**

United Kingdom Hydrographic Office (2016), *Admiralty sailing directions: Arctic pilot, vol 6*, NP10, 9th edn. UKHO

### **J3.7 Russia – Arctic**

State Hydrographic Department of the Ministry of Transport of Russian Federation (1996), *Guide to navigating through the Northern Sea Route*, 4151B. Available from the Centre for High North Logistics, <http://www.arctic-lio.com/>

United Kingdom Hydrographic Office (2016), *Admiralty sailing directions: Arctic pilot, vol 6*, NP10, 9th edn. UKHO

United Kingdom Hydrographic Office (2013), *Admiralty sailing directions: Bering Sea and Strait pilot*, NP23, 8th edn. UKHO

United Kingdom Hydrographic Office (2014), *Admiralty sailing directions: south and east coasts of Korea, east coast of Siberia and Sea of Okhotsk pilot*, NP43, 10th edn. UKHO

United Kingdom Hydrographic Office (2014), *Admiralty sailing directions: southern Barents Sea and Beye More pilot*, NP72, 3rd edn. UKHO

### **J3.8 Russia – Caspian**

United Kingdom Hydrographic Office (2017), *Admiralty sailing directions: Black Sea and Sea of Azov pilot*, NP24, 5th edn. UKHO

### **J3.9 Russia – Sakhalin**

United Kingdom Hydrographic Office (2014), *Admiralty sailing directions: south and east coasts of Korea, east coast of Siberia and Sea of Okhotsk pilot*, NP43, 10th edn. UKHO

### **J3.10 USA – Arctic**

National Geospatial-Intelligence Agency (2017), *Sailing directions (planning guide) Arctic Ocean*, Pub 180, 12th edn. NGA. Available as PDF download:

[http://msi.nga.mil/MSISiteContent/StaticFiles/NAV\\_PUBS/SD/Pub180/Pub180bk.pdf](http://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS/SD/Pub180/Pub180bk.pdf)

National Oceanic and Atmospheric Administration (2010), *United States coast pilot 9 – Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea*, 28th edn. NOAA. Available as PDF download:

<https://www.nauticalcharts.noaa.gov/nsd/coastpilot/archive/9/CP9-28ed-2010-reduced.pdf>

United Kingdom Hydrographic Office (2013), *Admiralty sailing directions: Bering Sea and Strait pilot*, NP23, 8th edn. UKHO

### **J3.11 USA – Great Lakes**

National Oceanic and Atmospheric Administration (2017), *United States coast pilot 6 – Great Lakes: Lakes Ontario, Erie, Huron, Michigan and Superior, and St. Lawrence River*, 47th edn. NOAA. Available as PDF download:

Available as PDF download:

[https://www.nauticalcharts.noaa.gov/nsd/coastpilot\\_w.php?book=6](https://www.nauticalcharts.noaa.gov/nsd/coastpilot_w.php?book=6)