



GUIDE FOR BUILDING AND CLASSING

INTERNATIONAL NAVAL SHIPS 2018

NOTICES AND GENERAL INFORMATION

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

**© 2017 American Bureau of Shipping. All rights reserved.
ABS Plaza
16855 Northchase Drive
Houston, TX 77060 USA**

Notices and General Information

CONTENTS

Introduction 1

TABLE 1 Applicable Editions of Booklets Comprising the 2018 Guide....4

TABLE 2 Division and Numbering of Rules and Guides 5

Change Notice (2018) 5

TABLE 3 Summary of Changes from the 2017 Guide 5

Definition of Terms Used Throughout the Guide 11

Notices and General Information

Introduction

1. The year 2018 edition of the *Guide for Building and Classing International Naval Ships* consists of the Parts shown in Table 1. Content has been added as necessary to extend its applicability to military vessels and other Government owned vessels in non-commercial service. The following is provided for information regarding each Part:
 - a) *Part 1:* The purpose of the generic title *ABS Rules for Conditions of Classification (Part 1)* is to reflect the expanded contents of PART 1, as a result of including consolidated requirements for “Classification” applicable to all types of and sizes of vessels, barges and specific shipboard arrangements/systems, etc., except for those in offshore service, as specified in the Foreword to Part 1.
 - b) *Part 2:* The purpose of the generic title *ABS Rules for Materials and Welding (Part 2)* is to reflect the common applicability of the requirements to all ABS-classed vessels, other marine structures and their associated machinery, and thereby make PART 2 more readily a common “PART” of various ABS Rules and Guides, as appropriate.
 - c) *Part 3:* The *ABS Guide for Building and Classing International Naval Ships (Part 3)* is based upon other existing ABS Rules and Guides to inherently incorporate baseline standards for hull design, construction, safety and environmental protection expected of all commercial vessels worldwide.
 - d) *Part 4:* The *ABS Guide for Building and Classing International Naval Ships (Part 4)* is based upon other existing ABS Rules and Guides to inherently incorporate baseline standards for machinery design, construction, safety and environmental protection expected of all commercial vessels worldwide.
 - e) *Part 5:* The *ABS Rules for Building and Classing Steel Vessels (Part 5A, 5B, 5C)* contains structural requirements for specific vessel types (tankers, bulk carriers, container carriers, liquefied gas carriers, passenger carriers, chemical carriers, and vessels intended to carry vehicles) that are normally classed in accordance with *ABS Rules for Building and Classing Steel Vessels*. The inclusion of this existing Part 5 in the *ABS Guide for Building and Classing International Naval Ships* is mainly for its potential application to certain naval ships (e.g., Oilers) and will require special consideration when applying its requirements since they were intended for application to commercial vessels and are therefore based heavily upon SOLAS and other IMO Convention standards; no modifications have been made to it at this time to tailor its applicability to military vessels or other Government-owned vessels in non-commercial service.
 - f) *Part 6:* The *ABS Guide for Building and Classing International Naval Ships (Part 6)* provides requirements regarding those optional notations offered by ABS that are most frequently requested and/or considered to be most applicable or unique to military vessels and other Government owned vessels in non-commercial service. A complete listing of available optional notations is on the ABS website (www.eagle.org). The requirements in Part 6 apply in addition to the basic requirements for Classification, but only apply for those optional notations that are requested.
 - g) *Part 7:* The purpose of the generic title *ABS Rules for Survey After Construction (Part 7)* is to reflect the common applicability of survey requirements to all ABS-classed vessels, other marine structures and their associated machinery.
2. The numbering system applied in the Guide is shown in Table 2.
3. The effective date of each technical change is shown in parentheses at the end of the subsection/paragraph titles within the text of each Part. Unless a particular date and month are shown, the years in parentheses refer to 1 January of the year shown.

This Guide becomes effective on 1 January 2018.

4. Until the next edition of the *Guide for Building and Classing International Naval Ships* is published, Rule Change Notices and/or Corrigenda, as necessary, will be published on the ABS website – www.eagle.org – only, and will be available free for downloading. It is not intended to publish hard copies of future Rule Change Notices and/or Corrigenda to existing Rules or Guides. The consolidated edition of the *Guide for Building and Classing International Naval Ships*, which includes Rule Change Notices and/or Corrigenda using different colors for easy recognition, will be published on the ABS website only when Rule Change Notices and/or Corrigenda are issued.
5. The listing of CLASSIFICATION SYMBOLS AND NOTATIONS is available from the ABS website <http://www.eagle.org> for download.
6. In association with the harmonization of the Common Structural Rules (CSR) for Bulk Carriers and Oil Tankers, on 1 July 2015, the three Sub-parts, 5A, 5B, and 5C, of Part 5 of the *Rules for Building and Classing Steel Vessels* are as follows:

Contents

Part 5A: General Hull Requirements (IACS CSR Part 1)

Part 5B: Ship Types (IACS CSR Part 2)

Part 5C: This Part is divided into two separate booklets as follows:

Chapters 1 to 6:	Tankers and Bulk Carriers not covered by Part 5A and Part 5B and Container Carriers
Chapters 7 to 13:	Passenger Vessels, Liquefied Gas Carriers, Chemical Carriers, Vessels Intended to Carry Vehicles, Water Carriers, Membrane Tank LNG Carriers, and Vessels Using Gases or other Low-Flashpoint Fuels.

Application – Oil Tankers

The structural requirements in Part 5A, Pt 1 and Part 5B, Pt 2, Ch 2 of the Rules are applicable for double hull oil tankers of 150 m in length and upward, with structural arrangements as specified in Part 5A, Pt 1, Ch 1, Sec 1, [1.3].

For oil tankers with structural arrangements not covered by Part 5A, Pt 1 and Part 5B, Pt 2, Ch 2, the requirements in Part 5C, Chapters 1 or 2, are to be complied with.

Application – Bulk Carriers

The structural requirements in Part 5A, Pt 1 and Part 5B, Pt 2, Ch 1 of the Rules are applicable for single side skin and double side skin bulk carriers of 90m in length and upward, with structural arrangements as specified in Part 5A, Pt 1, Ch 1, Sec 1, [1.2].

For vessels intended to carry ore or bulk cargoes, other than the single side skin or double side skin bulk carriers of 90 m in length and upward with structural arrangements as specified in Part 5A, Pt 1 and Part 5B, Pt 2, Ch 1, the requirements in Part 5C, Chapters 3 or 4 are to be complied with.

Application – ABS Construction Monitoring Program

These compulsory requirements for **CSR** notation are specified in Part 5C, Appendix 2.

Application – Onboard Systems for Oil Tankers and Bulk Carriers

The onboard systems for all tankers are to comply with the requirements of Part 5C, Chapter 1, Section 7, and for all bulk carriers are to comply with the requirements of Part 5C, Chapter 3, Section 7 of the Rules.

Application – References

Other Parts of the ABS Rules that are referenced within Part 5A, 5B, or 5C are also to be applied.

The following flow chart indicates the application of the Rules and typical Class Notations for tanker and bulk carrier vessels, of which arrangements and scantlings are in full compliance with the Rules:

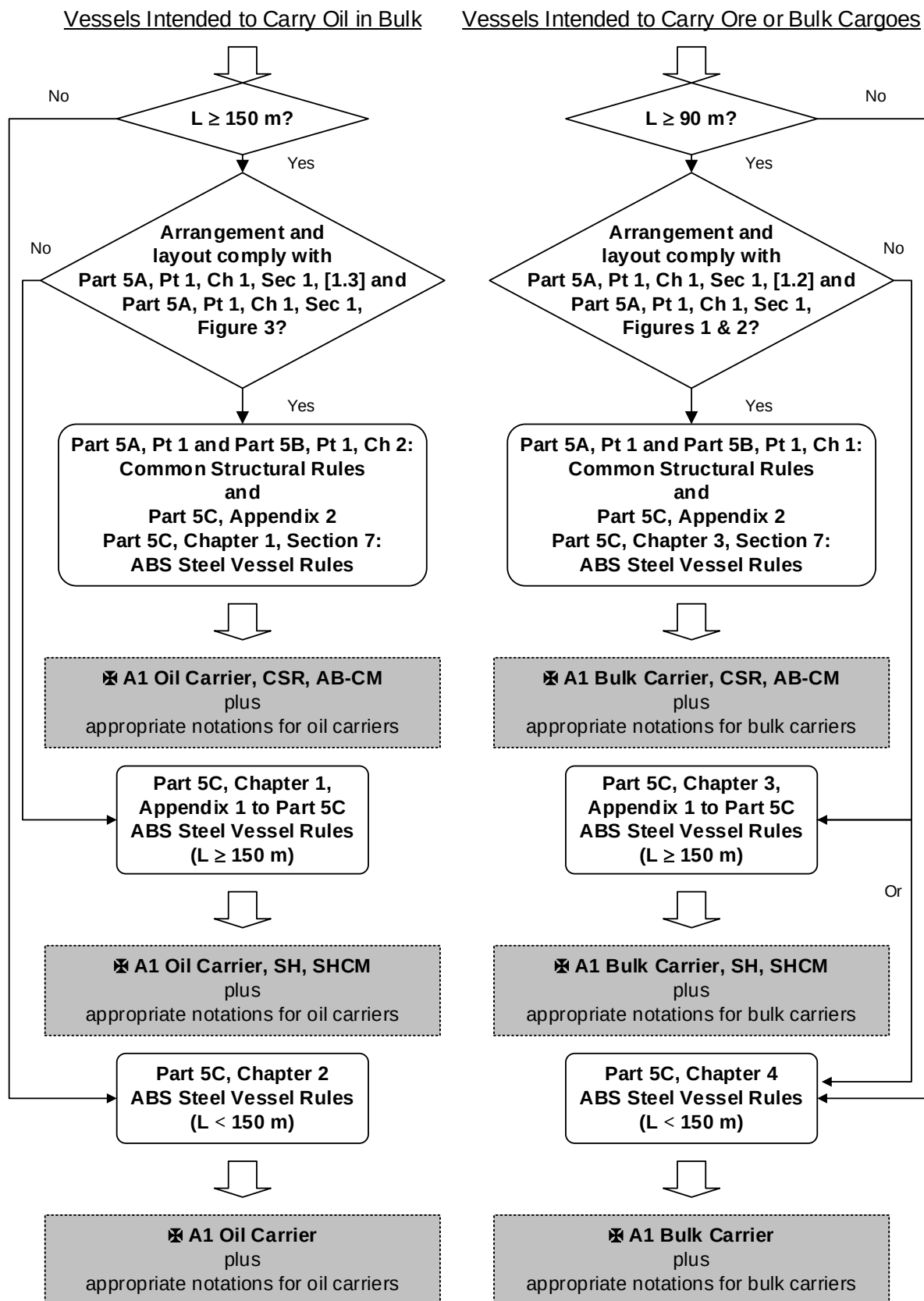


TABLE 1
Applicable Editions of Booklets Comprising the 2018 Guide

Notices and General Information		2018
Part 1:	Rules for Conditions of Classification ⁽¹⁾	2018
Part 1:	Conditions of Classification (Supplement to the ABS <i>Rules for Conditions of Classification</i>) ⁽¹⁾	2018
Part 2:	Rules for Materials and Welding Rules for Testing and Certification of Materials Rules for Welding and Fabrication	2018 ⁽²⁾
Part 2:	Rules for Materials and Welding – Aluminum and Fiber Reinforced Plastics (FRP) Materials for Hull Construction – Aluminum (Chapter 5) Materials for Hull Construction - Fiber Reinforced Plastics (Chapter 6)	2018 ⁽²⁾
Part 3:	Hull Construction and Equipment	2018
Part 4:	Vessel Systems and Machinery	2018
Part 5A: (Booklet 1)	Specific Vessel Types General Hull Requirements (IACS CSR Part 1)	2018 (on and after 1 July 2017)
Part 5B: (Booklet 1)	Specific Vessel Types Ship Types (IACS CSR Part 2)	2018 (on and after 1 July 2017)
Part 5C:	Specific Vessel Types Chapter 1 & 2 Oil Carrier Chapter 3 & 4 Bulk Carrier Chapter 5 & 6 Container Carrier	2018 ⁽²⁾
Part 5C:	Specific Vessel Types Chapter 7 Passenger Carrier Chapter 8 Liquefied Gas Carrier Chapter 9 Chemical Carrier Chapter 10 Vehicle Carrier	2018 ⁽²⁾
Part 6:	Optional Notations Chapter 1 Strengthening for Navigation in Ice Chapter 2 Bridge Design Notations (NBL, NBLES, NIBS)	2018
Part 7:	Rules for Survey After Construction	2018 ⁽²⁾

Notes:

- 1 The requirements for conditions of classification are contained in the separate, generic ABS *Rules for Conditions of Classification (Part 1)*. Additional specific requirements are contained in Part 1 of this Guide.
- 2 The latest edition of these Rules is to be referred to. These Rules may be downloaded from the ABS website at www.eagle.org, Rules and Guides, Downloads or may be ordered separately from the ABS Publications online catalog at www.eagle.org, Rules and Guides, Catalog.

TABLE 2
Division and Numbering of Rules and Guides

<i>Division</i>	<i>Number</i>
Part	Part 1
Chapter	Part 1, Chapter 1
Section	Section 1-1-1
Subsection (see Note 1)	1-1-1/1
Paragraph (see Note 1)	1-1-1/1.1
Subparagraph	1-1-1/1.1.1
Item	1-1-1/1.1.1(a)
Subitem	1-1-1/1.1.1(a)i
Appendix	Appendix 1-1-A1 or Appendix 1-A1-1

Note:

1

An odd number (1, 3, 5, etc.) numbering system is used for the Rules. The purpose is to permit future insertions of even-numbered paragraphs (2, 4, 6, etc.) of text and to avoid the necessity of having to renumber the existing text and associated cross-references, as applicable, within the Rules and associated process instructions, check sheets, etc.

Change Notice (2018)

TABLE 3
Summary of Changes from the 2017 Guide

EFFECTIVE DATE 1 July 2017 – shown as (1 July 2017)
(based on the contract date for new construction between builder and Owner)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
PART 3	Hull Construction and Equipment	
3-2-14/17.1	Strength	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 5 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 6 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 7 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/17.1.2	In way of Cutouts	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
PART 4	Vessel Systems and Machinery	
4-2-1/13.9.2iv)	<No Title>	To include the alternative of normal continuous cruise power, in line with IACS UR M51 Rev.4, Feb. 2015. (Incorporates Notice No. 1)
4-2-1/Table 1	Required Material and Nondestructive Tests of Diesel Engine Parts	To clarify the scope of hydraulic testing for high pressure fuel injection pipes including common fuel rail and high pressure common servo oil systems, in line with IACS UR M72 rev. 1 Mar. 2016. (Incorporates Notice No. 1)
4-2-1/Table 2	Test Pressures for Parts of Internal-combustion Engines	To clarify the scope of hydraulic testing for high pressure fuel injection pipes including common fuel rail and high pressure common servo oil systems, in line with IACS UR M72 rev. 1 Mar. 2016. (Incorporates Notice No. 1)
4-2-2/1.1	Application	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/1.3.1	Turbocharger	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
4-2-2/1.3.3 (New)	Generic Range	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/1.5.1ii)	<No Title>	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/3.3	Category A and B Turbochargers	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/3.5	Category C Turbochargers	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/3.7.3	Certification Under Quality Assurance Assessment PQA (IACS UR Z26 Alternative Certification Scheme)	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/5.1	General	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/5.3	Containment	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/5.7	Type Testing (applicable to category B and C turbochargers)	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/7	Piping Systems for Turbochargers	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/8 (New)	Alarms and Monitoring	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/11.1	Shop Inspection and Tests	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/11.1.1	Material Tests	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/11.1.5	Shop Trial	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-2-2/11.3	Certification of Turbochargers	To clarify the categorization of turbochargers and the application of Type Approval. (Incorporates Notice No. 1)
4-3-4/13.1.9 (New)	System Response Under Failure	To detect failure in the steering gear control system and provide the operator with sufficient information to decide what action is required for the different failure scenarios, in line with IACS UR E25 June 2016. (Incorporates Notice No. 1)
4-3-4/Table 1	Steering Gear Instrumentation	To detect failure in the steering gear control system and provide the operator with sufficient information to decide what action is required for the different failure scenarios and to require a deviation alarm in addition to basic failure detection, in line with IACS UR E25 June 2016. (Incorporates Notice No. 1)
4-3-5/1.1	Application	To clarify the various terms used for steering systems and their associated equipment, in line with IACS UI SC242 Rev.1, Apr. 2016. (Incorporates Notice No. 1)
4-3-5/1.5.6 (New)	Steering System	To clarify the various terms used for steering systems and their associated equipment, in line with IACS UI SC242 Rev.1, Apr. 2016. (Incorporates Notice No. 1)
4-3-5/5.12.2(b)iii)	<No Title>	To clarify that the capacity requirements apply regardless whether the steering systems are arranged with common or dedicated power units that the requirements of 4-3-4/11.1 apply to each steering system in ships fitted with multiple steering systems, in line with IACS UI SC242 Rev.1, Apr. 2016. (Incorporates Notice No. 1)
4-3-5/5.12.4 (New)	Electric and Electrohydraulic Steering Systems	To clarify that the capacity requirements apply regardless whether the steering systems are arranged with common or dedicated power units that the requirements of 4-3-4/11.1 apply to each steering system in ships fitted with multiple steering systems, in line with IACS UI SC242 Rev.1, Apr. 2016. (Incorporates Notice No. 1)

Notices and General Information

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
4-3-5/7.5 (New)	Failure Detection and Response	To detect failure in the steering gear control system and provide the operator with sufficient information to decide what action is required for the different failure scenarios, in line with IACS UR E25 June 2016. (Incorporates Notice No. 1)
4-3-7/15.11	Instrumentation	To detect failure in the steering gear control system and provide the operator with sufficient information to decide what action is required for the different failure scenarios, in line with IACS UR E25 June 2016. (Incorporates Notice No. 1)
4-6-2/5.7.3(c)	Fire Resistance	To clarify the cases in which flexible hoses need not be of fire-resistant type. (Incorporates Notice No. 1)
4-6-2/5.9.1(c) (Deleted)	Operational Conditions	To minimize the use of slip-on joints for pipe connection except for cases where compensation of axial pipe deformation is necessary and to clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(e)	Fire Testing	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(f)	Locations	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(h) (Deleted)	Application	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(g)	Joints	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(i)	Slip-on Joints	To minimize the use of slip-on joints for pipe connection except for cases where compensation of axial pipe deformation is necessary and to clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.1(j)	Application	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)ii)	Selection of Test Specimen	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v) 1(a)	<No Title>	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v)2	Vibration (Fatigue) Test	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v)4	Burst Pressure Test	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v)5	Pull-out Test	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v)6	Fire Endurance Test	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/5.9.2(e)v)7	Vacuum Test	To clarify the requirements, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/Table 9	Examples of Mechanical Joints	To update the figures for “Machine Grooved Type” and “Slip Type” slip-on joints, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-6-2/Table 10	Application of Mechanical Joints	To clarify the restrictions for on slip-on joints and flexible hoses used for L.O. lines and other flammable oils, and installed on open decks, in line with IACS UR P2 Rev.2, Mar. 2016. (Incorporates Notice No. 1)
4-8-2/7.25	Harmonics	To specify that the harmonic distortion calculation report is to be kept on board for exceptions to the 8% limit in cases where all installed equipment and systems have been designed for higher THD levels, in line with IACS UR E24 June 2016. (Incorporates Notice No. 1)
4-8-2/9.24 (New)	Harmonic Distortion for Ship Electrical Distribution System including Harmonic Filters	To introduce requirements for survey of harmonic filters and harmonic distortion levels, in line with IACS UR E24 June 2016. (Incorporates Notice No. 1)

Notices and General Information

Part/Para. No.	Title/Subject	Status/Remarks
4-8-2/9.25	Protection of Harmonic Filter Circuits Associated with Electric Propulsion	To introduce requirements for survey of harmonic filters and harmonic distortion levels, in line with IACS UR E24 June 2016. (Incorporates Notice No. 1)
4-8-3/9.1	Standard of Compliance	To identify the standards that have been withdrawn or replaced by new ones and to consider approaches for cables not manufactured to IEC standards identified, in line with IACS UR E7 Rev.4 Apr. 2016. (Incorporates Notice No. 1)
4-9-6/Table 1	Instrumentation and Safety System Functions in Centralized Control Station – Medium and High Speed (Trunk Piston) Diesel Engines	To require turbocharger speed alarm for Categories B and C turbochargers, in line with IACS UR M35 rev. 7 Mar. 2016. (Incorporates Notice No. 1)
4-9-6/Table 3B	Instrumentation and Safety System Functions in Centralized Control Station – Generator Prime Mover for Electric Propulsion	To require turbocharger speed alarm for Categories B and C turbochargers, in line with IACS UR M35 rev. 7 Mar. 2016. (Incorporates Notice No. 1)
4-9-6/Table 4	Instrumentation and Safety System Functions in Centralized Control Station – Auxiliary Turbines and Diesel Engines	To require turbocharger speed alarm for Categories B and C turbochargers, in line with IACS UR M35 rev. 7 Mar. 2016. (Incorporates Notice No. 1)

EFFECTIVE DATE 1 January 2018 – shown as (2018)
(based on the contract date for new construction between builder and Owner)

Part/Para. No.	Title/Subject	Status/Remarks
PART 3	Hull Construction and Equipment	
3-1-1/3.1.1	Scantling Length (L)	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.1.2	Freeboard Length (L_f)	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.15.1	Freeboard Deck	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.17.2	Lightship Weight	To incorporate interpretation made in IACS UI SC273 and MPC128.
3-1-2/Table 2	Material Class or Grade of Structural Members	To identify the minimum steel grades for deck plating other than strength deck (Line No. C4) at corners of cargo hatch openings adjacent to the engine room and/or deck house.
3-2-11/13.3.7 (New)	Bolted Connections	To specify requirements for bolted connections on helidecks.
3-2-11/13.5	Material	To clarify the requirements for aluminum helideck escape stairs and intermediate platforms.
3-2-11/13.9.2	Means of Escape and Access	To clarify the requirements for aluminum helideck escape stairs and intermediate platforms.
3-2-13/1.1	Plate Stems	To consider the material factor in the net thickness of the plate stem, in line with CSR-H.
3-2-14/7.3	Lower Rudder Stocks	To make the stress units consistent with the allowable stress.
3-2-14/Figure 4	Tapered Couplings	To be consistent with the requirements of 3-2-14/11.7.
3-2-14/17.5	Diaphragm Plates	To allow larger openings on diaphragm plates when the effects of openings are considered in the strength assessment.
3-2-15/3.3.1	Cargo Hatch Covers in Position 1	To align the requirements with IACS UR S21, S21A, and 3-2-15/3.3.1 of the <i>Steel Vessel Rules</i> for less than 100 m.
3-3-A2 (Title)	Computer Software for Onboard Stability Calculations	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/5	Types of Stability Software	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.1	Calculation Program	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.5	Warning	To align the Rules with IACS UR L5, Revision 3.

Notices and General Information

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
3-3-A2/7.15 (New)	Computer Model	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.17 (New)	Further Requirements for Type 4 Stability Software	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/Table 1	Acceptable Tolerances	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/11.1	Conditions of Approval of the Onboard Software for Stability Calculations	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/11.5	Specific Approval	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/15	Installation Testing	To align the Rules with IACS UR L5, Revision 3.
3-4-A1/1.1	<No Title>	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/5	Fire Test Requirements	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/7	Structural Fire Integrity Test Procedures	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/Table 1	Structural Fire Integrity Matrix	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-6-1/Figure 3	<No Title>	To align with the wording “Conning Position” as indicated in 3-6-1/1.1.1(c).
3-6-1/Figure 5	<No Title>	To shift the location of the main steering position.
3-7-1	Tank, Bulkhead and Rudder Tightness Testing	To reflect the comments from Administrations, Industry Organizations and IMO considered during review of the proposed Testing Guidelines associated with SOLAS Chapter II-1, Regulation 11, reflected in IACS UR S14 (Rev.6, Sept 2016).

PART 4 Vessel Systems and Machinery

4-3-1/5.13	Alternative Gear Rating Standards	To refer to the latest edition of the standards.
4-3-2/7.3.2(a)v	Geared Systems	To clarify how the misalignment is to be verified and to require that verification and adjustment procedure be reviewed if the calculated misalignment is not submitted.
4-3-2/7.3.2(b)	Hull Deflections Accounted for in the Analysis	To clarify that the fully laden draft of a vessel is not with the aft peak tank full.
4-3-2/11.1.2(e)iv	<No Title>	To clarify the draft of a vessel for shaft alignment analysis is accounted for in the hull deflection.
4-3-2/11.1.2(f) (New)	Geared Systems	To clarify how the misalignment is to be verified and to require that verification and adjustment procedure be reviewed if the calculated misalignment is not submitted.
4-3-4/1.11	Plans and Particulars to be Submitted	To clarify the requirements for automatic isolating systems.
4-3-4/25.1.2ii)	<No Title>	To clarify the requirements for automatic isolating systems.
4-4-1/1.1	Application	To clarify the requirements for accumulators of extruded seamless construction.
4-4-1/17.3.2	Diameter Over 457 mm (18 in.)	To clarify that the diameter is the inside diameter.
4-4-1/17.3.3	Diameter Over 305 mm (12 in.)	To clarify that the diameter is the inside diameter.
4-4-1/17.3.4	Diameter 305 mm (12 in.) or Less	To clarify that the diameter is the inside diameter.
4-6-4/5.7.4(c)	Sludge Piping	To align the requirement with Regulation 12 of MARPOL Annex 1, as amended by Resolution MEPC. 266(68).
4-6-4/9.5.5	Fuel Oil Tank Overflows	To align the requirements with ABS practice.
4-6-4/17.5	Class Notation – POT	To clarify that the protection requirements for lubrication oil tanks as required in 4-6-4/17.5 is not applicable to lubrication oil tanks with a capacity not greater than 30 m ³ .

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
4-6-5/15 (New)	Storage and Use of SCR Reductants	To provide requirements for Selective Catalytic Reduction (SCR) systems, in line with IACS UR M77 Sept. 2016.
4-6-7/3.5.4	Hydraulic Accumulators	To clarify the requirements for accumulators of extruded seamless construction.
4-6-7/7.3.2	Ventilation of Storage Room	To clarify that the requirements are applied to acetylene gas (as flammable gas) only.
4-6-7/7.3.3	Electrical Installation in Storage Room	To clarify that the requirements are applied to acetylene gas (as flammable gas) only.
4-6-7/7.5.4	Gas Cylinders	To clarify that the requirements are applied to acetylene gas (as flammable gas) only.
4-7-2/1.9.4(a)	Escapes	To clarify the requirements for internal dimensions and ladders, in line with IMO MSC.Circ1511 and IACS UI SC277.
4-7-2/1.13.1iii) (New)	Emergency Generator Spaces	To align the requirements with ABS practice.
4-7-3/3.1.2	Distribution Piping and Nozzles	To clarify the requirements for the pressure rating of the distribution pipe.
4-7-3/3.1.5	Medium Release Warning Alarm	To align the requirements with IACS UI SC132 (Rev.4).
4-7-3/3.1.9iii) (New)	<No Title>	To provide a cross reference to the additional clarification in 4-7-3/13.7.1(b).
4-7-3/11.3.1(f)i)	<No Title>	To clarify the acceptability for individually identifiable fire detectors without individual short circuit isolator, in line with 2.1.6.1 of FSS Code in IMO Resolution MSC.311(88)
4-7-3/13.7.1(b)	Location	To align the requirements for the location of the control panel with Chapter 10, paragraph 2.4.1.2 of the FSS Code (as amended by resolution MSC.292(87) as interpreted by IMO MSC.1/Circ. 1487 and IACS UI SC 260 (Rev. 1).
4-8-2/5.3.1	General	To explicitly prohibit the installation of other unrelated equipment in the emergency generator room.
4-8-2/7.11.1(d)	Current Carrying Capacity Correction	To clarify the application of the reduction factor of 0.85 where more than six cables are expected to operate simultaneously and are laid close together in a bunch in such a way that are an absence of free air circulation around them.
4-8-2/7.17.1	Main Lighting System	To align the requirement with other ABS Rules.
4-8-3/5.5.2(e)	Clearance and Creepage	To align the requirement with IEC 60092-302 and IEC 61892-3.
4-8-3/Table 2	Minimum Degree of Protection	To permit plugs and socket outlets installed in hazardous areas, in line with IEC 61892-7 Para. 8.11.1 and IEC 60079-14 Para. 5.13.
4-8-3/Table 5	Equipment and Instrumentation for Switchboards	To provide a reference to the requirements for high voltage systems.
4-8-3/Table 6	Maximum Current Carrying Capacity for Cables	To clarify the application of the reduction factor of 0.85 where more than six cables are expected to operate simultaneously and are laid close together in a bunch in such a way that are an absence of free air circulation around them.
4-8-4/21.3	Cable Current Carrying Capacity	To clarify the application of the reduction factor of 0.85 where more than six cables are expected to operate simultaneously and are laid close together in a bunch in such a way that are an absence of free air circulation around them.
4-8-4/25.5.5	Oxygen-acetylene Storage Room	To restrict the use of copper in acetylene atmospheres due to the potential formation of acetylides on the surface that can be ignited by friction or impact.
4-8-5/3.3.2	Earth Fault Detection and Indication	To clarify the requirements for audible and visual indication of earth faults for high voltage systems.
4-9-1/5.1.21 (New)	Worst Case Execution Time (WCET)	To define terms used in 4-9-1/7.3.9, in line with ISO 17894:2005 and IEC 61508-3.

Part/Para. No.	Title/Subject	Status/Remarks
4-9-1/5.1.22 (New)	Worst Case Response Time (WCRT)	To define terms used in 4-9-1/7.3.9, in line with ISO 17894:2005 and IEC 61508-3.
4-9-1/7.3.8	Programmable Electronic System (PES)	To mitigate the danger of critical alarms missing their deadlines.
4-9-2/7.3	Audible Alarms	To require a visual alarm for cases where the audible alarm may not be heard due to high noise levels in the machinery space.
4-9-5/15.3.1	Bilge Level	To clarify the number of bilge level switches/sensors required for vessels with ACC or ACCU notation, in line with IAC UR M27.
4-9-6/19.3vi)	<No Title>	To align the requirements for a high-expansion foam fire extinguishing system with IACS UI SC262.
4-9-6/19.3vii)	<No Title>	To require that weathertight doors fitted in the engine casing bulkhead also be a type of self-closing door or could be closed from fire control station, to prevent the release of CO ₂ from the unintentional remaining opened doors when fixed CO ₂ system in engine room is active, and to align the requirements for a high-expansion foam fire extinguishing system with IACS UI SC262.

Definition of Terms Used Throughout the Guide

Naval Vessel: This term is used to broadly refer to Government owned vessels in non-commercial service; primarily vessels whose purpose is for safety, security and/or defense. As such, it applies to vessels of the Navy, the Coast Guard, or other Government agency of a country; the main differences from commercial vessels being: (1) such vessels are not required by law to comply with national or international codes or standards with which commercial vessels must comply, and (2) in many cases such vessels are equipped and outfitted for combat or related military missions which requires vessel systems, functions, and capabilities to address operational scenarios not encountered by commercial vessels.

The criteria in this Guide was developed around the following features/characteristics/assumptions with regard to the vessels to which this Guide applies: surface vessels, non-nuclear, welded steel construction, welded aluminum construction, areas of composite structure (other than primary structure), mono-hull, displacement type (however, the Guide does address dynamically supported vessels), no restrictions on length, IMO/SOLAS not mandatory (if invoked in whole or in part it is invoked by choice/policy of the Naval Administration), unrestricted service (but criteria is included to allow for lesser service routes), fitted with systems that support aircraft operations, combat operations, or other military-unique missions.

Naval Administration: The department, directorate, bureau or command to whom the National Government has delegated authority over the acquisition, acceptance, maintenance and technical requirements of naval vessels, and who acts on the Government's behalf in all matters relating to the procurement and support of the vessels. In the case where these authorities are invested in separate departments within the naval organization, the term "Naval Administration" means the ensemble of departments having those authorities, or the command that overarches these departments.

Special Consideration: Where the term "special consideration" is used in this Guide, it is intended to indicate that ABS will consider a particular specified arrangement, detail, or proposed alternative or equivalency, or that application of the criteria in the Guide may require modification from what is prescribed in order to satisfy the intent of the requirements. Arrangements, details and proposed alternatives or equivalency determinations that require special consideration for ABS classification will be reviewed in conjunction with submitted calculations and other supporting documentation in accordance with sound engineering practice.

Recognized Standard: A document developed and maintained by an organization whose functions include the development and maintenance of specifications and standards, and designated as applicable for use in marine applications or made suitable by the addition of supplemental criteria. Acceptance of a recognized standard and any required supplemental criteria are subject to review and approval by ABS.

HM&E System: Hull, mechanical and electrical (HM&E) systems are those systems relating to the safety of vessel and crew in the basic operation and navigation of the vessel (i.e., aspects of the platform other than mission systems and mission-related or military-unique aspects that are the domain of other designated authorities).

Mission System: The systems, subsystems and individual equipment directly dedicated to carrying out the mission of the ship as opposed to those systems needed for crew and vessel safety regarding basic operation and navigation of the vessel. Mission systems include combat systems (weapons and sensors), C4ISR systems (including information security), and those systems and features related to military-unique aspects that are required for operation in a military environment (aspects such as signatures, shock, survivability, weapons effects, etc.).



GUIDE FOR BUILDING AND CLASSING

INTERNATIONAL NAVAL SHIPS 2018

PART 1 CONDITIONS OF CLASSIFICATION (Supplement to the ABS Rules for Conditions of Classification)

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

**© 2017 American Bureau of Shipping. All rights reserved.
ABS Plaza
16855 Northchase Drive
Houston, TX 77060 USA**

PART

1

Foreword

For the 2008 edition, Part 1, “Conditions of Classification” was consolidated into a generic booklet, entitled *Rules for Conditions of Classification (Part 1)* for all vessels other than those in offshore service. The purpose of this consolidation was to emphasize the common applicability of the classification requirements in “Part 1” to ABS-classed vessels, other marine structures and their associated machinery, and thereby make “Conditions of Classification” more readily a common Rule of the various ABS Rules and Guides, as appropriate.

Thus, this supplement specifies only the unique requirements applicable to military vessels and other Government-owned vessels in non-commercial service. This supplement is always to be used with the aforementioned *Rules for Conditions of Classification (Part 1)*.

It contains the terms and conditions for achieving ABS Classification, retaining a vessel in class, and situations that could result in suspension or cancellation of class. It also addresses class notations assigned to vessels; optional notations available; acceptance of alternatives; and application of the Guide.

Commercial vessels are required to comply with many national and international laws, codes, and standards. Most Government-owned vessels are exempt from such requirements; however, some choose to comply voluntarily. For various reasons, there has been a growing trend for Governments to selectively invoke commercial codes and standards, and in many cases to invoke classification.

All the various sets of ABS Rules contain provisions for accepting alternative arrangements, details and standards, and allow for special considerations in applying the Rules to Government vessels, and especially to military vessels. However, since they were written to apply to commercial vessels they include requirements and language that can at times make them difficult or time consuming to navigate when applying them to non-commercial vessels, and especially to military combatant vessels. This Guide was developed to address this by providing the same technical baseline of standards, but tailored where appropriate and written in a manner that better suits its direct application for the classification of military vessels and other Government-owned vessels in non-commercial service.

PART

1

Conditions of Classification

CONTENTS

CHAPTER 1	Scope and Conditions of Classification	1
Section 1	Classification	3
Section 4	Suspension and Cancellation of Classification	5
Section 3	Classification Symbols and Notations	6
Section 4	Rules for Classification	9
Section 5	Other Regulations	10
Section 6	Naval Administration Requirements	11
Section 7	Submission of Plans	13

[See also separately published booklet *ABS Rules for Conditions of Classification (Part 1)*]

This Page Intentionally Left Blank

PART

1

CHAPTER 1 Scope and Conditions of Classification

CONTENTS

SECTION 1	Classification.....	3
1	Process	3
3	Certificates and Reports	3
3.1	Communication with the Naval Administration	3
3.3	Communication with Other Certification Authorities	4
SECTION 2	Suspension and Cancellation of Classification.....	5
1	Notice of Surveys.....	5
3	Suspension of Class	5
3.1	General.....	5
3.3	Transit for Demolition or Repair.....	5
3.5	Unforeseen Delays	5
5	Cancellation of Class	5
5.1	Aging Survey Completions	5
7	Alternative Procedures for Certain Types of Vessels	5
SECTION 3	Classification Symbols and Notations	6
1	General	6
3	Structural Notation	6
5	Equipment Notation	6
7	Machinery Notation	6
9	Vessel Types	6
9.1	Naval Combatant.....	7
9.3	Naval Force Projection	7
9.5	Naval Support.....	7
9.7	Coast Guard	7
9.9	Naval Craft	7
9.11	Government Special Purpose.....	7
11	Service Route	7
13	Optional Notations	8
13.1	Dynamic Loading Approach (SH-DLA)	8
13.3	Spectral Fatigue Analysis (SFA).....	8
SECTION 4	Rules for Classification	9
1	Selection of Rules and Guides	9
3	Novel Features.....	9
5	International Standards.....	9
7	Naval Administration Standards	9

SECTION 5	Other Regulations	10
1	International Conventions or Codes	10
SECTION 6	Naval Administration Requirements.....	11
1	Ship Specifications.....	11
3	Equipment Specifications.....	11
5	Design Considerations.....	12
SECTION 7	Submission of Plans	13
1	Units	13
3	Hull Plans	13
5	Machinery Plans	13
7	Integrated Test Plan.....	14

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 1 Classification

The requirements for conditions of classification are contained in the separate, generic *ABS Rules for Conditions of Classification (Part 1)*.

Additional requirements specific to military vessels and other Government-owned vessels in non-commercial service are contained in the following Sections of this Part.

1 Process

The Rules, Guides, and standards are, in general, developed by the International Association of Classification Societies and by ABS staff, and passed upon by committees made up of naval architects, marine engineers, shipbuilders, engine builders, steel makers and by other technical, operating, and scientific personnel associated with the worldwide maritime and naval vessel design and construction industry. Theoretical research and development, established engineering disciplines, as well as satisfactory service experience are utilized in their development and promulgation. ABS and its committees can act only upon such theoretical and practical considerations in developing Rules, Guides, and standards.

Surveyors apply normally accepted examination and testing standards to those items specified for each survey by the Rules and Guides. Construction procedures, safety procedures, design and construction schedules, and construction supervision and quality assurance remain the responsibility of the shipyard, ship repairer, manufacturer, Owner or other client.

For classification, vessels are to comply with both the hull and the machinery requirements of the Rules and Guides, including satisfactory completion of all survey requirements and compliance with all Surveyor observations and recommendations.

3 Certificates and Reports

3.1 Communication with the Naval Administration

Due to the number and complexity of systems, the number of separate certifications by other authorities, the overlap and/or interface of Classification requirements with other certification requirements, and other factors unique to naval vessel acquisitions, the sharing of Classification and certification status and information with the Naval Administration is necessary.

To this end, ABS will freely communicate and share classification related information with the Naval Administration to assist in rectification of deficiencies during vessel design, construction, and through-life surveys. Such information may include the text of conditions of classification, survey due dates, certificate expiration dates, stamped copy of reviewed drawings, engineering review letters and comments, and copies of Surveyor comments, recommendations, observations and reports regarding the vessel and its systems and equipment.

3.3 Communication with Other Certification Authorities

For naval vessels, there are many certifications needed from various Certification Authorities. Such certifications are not addressed by Classification requirements; they are accomplished for verifying technical compliance or functional performance of systems or equipment unique to military missions or capabilities unique to the vessel type. However, the certifications often relate to the same functional and physical systems covered by Classification and thus there are areas of overlap and/or interface between the requirements for certain certifications and the requirements for Classification. This creates a need for open communication and coordination with other certification authorities throughout the Classification process.

To this end, ABS will freely communicate and share classification related information with Certification Authorities to assist in rectification of deficiencies during vessel design, construction, and through-life surveys. Such information may include the text of conditions of classification, survey due dates, certificate expiration dates, stamped copy of reviewed drawings, engineering review letters and comments, and copies of Surveyor comments, recommendations, observations and reports regarding the vessel and its systems and equipment.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 2 Suspension and Cancellation of Classification

1 Notice of Surveys

It is the responsibility of the party requesting classification to ensure that all surveys necessary for achieving class are carried out during construction, and it is the responsibility of the Naval Administration that all surveys necessary for the maintenance of class for vessels in service are carried out at the proper time. ABS will notify the Naval Administration of upcoming surveys and outstanding recommendations. This may be done by means of a letter or other communication. The non-receipt of such notice, however, does not absolve the Naval Administration from the responsibility to comply with survey requirements for maintenance of class.

3 Suspension of Class

3.1 General

Subsection 1-1-2/7 of the *ABS Rules for Conditions of Classification (Part 1)* defines the normal circumstances under which Class will be suspended and the Certificate of Classification will become invalid. Where ABS has been notified of a condition of national emergency declared by the Naval Administration that precludes normal Class activity, ABS will not automatically suspend Class. In such cases, a notation of "On National Emergency Service" will be entered in the Class record pending conclusion of the emergency and completion of all necessary surveys and repairs.

3.3 Transit for Demolition or Repair

The requirements of 1-1-2/7.11 of the *ABS Rules for Conditions of Classification (Part 1)* would apply for vessels needing to transit from a lay-up site to a repair facility, provided class was not already suspended prior to lay-up.

3.5 Unforeseen Delays

If due to circumstances reasonably beyond the Owner's or ABS's control, such as unscheduled extension of time at sea to complete current mission; the suspension of class may be held in abeyance to allow the vessel to sail, in class, to an agreed port at which the overdue surveys will be completed, provided that the requirements of 1-1-2/7.13 of the *ABS Rules for Conditions of Classification (Part 1)* are complied with.

5 Cancellation of Class

5.1 Aging Survey Completions

A longer suspension period than required by 1-1-2/11.5 of the *ABS Rules for Conditions of Classification (Part 1)* may be granted for vessels which are on National Emergency Service.

7 Alternative Procedures for Certain Types of Vessels

1-1-2/13 of the *ABS Rules for Conditions of Classification (Part 1)* does not apply to military vessels and other Government-owned vessels in non-commercial service.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 3 Classification Symbols and Notations

1 General

This Section provides the fundamental ABS classification symbols and notations for naval vessels, along with certain optional notations that are recommended for naval vessels that should be considered and decided upon early in the acquisition process.

A complete listing of all Classification Symbols and Notations available may be viewed and downloaded from the ABS website “<http://www.eagle.org>”. Optional notations are described further in Part 6.

ABS Classification symbols and notations identify whether the vessel structure was or was not built under ABS Surveyor attendance, identify whether the anchoring/mooring equipment was built in compliance with the Rules or Guides, identify whether the vessel machinery was or was not built under ABS Surveyor attendance, identify the vessel type, identify applicable service route restrictions (if any), identify special analyses that have been requested and performed, and identify optional notations that have been requested which reflect special systems, features, or capabilities of the vessel.

3 Structural Notation

See 1-1-3/1 and 1-1-3/9 of the *ABS Rules for Conditions of Classification (Part 1)*.

5 Equipment Notation

See 1-1-3/11 of the *ABS Rules for Conditions of Classification (Part 1)*.

7 Machinery Notation

See 1-1-3/13 and 1-1-3/15 of the *ABS Rules for Conditions of Classification (Part 1)*.

9 Vessel Types

This Guide is intended to apply to Government owned vessels in non-commercial service whose primary purpose is for safety, security or defense. This would include combatant vessels (vessels equipped and outfitted for combat missions) and non-combatant vessels (auxiliary vessels serving combat support roles, or other vessels which may have limited or no weaponry whose purpose is mainly safety and security such as for harbor patrol, border patrol, or ports and waterways security).

Vessel types would include (but is not limited to): Cruisers, Destroyers, Frigates, Corvettes, Patrol Boats, Amphibious vessels, Amphibious Support vessels, Auxiliary ships, Ice Breakers, Buoy Tenders, Offshore Patrol vessels, Mine Hunters, Mine Sweepers, Mine Layers, Salvage and Diving vessels, Command and Control vessels, and various naval craft of special design or purpose.

The vessel type appearing in the classification notation may be requested by the Naval Administration to include such type-specific identifier as noted above; if it is requested, it would be appended as a further descriptor to one of the following categorical vessel type notations:

9.1 Naval Combatant

The **NAVAL COMBATANT** notation will be assigned to a naval vessel that is intended to operate in higher-threat environments, and whose primary mission involves the use of own-vessel weapons (e.g., guns, missiles) within a theater of operations. Typical vessels covered under this type are cruisers, destroyers, frigates, and corvettes.

9.3 Naval Force Projection

The **NAVAL FORCE PROJECTION** notation will be assigned to a naval vessel that is intended to operate in higher-threat environments, and whose primary mission generally involves the conveyance of military personnel and/or other craft (e.g., aircraft, helicopters, landing craft) to and within a theater of operations. Typical vessels covered under this type are conventional powered (non-nuclear) aircraft carriers, helicopter carriers, amphibious assault vessels, and amphibious support vessels.

9.5 Naval Support

The **NAVAL SUPPORT** notation will be assigned to a naval vessel that is intended to operate in lower-threat environments, for example in escort duties or in Economic Exclusion Zone (EEZ) protection, or where threat has been reduced through other means. Typical vessels covered under this type are for combat support (fleet replenishment, landing ships), logistic support (supply, replenishment), and mine warfare (mine hunters, mine sweepers).

9.7 Coast Guard

The **COAST GUARD** notation will be assigned to a Coast Guard vessel whose primary mission is maritime safety, mobility, law enforcement, environmental protection and local or national security or defense. Typical vessels covered under this type are cutters, patrol boats, buoy tenders and icebreakers; and such will be appended as a further descriptor of the specific vessel type.

9.9 Naval Craft

The **NAVAL CRAFT** notation will be assigned to a naval vessel that is intended for higher-speed, shorter-range operations, for example in coastal areas. Typical vessels covered under this type are patrol craft and fast attack craft. [ABS should be consulted prior to application or use of this Guide for smaller vessels that operate at high speed; depending upon speed and length, the *ABS Guide for Building and Classing High Speed Naval Craft*, or portions of it, may be preferred or required in lieu of the classification requirements in this Guide.] This notation may also have additional descriptors added such as **COASTAL** or **RIVERINE**.

9.9.1 Coastal Craft

The **COASTAL** notation is to be assigned to a craft that is intended to operate on a coastal voyage with a maximum distance from safe harbor of 300 miles and a maximum voyage of 150 miles from a safe harbor when operating in the Winter Seasonal Zones as indicated in Annex II of the International Conference on Load Lines, 1966. Coastal Craft are not permitted to perform transoceanic movements.

9.9.2 Riverine Craft

The **RIVERINE** notation is to be assigned to a craft that is intended to operate in rivers, harbors, and coast lines with a maximum distance from safe harbor of 50 miles. Riverine Craft are not permitted to perform transoceanic movements.

9.11 Government Special Purpose

The **GOVERNMENT SPECIAL PURPOSE** notation will be assigned to a Government vessel not otherwise addressed above whose primary mission is maritime safety, mobility, law enforcement, environmental protection and local or national security or defense. Typical vessels covered under this type are border patrol boats, local harbor authority patrol boats, etc.; and such will be appended as a further descriptor of the specific vessel type.

11 Service Route

See 1-1-3/7 of the *ABS Rules for Conditions of Classification (Part 1)*.

13 Optional Notations

The optional notations available for naval vessels are identified in Part 6. The notations mentioned below are also optional but are mentioned here for early awareness to end users of this Guide; these notations involve global analyses of the vessel and, if elected, should be planned for and decided upon early in the acquisition process.

13.1 Dynamic Loading Approach (SH-DLA)

Vessels which have been built to plans reviewed in accordance with an acceptable procedure and criteria for calculating and evaluating the behavior of hull structures under dynamic loading conditions, in addition to full compliance with other requirements of the Rules or Guides, will be classed and distinguished in the *Record* by the notation **SH-DLA** placed after the appropriate hull classification notation. The application of the dynamic loading approach is optional. See Section 3-2-20 for details.

13.3 Spectral Fatigue Analysis (SFA)

In addition to full compliance with other requirements of the Rules or Guides, where a spectral fatigue analysis is performed satisfactorily in accordance with an acceptable procedure and criteria, and the vessel is built in accordance with plans approved on the basis of the results of such analysis, the vessel will be distinguished in the *Record* by the notation **SFA (year)**. The notation denotes that the designated fatigue life value is equal to 20 years or greater. The **(year)** will reflect the designated fatigue life, equal to 20 years or more (in 5-year increments) as specified by the applicant. See Section 3-2-20 for details.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 4 Rules for Classification

1 Selection of Rules and Guides

The appropriate edition of ABS Rules and Guides to apply for classification is, in general, based on the contract date for construction between the shipbuilder and the prospective Owner (e.g., Rules and Guides which became effective on 1 July 2014 are not applicable to a vessel for which the contract for construction was signed on 30 June 2014) and is to be specified in the ABS Request For Class Agreement.

References are made throughout the Guide to various documents without year notations. In such cases, the edition of any contained references to other ABS Rules or Guides or to national or international standards is to be taken as the edition that was in effect on the effective date of the ABS Rules or Guide to which the vessel will be classed, unless the client or Naval Administration requests or proposes that a more recent edition of such referenced standards be applied and ABS agrees the more recent edition is acceptable.

3 Novel Features

Guidance for the special consideration of novel features is available in the *ABS Guidance Notes on Risk Assessment Application for the Marine and Offshore Oil and Gas Industries* and the *ABS Guidance Notes on Review and Approval of Novel Concepts*. The same would apply in the case of new technology that the Rules or Guides may not yet address. In all such cases, ABS should be consulted with regard to proper application of the Rules and Guides.

5 International Standards

The Committee will consider special arrangements or details of hull, equipment or machinery which can be shown to comply with recognized international standards provided they are proven to be not less effective than the Rules or Guides.

7 Naval Administration Standards

The Committee will consider special arrangements or details of hull, equipment or machinery which can be shown to comply with standards recognized by the Naval Administration of the country in which the vessel is registered, provided they are proven to be no less effective than the Rules or Guides.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 5 Other Regulations

1 International Conventions or Codes

Upon request of the Naval Administration, ABS will survey a new or existing vessel for compliance with the provisions of the International Conventions and Codes in 1-1-5/3 of the *ABS Rules for Conditions of Classification (Part 1)*, and certify thereto in the manner prescribed in the Convention or Code.

Where applicable, the IACS Unified Interpretations for each International Convention and Code will be applied as recognized interpretations for plan approval and survey, unless the Naval Administration provides interpretations and they are found to be no less effective than those given by IACS.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 6 Naval Administration Requirements

1 Ship Specifications

Ship specifications capture Naval Administration requirements that are contractually passed to designers and builders and may be written in terms of performance level specifications, system level specifications, detail level specifications, or a combination of these. Typically included (if not called out directly in the body of the contract) will be the Naval Administration requirement to the designer or builder to obtain Classification and various certifications required from other Certification Authorities, along with additional technical requirements the Naval Administration may have for specific systems, equipment, or materials. Those developing and approving ship specifications are responsible for avoiding conflict with the requirements in the Rules and Guides. Where uncertainty exists on the potential for conflict, ABS should be consulted to ensure the Rules and Guides are being properly applied and interpreted.

With respect to classification, any additional requirements contained in ship specifications that relate to systems, equipment or materials that are addressed by the Rules and Guides are treated as follows.

- Where such requirements are found by ABS to be less effective than the Rules or Guides, the requirements in the Rules or Guides must be met in order to obtain ABS Classification.
- Where such requirements are considered to be equivalent, they may be accepted as such by ABS as an alternative to the requirements in the Rules or Guides, provided additional data or analysis, if necessary, is submitted for review to document the technical justification for such acceptance.
- Where such requirements do not conflict with and are merely in excess of the requirements in the Rules or Guides, they are considered Owner's requirements and not addressed by the verification activities conducted by ABS for vessel classification, they are subject to such verification as deemed necessary by the Owner. However, ABS can include verification of these additional requirements if specifically requested as Statement of Fact certifications and indicated as such in the ABS Request For Class Agreement, and provided any special criteria that may be needed regarding their verification is provided to ABS.

Specifications are not generally required to be submitted; where required with respect to certain systems and equipment, they are included in the listing of plans and data to be submitted for same.

3 Equipment Specifications

The Request For Class Agreement includes the requirement that ABS be informed of all equipment and materials for the vessel that will be procured from sources outside the builder. Equipment procurement specifications are typically generated based on the ship specifications to provide equipment manufacturers and suppliers the associated technical details and performance requirements, but may also contain further additional requirements to address integration or interface needs not addressed in the ship specifications. Those developing and approving procurement specifications are responsible for avoiding conflict with the requirements in the Rules and Guides. Where uncertainty exists on the potential for conflict, ABS should be consulted to ensure the Rules and Guides are being properly applied and interpreted.

With respect to ABS certification of equipment or materials, any additional requirements contained in procurement specifications that relate to systems, equipment or materials that are addressed by the Rules and Guides are treated as follows.

- Where such requirements are found by ABS to be less effective than the Rules or Guides, the requirements in the Rules or Guides must be met in order to obtain ABS certification
- Where such requirements are considered to be equivalent, they may be accepted as such by ABS as an alternative to the requirements in the Rules or Guides, provided additional data or analysis, if necessary, is submitted for review to document the technical justification for such acceptance
- Where such requirements do not conflict with and are merely in excess of the requirements in the Rules or Guides, they are considered Owner's requirements and not addressed by the verification activities conducted by ABS for equipment/material certification, they are subject to such verification as deemed necessary by the Owner; however, ABS can include verification of these additional requirements if specifically requested by the manufacturer/supplier as Statement of Fact certifications, and provided any special criteria that may be needed regarding their verification is provided to ABS

Specifications are not generally required to be submitted; where required with respect to certain systems and equipment, they are included in the listing of plans and data to be submitted for same.

5 Design Considerations

Due to the unique nature of the operational missions of naval vessels, there are design considerations that are addressed by Naval Administration requirements with regard to operational scenarios and threat environments unique to naval vessels and are not directly addressed by classification requirements or the verification activities associated with classification. Such design considerations include aspects related to survivability, shock, signatures, weapons operations, aircraft operations, communications, underway replenishment, and various types and degrees of protection of certain spaces and systems to ensure their continued operation after damage or a threat event. Classification requirements provide a certain inherent level of protection from fire, collision, grounding, flooding, weapon-firing effects, etc.

In addition to requirements to address above water threats, below water threats, and other combat mission related capabilities and systems, the Naval Administration requirements will also identify desired margins to be incorporated into the design to account for normal growth expected during design and build, or for planned growth to account for future upgrades or to accommodate changes to mission capabilities throughout the service life of the vessel. Such margins typically are in terms of space, weight, volume, equipment ratings, power generation, power distribution, cooling, etc.

These design considerations translate into system features, system performance, material selections, fabrication and welding details, and other aspects that are inherent to the final overall design. All such additional requirements of the Naval Administration are to be accounted for, as appropriate, in the plans and data required to be submitted for classification.

PART

1

CHAPTER 1 Scope and Conditions of Classification

SECTION 7 Submission of Plans

1 Units

This Guide is written in three systems of units, viz., SI units, MKS units and US customary units. Each system is to be used independently of any other system. Unless indicated otherwise, the format of presentation in this Guide of the three systems of units is as follows:

SI units (MKS units, US customary units)

3 Hull Plans

Plans showing the scantlings, arrangements, and details of the principal parts of the hull structure of each vessel to be built under survey are to be submitted and approved before the work of construction is commenced. These plans are to indicate clearly the scantlings and the details of welding, and they are to include such particulars as the design draft and design speed. Where provision is to be made for any special type of cargo or for any exceptional conditions of loading, whether in ballast or with cargo, particulars of the weights to be carried and of their distribution are also to be given.

Naval vessels, especially combatants, are subject to specific mission loads or other global or local loads due to mission systems or threat protection features required to address combat operation needs such as design for shock, ballistic protection, signature reduction, etc. For such vessels, the plans submitted are to reflect scantlings and structural arrangements and details that, in addition to the requirements for classification, have already taken into account these and similar design considerations regarding structural adequacy and performance required of the vessel, but is not required for or addressed by class.

5 Machinery Plans

Plans showing the boilers, main propulsion engines, reduction gears, shafting and thrust bearing foundations (including holding-down bolts), machinery general arrangement, installation and equipment are to be submitted and approved before manufacturing, fabrication or construction, and before proceeding with work regarding modifications or alterations to previously approved systems or equipment. In addition, a Ship Equipment List comprising a listing of all items that are to be fitted on the ship, including the item label, model/type, and manufacturer, is to be submitted.

Naval vessels, especially combatants, are subject to specific mission loads and have installed systems unique to such vessels for threat protection or features required to address combat operation needs such as design for shock, CBR attack, signature reduction, etc. Some unique systems are addressed in the Guide while others (referred to in the Guide as mission systems) are not addressed by classification requirements; however, they do rely upon ship systems for power, cooling, passive and active firefighting, etc.

Plans for mission systems are not required to be submitted; however, the plans required by the Guide are to include information adequate to assess the loads and demands such systems place on ship systems and allow for proper evaluation of the dependencies and interfaces between ship systems and mission systems.

ABS should be consulted prior to application or use of this Guide to ensure systems are properly identified as ship systems or mission systems and to clarify what constitutes the points of interface between them. Classification requirements apply to ship systems up to the point of interface with mission systems in terms of both the functional and physical interface. To meet the intent of the Rules, such interfaces are normally best determined by first identifying the functional interface, then the physical interface.

7

Integrated Test Plan

An Integrated Test Plan (ITP) is to be submitted for review that documents the overall structure and objectives of the test and evaluation (T&E) program and includes a comprehensive listing and schedule of inspections and tests to be conducted with regard to vendor facilities, shipyard fabrication shop testing, ship installation testing, operational testing, and all T&E conducted during sea trials. Inspections and tests that require ABS Surveyor attendance are to be indicated as such.



GUIDE FOR BUILDING AND CLASSING

INTERNATIONAL NAVAL SHIPS 2018

PART 3 HULL CONSTRUCTION AND EQUIPMENT

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

**© 2017 American Bureau of Shipping. All rights reserved.
ABS Plaza
16855 Northchase Drive
Houston, TX 77060 USA**

Change Notice (2018)

The effective date of each technical change since 1993 is shown in parentheses at the end of the subsection/paragraph titles within the text of each Part. Unless a particular date and month are shown, the years in parentheses refer to the following effective dates:

(2000) and after	1 January 2000 (and subsequent years)	(1996)	9 May 1996
(1999)	12 May 1999	(1995)	15 May 1995
(1998)	13 May 1998	(1994)	9 May 1994
(1997)	19 May 1997	(1993)	11 May 1993

Listing by Effective Dates of Changes from the 2017 Guide

Notice No. 1 (effective on 1 July 2017) to the 2017 Guide, which is incorporated in the 2018 Guide, is summarized below.

EFFECTIVE DATE 1 July 2017 – shown as (1 July 2017) (based on the contract date for new construction between builder and Owner)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
3-2-14/17.1	Strength	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 5 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 6 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/Figure 7 (New)	<No Title>	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)
3-2-14/17.1.2	In way of Cutouts	To reflect current practice for cover plates and address vortex shedding for spade rudders with embedded trunks. (Incorporates Notice No. 1)

EFFECTIVE DATE 1 January 2018 – shown as (2018) (based on the contract date for new construction between builder and Owner)

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
3-1-1/3.1.1	Scantling Length (<i>L</i>)	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.1.2	Freeboard Length (<i>L_f</i>)	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.15.1	Freeboard Deck	To align the requirements with ICLL 1966/Reg. 3 & IACS UR S2.
3-1-1/3.17.2	Lightship Weight	To incorporate interpretation made in IACS UI SC273 and MPC128.
3-1-2/Table 2	Material Class or Grade of Structural Members	To identify the minimum steel grades for deck plating other than strength deck (Line No. C4) at corners of cargo hatch openings adjacent to the engine room and/or deck house.
3-2-11/13.3.7 (New)	Bolted Connections	To specify requirements for bolted connections on helidecks.
3-2-11/13.5	Material	To clarify the requirements for aluminum helideck escape stairs and intermediate platforms.
3-2-11/13.9.2	Means of Escape and Access	To clarify the requirements for aluminum helideck escape stairs and intermediate platforms.
3-2-13/1.1	Plate Stems	To consider the material factor in the net thickness of the plate stem, in line with CSR-H.
3-2-14/7.3	Lower Rudder Stocks	To make the stress units consistent with the allowable stress.
3-2-14/Figure 4	Tapered Couplings	To be consistent with the requirements of 3-2-14/11.7.

<i>Part/Para. No.</i>	<i>Title/Subject</i>	<i>Status/Remarks</i>
3-2-14/17.5	Diaphragm Plates	To allow larger openings on diaphragm plates when the effects of openings are considered in the strength assessment.
3-2-15/3.3.1	Cargo Hatch Covers in Position 1	To align the requirements with IACS UR S21, S21A, and 3-2-15/3.3.1 of the <i>Steel Vessel Rules</i> for less than 100 m.
3-3-A2 (Title)	Computer Software for Onboard Stability Calculations	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/5	Types of Stability Software	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.1	Calculation Program	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.5	Warning	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.15 (New)	Computer Model	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/7.17 (New)	Further Requirements for Type 4 Stability Software	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/Table 1	Acceptable Tolerances	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/11.1	Conditions of Approval of the Onboard Software for Stability Calculations	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/11.5	Specific Approval	To align the Rules with IACS UR L5, Revision 3.
3-3-A2/15	Installation Testing	To align the Rules with IACS UR L5, Revision 3.
3-4-A1/1.1	<No Title>	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/5	Fire Test Requirements	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/7	Structural Fire Integrity Test Procedures	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-4-A1/Table 1	Structural Fire Integrity Matrix	To align the requirements with ASTM F3059-15, in line with IACS, IMO, and USCG policy.
3-6-1/Figure 3	<No Title>	To align with the wording “Conning Position” as indicated in 3-6-1/1.1.1(c).
3-6-1/Figure 5	<No Title>	To shift the location of the main steering position.
3-7-1	Tank, Bulkhead and Rudder Tightness Testing	To reflect the comments from Administrations, Industry Organizations and IMO considered during review of the proposed Testing Guidelines associated with SOLAS Chapter II-1, Regulation 11, reflected in IACS UR S14 (Rev.6, Sept 2016).

Hull Construction and Equipment

CONTENTS

CHAPTER 1	General	1
Section 1	Application and Definitions.....	3
Section 2	General Requirements.....	7
CHAPTER 2	Hull Structures and Arrangements	22
Section 1	Longitudinal Strength	42
Section 2	Shell Plating	64
Section 3	Decks	74
Section 4	Bottom Structures	81
Section 5	Frames	93
Section 6	Web Frames and Side Stringers.....	101
Section 7	Deck Beams.....	105
Section 8	Pillars and Deck Girders	113
Section 9	Watertight Bulkheads and Doors	120
Section 10	Tank Boundaries	132
Section 11	Superstructures, Deckhouses and Helicopter Decks	136
Section 12	Machinery Foundations and Shaft Tunnels	149
Section 13	Stems, Stern Frames and Rudder Horns	152
Section 14	Rudders and Steering Equipment.....	167
Section 15	Protection of Deck Openings	220
Section 16	Protection of Shell Openings	234
Section 17	Bulwarks, Rails, Freeing Ports, Portlights, Windows, Ventilators, Tank Vents and Overflows.....	251
Section 18	Protective Coatings.....	263
Section 19	Weld Design.....	266
Section 20	Direct Analysis Application and Methods.....	273
Appendix 1	Calculation of Shear Stresses for Vessels Having Flat Plate (Non-Corrugated) Longitudinal Bulkheads	54
Appendix 2	Loading Manuals and Loading Instruments.....	56
Appendix 3	Buckling Strength of Longitudinal Strength Members for Vessels Over 61 m (200 ft) in Length	58
Appendix 4	Guidelines for Calculating Bending Moment and Shear Force in Rudders and Rudder Stocks.....	210
Appendix 5	Hatch Cover Stiffeners of Variable Cross Section.....	232
Appendix 6	Accelerations Due to Ship Motions.....	239
Appendix 7	Mission Specific Criteria.....	244

CHAPTER 3	Subdivision and Stability.....	288
Section 1	General Requirements.....	291
Appendix 1	Alternative Requirements for the Subdivision and Stability of Naval Vessels	298
Appendix 2	Onboard Computers for Stability Calculations.....	315
CHAPTER 4	Fire Safety Measures	325
Section 1	Structural Fire Protection	326
Appendix 1	Fiber Reinforced Plastic (FRP) Gratings	328
CHAPTER 5	Equipment.....	331
Section 1	Anchoring, Mooring and Towing Equipment.....	333
Appendix 1	Alternative Standard for the Required Anchor Size.....	350
CHAPTER 6	Navigation.....	351
Section 1	Visibility	352
CHAPTER 7	Testing, Trials and Surveys During Construction – Hull	357
Section 1	Tank, Bulkhead and Rudder Tightness Testing	358
Section 2	Trials	367
Section 3	Surveys	368

This Page Intentionally Left Blank

11/11/2018 11:11:11 AM

PART 3

CHAPTER 1 General

CONTENTS

SECTION 1	Application and Definitions	3
1	Application	3
3	Definitions	3
3.1	Length	3
3.3	Breadth (<i>B</i>)	4
3.5	Depth	4
3.7	Draft	4
3.9	Maximum Service Speed (<i>V</i>)	4
3.11	Molded Displacement and Block Coefficient	5
3.13	Enclosed Structures Above the Freeboard Deck	5
3.15	Decks	5
3.17	Deadweight (DWT) and Lightship Weight	6
3.19	Primary and Local Support Members	6
	FIGURE 1	4
SECTION 2	General Requirements	7
1	Units	7
3	Material	7
3.1	Steel	7
3.3	Aluminum Alloys	7
3.5	Fiber-Reinforced Plastic (FRP)	7
5	Application of Steels 100 mm (4.0 in.) and Under in Thickness	8
5.1	Selection of Material Grade	8
5.3	Structures Exposed to Low Air Temperatures	10
5.5	Design Temperature <i>t_D</i>	12
7	Scantling Design	13
7.1	General	13
7.3	Mission Loads	13
7.5	Structural Continuity	14
7.7	Rounding of Calculated Thickness	14
7.9	Openings	15
7.11	End Attachments	15
7.13	Structural Details	18
7.15	Termination of Structural Members	18
9	Structural Sections	18
9.1	General	18
9.3	Effective Width of Plating	18
9.5	Web Thickness	19

11	Plans and Data to be Submitted	19
13	Fabrication Standards.....	21
TABLE 1	Material Grades.....	8
TABLE 2	Material Class or Grade of Structural Members	9
TABLE 3	Application of Material Classes and Grades – Structures Exposed at Low Temperatures	11
TABLE 4	Material Grade Requirements for Classes I, II and III at Low Temperatures	12
TABLE 5	Thickness and Flanges of Brackets and Knees.....	17
FIGURE 1	Commonly Used Definitions of Temperatures	13
FIGURE 2		14
FIGURE 3		14
FIGURE 4		14
FIGURE 5	End Connections.....	16

PART

3

CHAPTER 1 General

SECTION 1 Application and Definitions

1 Application

The requirements in Part 3 are applicable for vessels having a speed length ratio $V/\sqrt{L} < 2.36$ (1.3), where L and V are as defined below. Where this proportion equals or exceeds the prescribed limit value, application of the requirements in Part 3 is subject to special consideration. Such consideration may require selective application of relevant criteria in the *ABS Rules for Building and Classing High-Speed Naval Craft* or requiring scaled model testing in order to validate the vessel's structural design with respect to expected seaway loads and motions.

Vessels having one or more of the following characteristics will be subject to special consideration:

- i) Proportions: $L/B < 5$; $B/D > 2.5$
- ii) Length: $L > 305$ m (1000 ft)
- iii) Block Coefficient: $C_b < 0.6$
- iv) Speed Length Ratio: $V/\sqrt{L} > 2.36$ (1.3)
- v) Vessels with wave piercing hull forms
- vi) Vessels with large flare
- vii) Multi-hull vessels
- viii) Unusual type or design

3 Definitions

Definitions for terms that appear throughout this Guide are provided in Part 1. The following provides definitions of symbols and terms introduced and used throughout Part 3.

3.1 Length

3.1.1 Scantling Length (L) (2018)

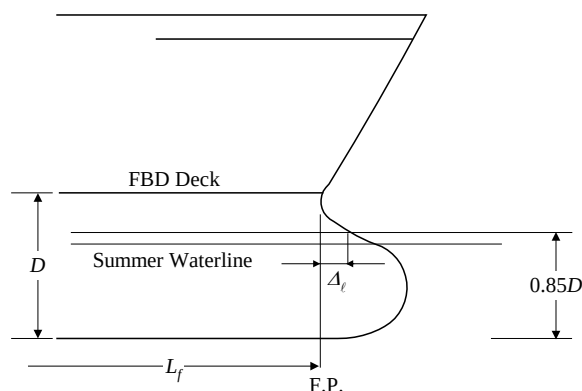
L is the distance in meters (feet) on the deepest draft waterline from the fore side of the stem to the centerline of the rudder stock. L is not to be less than 0.96 and need not be greater than 0.97 of the extreme length on the deepest draft waterline. In ships with an unusual stern and bow arrangement, the length, L , is subject to special consideration.

3.1.2 Freeboard Length (L_f) (2018)

L_f is the distance in meters (feet) on a waterline at 0.85 of the molded depth measured from the top of the keel from the fore side of the stem to the centerline of the rudder stock or 0.96 of the length on that waterline, whichever is greater. Where the stem is a fair concave curve above the waterline at 0.85 of the molded depth and where the aftermost point of the stem is above the waterline, the forward end of the length, L_f , is to be taken at the aftermost point of the stem above that waterline. See 3-1-1/Figure 1.

In ships designed with a raked keel, the waterline on which this length is measured is to be parallel to the designed waterline.

FIGURE 1



3.3 Breadth (B)

B is the greatest molded breadth in meters (feet).

For vessels having flare or tumblehome, B is the mean breadth of the waterline breadth and the maximum breadth between the waterline and main deck at the longitudinal center of flotation (LCF).

3.5 Depth

3.5.1 Molded Depth (D)

D is the molded depth at side in meters (feet) measured at the middle of L from the molded base line to the freeboard deck. In vessels having rounded gunwales, D is to be measured to the point of intersection of the molded lines of the deck and side shell plating. In cases where watertight bulkheads extend to a deck above the freeboard deck D is to be measured to the bulkhead deck.

3.5.2 Scantling Depth (D_s)

The depth D_s for use with scantling requirements is the distance in meters (feet) from the molded base line to the strength deck as defined in 3-1-1/3.15.3 and in 3-2-2/5.1 through 3-2-2/5.7, as applicable.

3.7 Draft

3.7.1 Molded Draft (d)

The molded draft d , is the distance in meters (feet) from the molded base line to the deepest draft waterline.

3.7.2 Scantling Draft (d_s)

The scantling draft d_s is the pre-defined draft value for which the vessel's scantlings shall be evaluated to the requirements in this Guide.

Scantling draft d_s is not to be taken as less than the molded draft or $0.67D_s$. The declared scantling draft is to be indicated on the Midship Section and Shell Expansion drawings.

3.9 Maximum Service Speed (V)

V is the maximum ahead service speed, in knots, defined as the greatest speed which the ship is designed to maintain in service at the deepest draft waterline at the maximum propeller RPM and corresponding engine Maximum Continuous Rating (MCR).

3.11 Molded Displacement and Block Coefficient

3.11.1 Molded Displacement (Δ)

Δ is the molded displacement of the vessel in metric tons (long tons), excluding appendages, taken at the deepest draft waterline in the full load condition.

3.11.2 Block Coefficient (C_b)

C_b is the block coefficient at the deepest draft waterline obtained from the following equation:

$$C_b = \Delta / 1.025 L B_{wl} d \quad (\text{SI \& MKS units})$$

$$C_b = 35 \Delta / L B_{wl} d \quad (\text{US units})$$

where:

Δ = molded displacement, as defined in 3-1-1/3.11.1

L = scantling length, as defined in 3-1-1/3.1.1

d = molded draft, as defined in 3-1-1/3.7.1

B_{wl} = greatest molded breadth at the deepest draft waterline, in m (ft)

3.13 Enclosed Structures Above the Freeboard Deck

3.13.1 Superstructure

A superstructure is an enclosed structure above the freeboard deck having side plating as an extension of the shell plating, or not fitted inboard of the hull side more than 4% of the breadth B .

3.13.2 Partial Superstructure

A partial superstructure is a superstructure which extends fore and aft for a length of less than $0.1L$.

3.13.3 Deckhouse

A deckhouse is an enclosed structure above the freeboard deck, having side plating set inboard of the hull side-shell plating more than 4% of the breadth B of the vessel.

3.15 Decks

3.15.1 Freeboard Deck (2018)

The freeboard deck is normally the uppermost complete deck exposed to weather and sea, which has permanent means of closing all openings in the weather part thereof, and below which all openings in the sides of the ship are fitted with permanent means of watertight closing. Where a vessel is designed for a special draft, considerably less than that corresponding to the least freeboard obtainable under the *International Load Line Regulations*, the freeboard deck, for the purpose of this Guide, may be taken as the actual lowest deck from which the draft can be obtained under those regulations.

3.15.2 Bulkhead Deck

The bulkhead deck is the highest deck to which the watertight bulkheads extend and are made effective.

3.15.3 Strength Deck

The strength deck is the deck that forms the top of the effective hull girder at any part of its length. See 3-2-1/11.1.

3.15.4 Superstructure Deck

A superstructure deck is a deck above the freeboard deck to which the side shell plating extends. Where the term "the superstructure deck" is used in this Guide, it refers to the first such deck above the freeboard deck, unless specifically stated otherwise.

3.17 Deadweight (DWT) and Lightship Weight

3.17.1 Deadweight (DWT)

Deadweight, *DWT*, is the difference in metric tons (long tons) between the displacement of the vessel at its summer load line in water having a specific gravity of 1.025 and the lightship weight.

3.17.2 Lightship Weight (2018)

Lightship weight is the displacement of the vessel in metric tons (long tons) with no cargo, fuel, lubricating oil, ballast water, fresh water or feed water in tanks, no consumable stores, and no passengers or crew or their effects. **The weight of mediums on board for the fixed fire-fighting systems (e.g., freshwater, CO₂, dry chemical powder, foam concentrate, etc.) are to be included in the lightweight and lightship condition.**

3.19 Primary and Local Support Members

3.19.1 Primary Support Members

Primary support members are structural members (such as girders, transverse webs, stringers, and floors) that support local support members.

3.19.2 Local Support Members

Local support members are structural members (such as longitudinals, beams, frames and stiffeners) that directly support the plating.

PART

3

CHAPTER 1 General

SECTION 2 General Requirements

1 Units

This Guide is written in three systems of units, viz., SI units, MKS units and US customary units. Each system is to be used independently of any other system. Unless indicated otherwise, the format of presentation in this Guide of the three systems of units is as follows:

SI units (MKS units, US customary units)

3 Material

This Guide applies to vessels constructed of steel, aluminum, or fiber-reinforced plastic as specified herein. The use of other materials is subject to special consideration. The design temperatures for unrestricted service are assumed to be not less than -10°C (14°F) for air temperature and not less than 0°C (32°F) for sea water temperature.

3.1 Steel

Steels used for construction are to comply with the requirements of Chapter 1 of the *ABS Rules for Materials and Welding (Part 2)*. Use of other steels is subject to special consideration.

3.3 Aluminum Alloys

The use of aluminum alloys complying with the requirements in Chapter 5 of the *ABS Rules for Materials and Welding (Part 2) – Aluminum and Fiber Reinforced Plastics (FRP)* is subject to special consideration upon submission of the specification for the proposed alloys and the proposed method of fabrication.

Aluminum alloys for deckhouses, helicopter landing platforms, masts, ladders and hatch covers are acceptable when approved in accordance with the requirements of Chapter 5 of the *ABS Rules for Materials and Welding (Part 2) – Aluminum and Fiber Reinforced Plastics (FRP)*.

Connections between steel and aluminum structures are to be made by interfacing bimetallic inserts to avoid galvanic corrosion. Aluminum structures and components are to be precluded from having direct contact with steel by the use of approved non-wicking, non-water-absorbing insulating materials.

3.5 Fiber-Reinforced Plastic (FRP)

The use of Fiber-Reinforced Plastic (FRP) for any portion of vessel structure is subject to special consideration upon submission of the specification for the proposed laminate arrangement and the proposed method of fabrication. FRP materials are to comply with the requirements in Chapter 6 of the *ABS Rules for Materials and Welding (Part 2) – Aluminum and Fiber Reinforced Plastics (FRP)*.

5 Application of Steels 100 mm (4.0 in.) and Under in Thickness

5.1 Selection of Material Grade

Steel materials for particular locations are not to be of lower grades than those required by 3-1-2/Table 1 for the material class given in 3-1-2/Table 2.

TABLE 1
Material Grades (2017)

Plate Thickness <i>t</i> mm (in.)	Material Class		
	I	II	III
$t \leq 15$ ($t \leq 0.60$)	A ⁽²⁾ , AH	A, AH	A, AH
$15 < t \leq 20$ ($0.60 < t \leq 0.79$)	A, AH	A, AH	B, AH
$20 < t \leq 25$ ($0.79 < t \leq 0.98$)	A, AH	B, AH	D, DH
$25 < t \leq 30$ ($0.98 < t \leq 1.18$)	A, AH	D, DH	D ⁽¹⁾ , DH
$30 < t \leq 35$ ($1.18 < t \leq 1.38$)	B, AH	D, DH	E, EH
$35 < t \leq 40$ ($1.38 < t \leq 1.57$)	B, AH	D, DH	E, EH
$40 < t \leq 100$ ($1.57 < t \leq 4.00$)	D, DH	E, EH	E, EH

Notes

- Grade D, of these plate thicknesses, is to be normalized.
- (2017) ASTM A36 steel otherwise manufactured by an ABS approved steel mill, tested and certified to the satisfaction of ABS may be used in lieu of Grade A for a thickness up to and including 12.5 mm (0.5 in.) for plate and up to and including 19 mm (0.75 in.) for sections.

TABLE 2
Material Class or Grade of Structural Members (2018)

Line No.	Structural Members	Within 0.4L Amidships	Outside 0.4L amidships
		Material Class ⁽⁸⁾ or Grade	Material Class or Grade
A	Secondary		
A1	Longitudinal bulkhead strakes, other than those belonging to the Primary category	I	A ⁽¹⁰⁾ /AH
A2	Deck plating exposed to weather, other than that belonging to the Primary or Special category		
A3	Side plating ⁽¹²⁾		
B	Primary		
B1	Bottom plating, including keel plate	II	A ⁽¹⁰⁾ /AH
B2	Strength deck plating, excluding that belonging to the Special category ⁽¹³⁾		
B3	Continuous longitudinal members above strength deck, excluding hatch coamings ⁽¹³⁾		
B4	Uppermost strake in longitudinal bulkhead		
B5	Vertical strake (hatch side girder) and uppermost sloped strake in top wing tank		
C	Special		
C1	Sheer strake at strength deck ^(1, 9, 13)	III	II (I outside 0.6L amidships)
C2	Stringer plate in strength deck ^(1, 9, 13)		
C3	Deck strake at longitudinal bulkhead ^(2, 9, 13)		
C4	Strength deck plating at outboard corners of cargo hatch openings in container carriers and other ships with similar hatch opening configurations ^(3, 13)		
C5	Strength deck plating at corners of cargo hatch openings in bulk carriers, ore carriers, combination carriers and other ships with similar hatch opening configurations ^(4, 13)		
C6	Bilge strake ^(5, 6, 9)		
C7	Longitudinal hatch coamings of length greater than 0.15L ⁽⁷⁾		
C8	End brackets and deck house transition of longitudinal cargo hatch coamings ⁽⁷⁾		
D	Other Categories		
D1	(1 July 2015) Plating materials for stern frames supporting rudder and propeller boss, rudders, rudder horns, steering equipment ⁽¹⁵⁾ , propeller nozzles, and shaft brackets	-	II ⁽¹¹⁾
D2	Strength members not referred to in A to C and D1 ⁽¹⁷⁾	A ⁽¹⁰⁾ /AH	A ⁽¹⁰⁾ /AH
D3	Face plates and webs of primary members and hatch covers	II ⁽¹⁴⁾	II ⁽¹⁴⁾
D4	(2017) Equipment foundations, Non-hull structure, Appurtenant structures	(16)	(16)

TABLE 2 (continued)
Material Class or Grade of Structural Members (2018)

Notes:

- 1 Not to be less than grade E/EH⁽⁹⁾ within 0.4L amidships in ships with length exceeding 250 m (984 ft)..
- 2 Excluding deck plating in way of inner-skin bulkhead of double hull ships.
- 3 Not to be less than class III within the length of the cargo region.
- 4 Not to be less than class III within 0.6L amidships and class II within the remaining length of the cargo region.
- 5 May be of class II in ships with a double bottom over the full breadth and with length less than 150 m (492 ft).
- 6 Not to be less than grade D/DH within 0.4L amidships in ships with length exceeding 250 m (984 ft).
- 7 Not to be less than grade D/DH.
- 8 Special consideration will be given to vessels of restricted class.
- 9 Single strake required to be class III or E/EH are to have breadths not less than 800 + 5L mm (31.5 + 0.06L in.), but need not exceed 1800 mm (71 in.), unless limited by the geometry of the vessel's design.
- 10 (2017) ASTM A36 steel otherwise manufactured by an ABS approved steel mill, tested and certified to the satisfaction of ABS may be used in lieu of Grade A for a thickness up to and including 12.5 mm (0.5 in.) for plates and up to and including 19 mm (0.75 in.) for sections.
- 11 For rudder and rudder body plates subjected to stress concentrations (e.g., in way of lower support or at upper part of spade rudders), class III is to be applied.
- 12 Single side strakes for ships exceeding 150 m (492 feet) without inner continuous longitudinal bulkheads between bottom and the single strength deck are not to be less than grade B/AH within cargo region in ships.
- 13 Not to be less than grade B/AH within 0.4L amidships in ships with length exceeding 150 m (492 feet) and single strength deck.
- 14 May be Class I for rolled sections
- 15 (1 July 2015) Steering equipment components other than rudders, as described in Section 3-2-14.
- 16 (2017) ASTM A36 steel otherwise tested and certified to the satisfaction of ABS may be used in lieu of Grade A for a thickness up to and including 12.5 mm (0.5 in.) for plates and up to and including 19 mm (0.75 in.) for sections.
- 17 (2018) Deck plating below the strength deck at corners of cargo hatch openings immediately forward and aft of the engine room and/or deck house in container carriers and other ships with similar hatch opening configurations, is not to be less than Class I.

5.3 Structures Exposed to Low Air Temperatures (2017)

For ships intended to operate in areas with low air temperatures [below and including -20°C (-4°F)], the materials in exposed structures are to be selected based on the design temperature t_D , to be taken as defined in 3-1-2/5.5.

Materials in the various strength members above the lowest ballast water line (BWL) exposed to air are not to be of lower grades than those corresponding to Classes I, II and III, as given in 3-1-2/Table 3, depending on the categories of structural members (secondary, primary and special). For non-exposed structures (except as indicated in Note 5 of 3-1-2/Table 3) and structures below the lowest ballast water line, see 3-1-2/3.1.

The material grade requirements for hull members of each class depending on thickness and design temperature are defined in 3-1-2/Table 4. For design temperatures $t_D < -55^{\circ}\text{C}$ (-67°F), materials are to be specially considered.

Single strakes required to be of Class III or of Grade E/EH or FH are to have breadths not less than 800 + 5L mm, maximum 1800 mm.

Plating materials for sternframes, rudder horns, rudders and shaft brackets are not to be of lower grades than those corresponding to the material classes given in 3-1-2/5.1.

TABLE 3
Application of Material Classes and Grades – Structures Exposed at Low
Temperatures (2017)

Structural Member Category	Material Class	
	Within 0.4L Amidships	Outside 0.4L Amidships
Secondary	I	I
Deck plating exposed to weather, in general		
Side plating above BWL		
Transverse bulkheads above BWL ⁽⁵⁾		
Primary	II	I
Strength deck plating ⁽¹⁾		
Continuous longitudinal members above strength deck, excluding longitudinal hatch coamings		
Longitudinal bulkhead above BWL ⁽⁵⁾		
Top wing tank bulkhead above BWL ⁽⁵⁾	III	II
Special		
Sheer strake at strength deck ⁽²⁾		
Stringer plate in strength deck ⁽²⁾		
Deck strake at longitudinal bulkhead ⁽³⁾		
Continuous longitudinal hatch coamings ⁽⁴⁾		

Notes:

- 1 Plating at corners of large hatch openings to be specially considered. Class III or Grade E/EH to be applied in positions where high local stresses may occur.
- 2 Not to be less than Grade E/EH within 0.4L amidships in ships with length exceeding 250 meters (820 feet).
- 3 In ships with breadth exceeding 70 meters (230 feet) at least three deck strakes to be Class III.
- 4 Not to be less than Grade D/DH.
- 5 (2017) Applicable to plating attached to hull envelope plating exposed to low air temperature. At least one strake is to be considered in the same way as exposed plating and the strake width is to be at least 600 mm (24 in.).

TABLE 4
Material Grade Requirements for Classes I, II and III at Low Temperatures (2015)

Class I

Thickness, in mm (in.)	-20 to -25°C (-4 to -13°F)	-26 to -35°C (-14 to -31°F)	-36 to -45°C (-32 to -49°F)	-46 to -55°C (-50 to -68°F)
$t \leq 10$ ($t \leq 0.39$)	A, AH	B, AH	D, DH	D, DH
$10 < t \leq 15$ ($0.39 < t \leq 0.60$)	B, AH	D, DH	D, DH	D, DH
$15 < t \leq 20$ ($0.60 < t \leq 0.79$)	B, AH	D, DH	D, DH	E, EH
$20 < t \leq 25$ ($0.79 < t \leq 0.98$)	D, DH	D, DH	D, DH	E, EH
$25 < t \leq 30$ ($0.98 < t \leq 1.18$)	D, DH	D, DH	E, EH	E, EH
$30 < t \leq 35$ ($1.18 < t \leq 1.38$)	D, DH	D, DH	E, EH	E, EH
$35 < t \leq 45$ ($1.38 < t \leq 1.80$)	D, DH	E, EH	E, EH	-, FH
$45 < t \leq 50$ ($1.80 < t \leq 1.97$)	E, EH	E, EH	-, FH	-, FH

Class II

Thickness, in mm (in.)	-20 to -25°C (-4 to -13°F)	-26 to -35°C (-14 to -31°F)	-36 to -45°C (-32 to -49°F)	-46 to -55°C (-50 to -68°F)
$t \leq 10$ ($t \leq 0.39$)	B, AH	D, DH	D, DH	E, EH
$10 < t \leq 20$ ($0.39 < t \leq 0.79$)	D, DH	D, DH	E, EH	E, EH
$20 < t \leq 30$ ($0.79 < t \leq 1.18$)	D, DH	E, EH	E, EH	-, FH
$30 < t \leq 40$ ($1.18 < t \leq 1.57$)	E, EH	E, EH	-, FH	-, FH
$40 < t \leq 45$ ($1.57 < t \leq 1.80$)	E, EH	-, FH	-, FH	-, -
$45 < t \leq 50$ ($1.80 < t \leq 1.97$)	E, EH	-, FH	-, FH	-, -

Class III

Thickness, in mm (in.)	-20 to -25°C (-4 to -13°F)	-26 to -35°C (-14 to -31°F)	-36 to -45°C (-32 to -49°F)	-46 to -55°C (-50 to -68°F)
$t \leq 10$ ($t \leq 0.39$)	D, DH	D, DH	E, EH	E, EH
$10 < t \leq 20$ ($0.39 < t \leq 0.79$)	D, DH	E, EH	E, EH	-, FH
$20 < t \leq 25$ ($0.79 < t \leq 0.98$)	E, EH	E, EH	E, FH	-, FH
$25 < t \leq 30$ ($0.98 < t \leq 1.18$)	E, EH	E, EH	-, FH	-, FH
$30 < t \leq 35$ ($1.18 < t \leq 1.38$)	E, EH	-, FH	-, FH	-, -
$35 < t \leq 40$ ($1.38 < t \leq 1.57$)	E, EH	-, FH	-, FH	-, -
$40 < t \leq 50$ ($1.57 < t \leq 1.97$)	-, FH	-, FH	-, -	-, -

5.5 Design Temperature t_D (2017)

The design temperature t_D is to be taken as the lowest mean daily average air temperature in the area of operation.

- **Mean:** Statistical mean over observation period
- **Average:** Average during one day and night
- **Lowest:** Lowest during year

For seasonally restricted service the lowest value within the period of operation applies.

For the purpose of issuing a Polar Ship Certificate in accordance with the Polar Code, the design temperature t_D shall be no more than 13°C (23.6°F) higher than the Polar Service Temperature (PST) of the ship.