BUREAU VERITAS MARINE & OFFSHORE

RULES FOR CLASSIFICATION

RULES FOR THE CLASSIFICATION OF **NAVAL SHIPS**

PART A

CLASSIFICATION AND SURVEYS

NR483 A DT R08

EDITION DECEMBER 2026



BUREAU VERITAS MARINE & OFFSHORE
RULES FOR CLASSIFICATION

NR483 A DT R08 DECEMBER 2026

This edition of the document replaces the previous edtion. Unless otherwise specified, these rules apply to ships which are contracted for construction on or after 1 December 2026. The Society may refer to the contents hereof before 1 December 2026, as and when deemed necessary or appropriate.

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PART A
CLASSIFICATION AND SURVEYS
NR483 A DT R08 DECEMBER 2026

PART B
HULL AND STABILITY
NR483 B DT R08 DECEMBER 2026

PART C
MACHINERY, SYSTEMS AND FIRE PROTECTION
NR483 C DT R08 DECEMBER 2026

PART D
SERVICE NOTATIONS
NR483 D DT R08 DECEMBER 2026

PART E
ADDITIONAL CLASS NOTATIONS
NR483 E DT R08 DECEMBER 2026

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Rules for Classification
NR483

RULES FOR THE CLASSIFICATION OF NAVAL SHIPS

Part A
Classification and Surveys

Chapter 1	Principles of Classification and Class Notations
Chapter 2	Assignment, Maintenance, Suspension and Withdrawal of Class
Chapter 3	Scope of Surveys (all ships)
Chapter 4	Scope of Surveys in Respect of the Different Services of Ships
Chapter 5	Scope of Surveys Related to Additional Class Notations

December 2026

Table of Content

Chapter 1 Principles of Classification and Class Notations

Section 1 General Principles of Classification

1 Principles of classification 14

1.1 Purpose of the Rules
1.2 General definitions
1.3 Meaning of classification, scope and limits
1.4 Request for services

2 Rules 15

2.1 Effective date
2.2 Equivalence
2.3 Novel features
2.4 Interpretation
2.5 Disagreement and appeal

3 Duties of the Interested Parties 16

3.1 International and national regulations
3.2 Surveyor's intervention
3.3 Operation and maintenance of ships
3.4 Use of measuring equipment and of service suppliers
3.5 Spare parts

Section 2 Classification Notations

1 General 18

1.1 Purpose of the classification notations
1.2 Types of notations assigned

2 Class symbol 18

2.1 General

3 Construction marks 19

3.1 General
3.2 List of construction marks

4 Service notations 19

4.1 General
4.2 Frigate
4.3 Aircraft carrier
4.4 Corvette
4.5 Auxiliary naval vessel
4.6 Amphibious vessel
4.7 Military OPV
4.8 Landing craft
4.9 Unmanned Surface Vessel (USV)
4.10 Special service
4.11 Miscellaneous service features

5 Navigation notations 21

5.1 Navigation notations
5.2 List of navigation notations

Table of Content

6 Additional class notations 21

6.1 General
6.2 Military environment
6.3 System of Trace and Analysis of Records (STAR)
6.4 Availability of machinery (AVM)
6.5 Automated machinery systems (AUT)
6.6 Integrated and digital systems
6.7 Monitoring equipment (MON)
6.8 Comfort on board (COMF)
6.9 Refrigerating installations
6.10 Environmental protection
6.11 Protection against chemical, biological, radiological or nuclear risks (CBRN)
6.12 Manoeuvring, stability and sea-keeping
6.13 Safety equipment and installations
6.14 Lifting appliances
6.15 Other additional class notations

7 Other notations 30

7.1

8 Explicit request of the Naval Authority 30

8.1

Chapter 2 Assignment, Maintenance, Suspension and Withdrawal of Class

Section 1 Assignment of Class

1 General 32

1.1 Criteria
1.2 Confidentiality

2 New building procedure 32

2.1 Ships surveyed by the Society during construction
2.2 Other cases
2.3 Documentation

3 Ships classed after construction 33

3.1 Class admission process and requirements

4 Date of initial classification 34

4.1 Definitions

5 Reassignment of class 35

5.1 Conditions

Section 2 Maintenance of Class

1 Foreword 36

1.1 Terminology

2 General principles of surveys 36

2.1 Survey types
2.2 Change of periodicity, postponement or advance of surveys
2.3 Extension of scope of survey
2.4 General procedure of survey
2.5 Appointment of another Surveyor
2.6 Alterations or additions to approved systems

Table of Content

3 Definitions and procedures related to surveys 37

3.1 General
3.2 Terminology related to hull survey
3.3 Procedures for thickness measurements
3.4 Agreement for in-water survey
3.5 Conditions for surveys
3.6 Access to structures
3.7 Equipment for surveys
3.8 Surveys at sea and anchorage
3.9 Repairs and maintenance during voyage
3.10 Repairs

4 Certificate of Classification: issue, validity, endorsement and renewal 41

4.1 Issue of Certificate of Classification
4.2 Validity of Certificate of Classification, maintenance of class
4.3 Endorsement of Certificate of Classification
4.4 Status of surveys and recommendations

5 Class renewal survey 42

5.1 General principles
5.2 Normal survey system (SS)
5.3 Continuous survey system (CS)
5.4 Planned maintenance survey system for machinery (PMS)
5.5 STAR-MACH survey system

6 Other periodical surveys 44

6.1 General
6.2 Annual surveys
6.3 Intermediate surveys
6.4 Ship lightweight and stability check
6.5 Bottom survey
6.6 Tailshaft survey
6.7 Boiler survey
6.8 Links between anniversary dates and annual surveys, intermediate surveys and class renewal surveys

7 Occasional surveys 47

7.1 General
7.2 Damage and repair surveys
7.3 Conversions, alterations and repairs
7.4 Quality System audits

8 Change of ownership 48

8.1

9 Lay-up and re-commissioning 48

9.1 General principles

Section 3 Suspension and Withdrawal of Class

1 General 50

1.1 Discontinuance of class
1.2 Suspension of class
1.3 Withdrawal of class
1.4 Suspension/withdrawal of additional class notations

Appendix 1 Planned Maintenance Scheme

1 General 52

1.1

Table of Content

2 Conditions and procedures for the approval of the system 52

2.1 General
2.2 Documentation
2.3 Information on board
2.4 Annual report

3 Implementation of the system 53

3.1

4 Retention and withdrawal of the system 53

4.1

5 Surveys 54

5.1 Implementation survey
5.2 Annual audit
5.3 Damage and repairs

6 Machinery items surveyed on the basis of condition monitoring 55

6.1

Appendix 2 CSM and PMS Systems: Surveys Carried out by the Chief Engineer

1 Conditions 56

1.1

2 Limits of the interventions 56

2.1

3 Procedure for carrying out surveys 56

3.1 General
3.2 Main diesel engines
3.3 Auxiliary diesel engines
3.4 Reciprocating compressors
3.5 Coolers, condensers, heaters
3.6 Electrical switchboard
3.7 a.c. and d.c. generators
3.8 Other items (pumps, electric motors, etc.)

4 Records of surveys carried out 58

4.1

5 Confirmatory survey 58

5.1

6 Suspension of the Chief Engineer's authorization 59

6.1

Appendix 3 Thickness Measurements: Extent, Determination of Locations, Acceptance Criteria

1 General 60

1.1 Aim of the Appendix
1.2 Scope of the Appendix

2 Rule requirements for the extent of measurements 60

2.1 General
2.2 Class renewal survey

3 Number and locations of measurements 61

3.1 General
3.2 Locations of points

4 Acceptance criteria for thickness measurements 63

4.1 General
4.2 Criteria
4.3 Local and global strength criteria
4.4 Buckling strength criterion
4.5 Pitting

Appendix 4 Condition Monitoring and Condition Based Maintenance

1 General 68

1.1 Application
1.2 Definitions
1.3 Condition monitoring (CM)
1.4 Condition based maintenance (CBM)

2 Procedures and conditions for approval of CM and CBM 69

2.1 Onboard responsibility
2.2 Equipment and systems requirements
2.3 Documentation and information
2.4 Approval validity

3 Surveys 70

3.1 Installation survey
3.2 Implementation survey
3.3 Annual audit
3.4 Damage and repairs

Chapter 3 Scope of Surveys (all ships)

Section 1 Annual Survey

1 General 73

1.1

2 Hull 73

2.1 Hull and hull equipment
2.2 Survey of watertight cable transits
2.3 Hatch covers and coamings

3 Machinery and systems 74

3.1 General machinery installations
3.2 Boilers
3.3 Electrical machinery and equipment
3.4 Fire protection, detection and extinction

Section 2 Intermediate Survey

1 General 78

1.1 Application

2 Hull 78

2.1 Surveys and testings

Section 3 Class Renewal Survey

1 General 79

1.1

2 Stability and ship lightweight 79

2.1 Ship lightweight check
2.2 Hull girder deflection
2.3 Stability check

Table of Content

3 Hull and hull equipment 79

3.1 Bottom survey in dry condition
3.2 Decks, hatch covers and equipment
3.3 Survey of watertight cable transits
3.4 Dry compartments
3.5 Tanks
3.6 Thickness measurements

4 Machinery and systems 82

4.1 General
4.2 Main and auxiliary engines and turbines
4.3 Reduction gears, main thrust and intermediate shaft(s)
4.4 Pumps and other machinery items
4.5 Systems in machinery spaces
4.6 Electrical equipment and installations
4.7 Controls, commands
4.8 Fire protection, detection and extinction

Section 4 Bottom Survey

1 General 88

1.1 Conditions

2 Bottom survey in dry condition 88

2.1 General requirements
2.2 Bottom survey held within the scope of class renewal survey

3 Bottom in-water survey 88

3.1 General

Section 5 Tailshaft Survey

1 Survey of tailshafts 90

1.1 General
1.2 Complete survey
1.3 Modified survey

2 Periodical survey of other propulsion systems 91

2.1 Rotating and azimuth thrusters
2.2 Vertical axis propellers
2.3 Ventilated propellers
2.4 Pump jet systems

Section 6 Boiler Survey

1 Steam boilers 92

1.1

2 Thermal oil heaters 92

2.1

Section 7 Survey of Watertight Cable Transits

1 General 93

1.1 Application

2 Cable Transit Seal Systems Register 93

2.1 New construction
2.2 Ship in service

3 Installation and maintenance of Watertight Cable transits 93

3.1 General

Table of Content

Appendix 1 Class Requirements and Surveys of Laid-up Ships

1 General 94

1.1

2 Safety conditions 94

2.1

3 Preservation measures for lay-up and maintenance 95

3.1 General
3.2 Exposed parts of the hull
3.3 Internal spaces
3.4 Deck fittings
3.5 Machinery
3.6 Electrical installations
3.7 Steering gear
3.8 Boilers
3.9 Automated installation

4 Lay-up site and mooring arrangements 98

4.1 General
4.2 Recommendations for the lay-up site
4.3 Recommendations for the mooring arrangements
4.4 Review of the mooring arrangements

5 Surveys 99

5.1 Laying-up survey
5.2 Annual lay-up condition survey
5.3 Re-commissioning survey

Chapter 4 Scope of Surveys in Respect of the Different Services of Ships

Section 1 General

1 Application 102

1.1

2 Service notations subject to additional surveys 102

2.1

Section 2 Frigate, Corvette and Military OPV

1 General 103

1.1 Application

2 Annual survey 103

2.1 Watertight bulkheads
2.2 Openings in shell plating
2.3 Shell and inner doors
2.4 Fire protection, detection and extinction
2.5 Emergency escapes
2.6 Ballast equipment and installation

3 Class renewal survey 105

3.1 Stability
3.2 Lighting
3.3 Shell and inner doors
3.4 Fire protection, detection and extinction

Table of Content

Section 3 Aircraft Carrier

1 General 106

1.1 Application

2 Annual survey 106

2.1 Inner doors
2.2 Internal platforms and ramps
2.3 Fire protection, detection and extinction
2.4 Emergency escapes

3 Class renewal survey 107

3.1 Stability
3.2 Lighting
3.3 Inner doors
3.4 Internal platforms and ramps
3.5 Fire protection, detection and extinction

Section 4 Auxiliary Naval Vessel

1 General 109

1.1 Application
1.2 Documentation on board
1.3 Reporting and evaluation of surveys
1.4 Conditions for survey
1.5 Access to structures

2 Annual survey - Hull items - Liquid cargo area 110

2.1 Weather decks
2.2 Cargo pump rooms and pipe tunnels
2.3 Ballast tanks
2.4 Safe access to tanker bows

3 Annual survey - Hull items - Dry cargo area 111

3.1 Watertight bulkheads
3.2 Openings in shell plating
3.3 Shell and inner doors

4 Annual survey - Machinery items - Liquid cargo area 112

4.1 Cargo area and cargo pump rooms
4.2 Instrumentation and safety devices
4.3 Fire-fighting systems in cargo area
4.4 Inert gas system

5 Annual survey - Machinery items - Dry cargo area 114

5.1 Fire protection, detection and extinction
5.2 Emergency escapes
5.3 Ballast equipment and installation

6 Intermediate survey - Hull items 114

6.1 General
6.2 Ships between 5 and 10 years of age
6.3 Ships between 10 and 15 years of age
6.4 Ships over 15 years of age

7 Intermediate survey - Machinery items - Liquid cargo area 115

7.1 Cargo area and cargo pump rooms
7.2 Inert gas system

8 Class renewal survey - Hull items - Liquid cargo area 115
8.1 Survey planning meeting
8.2 Scope of survey
8.3 Overall surveys
8.4 Thickness measurements
8.5 Tank testing
8.6 Cargo piping, area and pump rooms
9 Class renewal survey - Hull items - Dry cargo area 121
9.1 Stability
9.2 Shell and inner doors
10 Class renewal survey - Machinery items - Liquid cargo area 121
10.1 Cargo area and cargo pump rooms
10.2 Fire-fighting systems in cargo area
10.3 Inert gas system
11 Class renewal survey - Machinery items - Dry cargo area 122
11.1 Lighting
11.2 Fire protection, detection and extinction

Section 5 Amphibious Vessel
1 General 123
1.1 Application
2 Annual survey 123
2.1 Shell and inner doors
2.2 Internal platforms and ramps
2.3 Watertight bulkheads
2.4 Openings in shell plating
2.5 Fire protection, detection and extinction
2.6 Means of escape
3 Class renewal survey 125
3.1 Lightweight survey
3.2 Shell and inner doors
3.3 Internal platforms and ramps
3.4 Fire protection, detection and extinction
3.5 Means of escape

Chapter 5 Scope of Surveys Related to Additional Class Notations

Section 1 General
1 Application 128
1.1
2 Additional class notations subject to additional surveys 128
2.1

Section 2 Military environment
1 General 130
1.1 Application
2 ARMOUR 130
2.1 Class renewal surveys

Table of Content

3 FFS 130

3.1 Annual survey
3.2 Class renewal survey

Section 3 VeriSTAR System

1 General 131

1.1 Application

2 STAR-HULL 131

2.1 Survey scope and periodicity

3 STAR-MACH 131

3.1 Survey scope and periodicity

Section 4 Availability of Machinery

1 General 132

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 5 Automated Machinery Systems

1 General 133

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 6 Integrated Ship Systems

1 General 134

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 7 Monitoring Equipment

1 General 135

1.1 Application

2 MON-HULL 135

2.1 Annual and class renewal survey

3 MON-SHAFT 135

3.1 Tailshaft survey

Section 8 Refrigerating Installations

1 General 136

1.1 Application

2 Annual survey 136

2.1 General
2.2 Refrigerating plant
2.3 Refrigerated spaces
2.4 Instrumentation and safety devices

3 Class renewal survey 137

3.1 General
3.2 Refrigerating plant
3.3 Refrigerated spaces
3.4 Instrumentation and safety devices

Table of Content

Section 9 Environmental Protection

1 General 138

1.1 Application

2 Prevention of sea pollution 138

2.1 First annual survey
2.2 Annual survey
2.3 Class renewal survey

3 Prevention of air pollution 139

3.1 Annual survey
3.2 Class renewal survey

Section 10 CBRN Protection

1 General 141

1.1 Application
1.2 Significant modifications

2 Annual survey 141

2.1 General
2.2 Air blast resistance

3 Class renewal survey 141

3.1 General

Section 11 Manoeuvrability

1 General 143

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 12 Towing

1 General 144

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 13 Helideck

1 General 145

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

Section 14 Compartment Air Testing

1 General 146

1.1 Application
1.2 Annual survey
1.3 Class renewal survey

CHAPTER 1
PRINCIPLES OF CLASSIFICATION AND CLASS NOTATIONS

Section 1 General Principles of Classification

Section 2 Classification Notations

Section 1 General Principles of Classification

1 Principles of classification

1.1 Purpose of the Rules

1.1.1 The Rules published by the Society give the requirements for the assignment and the maintenance of class for seagoing surface naval ships, in particular frigates.

Class assigned to a ship reflects the discretionary opinion of the Society that the ship, for declared conditions of use and within the relevant time frame, complies with the Rules applicable at the time the service is rendered. Class requirements can be temporarily suspended under emergency conditions (war, terrorist attack,...) declared by the Naval Authority.

Note 1: The general conditions of classification are laid down in the Preamble.

1.1.2 The application criteria of the different parts of the present Rules are the following:

- Part A - Classification and Surveys applies to all ships.
- Part B - Hull and Stability, Part C - Machinery, Systems and Fire Protection, Part D - Service Notations and NR216 - Materials and Welding apply to seagoing ships whose hull is of welded steel construction. Where necessary, the extent of application is more precisely defined in each chapter of these parts of the Rules.
- Part E - Additional Class Notations applies, at the request of the Interested Party, to all ships.

The classification of ships other than those dealt with in the above-mentioned Part B, Part C, Part D, Part E and NR216 is covered by specific Rules published by the Society.

1.2 General definitions

1.2.1 The following general definitions are used in these Rules :

- Society means the Classification Society with which the ship is classed.
- Rules means these Rules for the Classification of Ships and documents issued by the Society serving the same purpose.
- Surveyor means technical staff acting on behalf of the Society to perform tasks in relation to classification and survey duties.
- Survey means an intervention by the Surveyor for assignment or maintenance of class as defined in Part A, Chapter 2, or interventions by the Surveyor within the limits of the tasks delegated by the Naval Authorities.
- Interested Party means a party, other than the Society, having responsibility for the classification of the ship, such as the Owner of the ship and his representatives, or the Shipbuilder, or the Engine Builder, or the Supplier of parts to be tested.
- Navy means the Governmental Body to whom the State or the Defence Department of the State has delegated responsibility for ownership of naval ships. The Navy is responsible for the requirement, procurement and through life support and maintenance of the naval ship.
- Naval Authority means the authority nominated by the Navy responsible for providing regulation associated with procurement and support of the ship. The Naval Authority may also be responsible for identifying appropriate standards, auditing and classification. The Naval Authority could be a Navy department, Statutory Authority or an independent organization with appropriate standing.
- Owner means the party having the responsibility to keep the ship seaworthy, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2.
- Shipbuilder means the party having the responsibility of the construction of the ship and of her classification at the assignment phase.
- Approval means the examination and acceptance by the Society of documents, procedures or other items related to classification, verifying solely their compliance with the relevant Rules requirements, or other referentials where requested.
- Type approval means an approval process for verifying compliance with the Rules of a product, a group of products or a system, and considered by the Society as representative of continuous production.
- Essential service is intended to mean a service necessary for a ship to proceed at sea, be steered or manoeuvred, or undertake activities connected with its operation, and for the safety of life, as far as class is concerned.
- The gross tonnage (GT) is the measure of the overall size of a ship as determined in accordance with the provisions of the 1969 International Convention on Tonnage Measurement of Ships. It is expressed as a figure without units.

1.3 Meaning of classification, scope and limits

1.3.1 The classification consists of:

- the development of Rules, guidance notes and other documents relevant to the ship, structure, material, equipment, machinery and any other item covered by such documents

- the examination of plans and calculations and the surveys, checks and tests intended to ensure that the ship meets the Rules (refer to Ch 2, Sec 1)
- the assignment of class (see Ch 2, Sec 1) and issue of a Certificate of Classification, where the above Rules are met
- the periodical, occasional and class renewal surveys performed to verify that the ship in service meets the conditions for maintenance of class (see Ch 2, Sec 2).

1.3.2 The Rules, surveys performed, reports, certificates and other documents issued by the Society, are in no way intended to replace or alleviate the duties and responsibilities of other parties such as Navy, Naval Authority, Designers, Shipbuilders, Manufacturers, Repairers, Suppliers, Contractors or Sub-contractors, actual or prospective Owners or Operators, Charterers, Brokers, Cargo-owners and Underwriters. The Society cannot therefore assume the obligations arising from these functions, even when the Society is consulted to answer inquiries concerning matters not covered by its Rules, or other documents.

The activities of such parties which fall outside the scope of the classification as set out in the Rules, such as design, engineering, manufacturing, operating alternatives, choice of type and power of machinery and equipment, number and qualification of crew or operating personnel, lines of the ship, trim, hull vibrations, spare parts including their number, location and fastening arrangements, life-saving appliances, and maintenance equipment, remain therefore the responsibility of those parties, even if these matters may be given consideration for classification according to the type of ship or additional class notation assigned.

The classification-related services and documents performed and issued by the Society do not relieve the parties concerned of their responsibilities or other contractual obligations expressed or implied or of any liability whatsoever, nor do they create any right or claim in relation to the Society with regard to such responsibilities, obligations and liabilities. In particular, the Society does not declare the acceptance or commissioning of a ship or any part of it, this being the exclusive responsibility of the Owner.

1.3.3 Unless otherwise specified, the Rules do not deal with structures, pressure vessels, machinery and equipment which are not permanently installed and used solely for operational activities such as dredging or heavy load lifting, workshops or welding equipment, except for their effect on the classification-related matters, as declared by the Interested Party the Naval Authority or the Owner, such as fire protection and ship's general strength.

During periods of construction, modification or repair, the unit is solely under the responsibility of the builder or the repair yard. As an example, the builder or repair yard is to ensure that the construction, modification or repair activities are compatible with the design strength of the ship and that no permanent deformations are sustained.

Note 1: Refer to [3.3] as regards the Owner's responsibility for maintenance and operation of the ship in relation to the maintenance of class.

1.4 Request for services

1.4.1 Requests for interventions by the Society, such as surveys during construction, surveys of ships in service, tests, etc., are in principle to be submitted in writing and signed by the Interested Party. Such request implies that the applicant will abide by all the relevant requirements of the Rules, including its Preamble.

The Society reserves the right to refuse or withdraw the class of any ship for which any applicable requirement of the Rules is not complied with.

2 Rules

2.1 Effective date

2.1.1 The effective date of entry into force of any amendments to the Rules is indicated on the inside front page of each Part of the Rules.

2.1.2 In principle, the applicable Rules for assignment of class to a new ship are those in force at the date when the contract between the Owner and the shipyard is signed.

2.1.3 Special consideration may be given to applying new or modified rule requirements which entered into force subsequent to the date of the contract, at the discretion of the Society and in the following cases:

- when a justified written request is received from the parties applying for classification
- when the keel is not yet laid and more than one year has elapsed since the contract was signed
- where it is intended to use existing previously approved plans for a new contract.

2.1.4 The above procedures for application of the Rules are, in principle, also applicable to existing ships in the case of major conversions and, in the case of alterations, to the altered parts of the ship.

2.1.5 The rule requirements related to assignment, maintenance and withdrawal of the class of ships already in operation, as detailed in Part A, Chapter 2 to Part A, Chapter 5, are applicable from the date of their entry into force.

2.2 Equivalence

2.2.1 The Society may consider the acceptance of alternatives to these Rules, provided that they are deemed to be equivalent to the Rules to the satisfaction of the Society.

2.2.2 Except when the alternative design and arrangements are:

- already approved by the Society on a ship with similar characteristics and operating conditions, or
- based on novel principles and features as indicated in [2.3.1],

a justificative engineering analysis of the alternative design and arrangements is to be submitted to the Society.

2.2.3 The engineering analysis submitted to the Society shall include, as a minimum, the following elements:

a) determination of the ship type and arrangement concerned

b) identification of the rule requirements with which the ship or the arrangement will not comply

c) identification of the potential hazards of the ship or arrangement concerned

d) identification of the relevant alternative standard or regulations, functional requirements and operating conditions

e) detailed technical description of the proposed alternative design and arrangements

f) technical justification or analysis of previous in service experience on ships of similar characteristics and operating conditions showing that the proposed design and arrangements comply with the alternative standard in d).

2.3 Novel features

2.3.1 The Society may consider the classification of ships based on or applying novel design principles or features, to which the Rules are not directly applicable, on the basis of experiments, calculations or other supporting information provided to the Society. The specific limitations may then be indicated on the Certificate of Classification.

2.4 Interpretation

2.4.1 The Society alone is qualified to decide upon the meaning, interpretation and application of the Rules and other classification-related documents. No reference to the Rules or other classification-related documents has any value unless it involves, accompanies or follows the intervention of the Society.

2.5 Disagreement and appeal

2.5.1 Any technical disagreement with the Surveyor in connection with the performance of his duties should be raised by the Interested Party as soon as possible.

The Interested Party may appeal in writing to the Society, which will subsequently consider the matter and announce its decision according to its established procedure.

3 Duties of the Interested Parties

3.1 International and national regulations

3.1.1 The classification of a ship does not absolve the Interested Party from compliance with any requirements issued by the Naval Authority.

3.1.2 When authorized by the Naval Authority concerned, the Society will act on its behalf within the limits of such authorization. In this respect, the Society will take into account the relevant requirements, survey the ship, report and issue or contribute to the issue of the corresponding certificates.

The above surveys do not fall within the scope of the classification of ships, even though their scope may overlap in part and may be carried out concurrently with surveys for assignment or maintenance of class.

3.2 Surveyor's intervention

3.2.1 Except for secrecy or operational restrictions, Surveyors are to be given free access at all times to ships in service which are classed or being classed, shipyards and works, to carry out their interventions within the scope of assignment or maintenance of class, or within the scope of interventions carried out on behalf of the Naval Authority, when so delegated.

3.2.2 Interested Parties are to take the necessary measures for the Surveyors' inspections and testing to be carried out safely. Interested Parties - irrespective of the nature of the service provided by the Surveyors of the Society or others acting on its behalf - assume with respect to such Surveyors all the responsibility of an employer for his workforce such as to meet the provisions of applicable legislation. As a rule, the Surveyor is to be constantly accompanied during surveys by personnel of the Interested Party.

Refer also to Ch 2, Sec 2, [2.5].

3.2.3 The Certificate of Classification and/or other documents issued by the Society remain the property of the Society. All certificates and documents necessary to the Surveyor's interventions are to be made available by the Interested Party to the Surveyor on request.

3.2.4 During the phases of ship design and construction, due consideration should be given to rule requirements in respect of all necessary arrangements for access to spaces and structures with a view to carrying out class surveys. Arrangements of a special nature are to be brought to the attention of the Society.

3.3 Operation and maintenance of ships

3.3.1 The classification of a ship is based on the understanding that the ship is loaded and operated in a proper manner by competent and qualified crew or operating personnel according to the loading, environmental, operating and other criteria on which classification is based.

In particular, it will be assumed that the draught maximum displacement of the ship in operating conditions will not exceed the maximum approved for the classification, that the ship will be properly loaded taking into account both its stability and the stresses imposed on its structures and that cargoes will be properly stowed and suitably secured and that the speed and course of the ship are adapted to the prevailing sea and weather conditions, and that the ship is operated in accordance with the applicable international and national regulations for the prevention and containment of marine pollution.

3.3.2 Any document issued by the Society in relation to its interventions reflects the condition of the ship as found at the time and within the scope of the survey. It is the Owner's responsibility to ensure proper maintenance of the ship until the next survey required by the Rules. It is the duty of the Owner to inform the Surveyor when he boards the ship of any events or circumstances affecting the class.

3.4 Use of measuring equipment and of service suppliers

3.4.1 General

Firms providing services on behalf of the Interested Party, such as measurements, tests and servicing of safety systems and equipment, the results of which may form the basis for the Surveyor's decisions, are subject to the acceptance of the Society, as deemed necessary.

The equipment used during tests and inspections in workshops, shipyards and on board ships, the results of which may form the basis for the Surveyor's decisions, is to be customary for the checks to be performed. Firms are to individually identify and calibrate to a recognized national or international standard each piece of such equipment.

3.4.2 Simple measuring equipment

The Surveyor may accept simple measuring equipment (e.g. rulers, tape measures, weld gauges, micrometers) without individual identification or confirmation of calibration, provided it is of standard commercial design, properly maintained and periodically compared with other similar equipment or test pieces.

3.4.3 Shipboard measuring equipment

The Surveyor may accept measuring equipment fitted on board a ship (e.g. pressure, temperature or rpm gauges and meters) and used in examination of shipboard machinery and/or equipment based either on calibration records or comparison of readings with multiple instruments.

3.4.4 Other equipment

The Surveyor may request evidence that other equipment (e.g. tensile test machines, ultrasonic thickness measurement equipment, etc.) is calibrated to a recognized national or international standard.

3.5 Spare parts

3.5.1 It is the Owner's responsibility to decide whether and which spare parts are to be carried on board.

3.5.2 As spare parts are outside the scope of classification, the Surveyor will not check that they are kept on board, maintained in a satisfactory condition, or suitably protected and lashed.

However, in the case of repairs or replacement, the spare parts used are to meet the requirements of the Rules as far as practicable; refer to Ch 2, Sec 2, [7.3.2].

Section 2 Classification Notations

1 General

1.1 Purpose of the classification notations

1.1.1 The classification notations give the scope according to which the class of the ship has been based and refer to the specific rule requirements which are to be complied with for their assignment. In particular, the classification notations are assigned according to the type, service and navigation of the ship and other criteria which have been provided by the Interested Party, when applying for classification.

The Society may change the classification notations at any time, when the information available shows that the requested or already assigned notations are not suitable for the intended service, navigation and any other criteria taken into account for classification.

Note 1: Reference should be made to Ch 1, Sec 1, [1.3] on the limits of classification and its meaning.

1.1.2 The classification notations assigned to a ship are indicated on the Certificate of Classification.

1.2 Types of notations assigned

1.2.1 The types of classification notations assigned to a ship are the following:

a) class symbol

b) construction marks

c) service notations with additional service features, as applicable

d) navigation notations

e) additional class notations (optional).

The different classification notations and their conditions of assignment are listed in [2] to [6], according to their types.

1.2.2 As an example, the classification notations assigned to a ship may be as follows (the kind of notation shown in brackets does not form part of the classification notation indicated the Certificate of Classification:

I ✠ HULL • MACH

(class symbol, construction marks)

frigate

(service notation)

unrestricted navigation

(navigation notation)

✠ AUT-PORT

(additional class notation).

2 Class symbol

2.1 General

2.1.1 The class symbol expresses the degree of compliance of the ship with the rule requirements as regards its construction and maintenance. There is one class symbol, which is compulsory for every classed ship.

2.1.2 The class symbol **I** is assigned to ships built in accordance with the requirements of the Rules or other rules recognized as equivalent, and maintained in a condition considered satisfactory by the Society.

The period of class (or interval between class renewal surveys) assigned to class symbol **I** ships is maximum 5 years; see Ch 2, Sec 2, [5].

Note 1: The class symbol **I** is to be understood as being the highest class granted by the Society.

2.1.3 The class symbol **II** is assigned to ships which do not meet all requirements for class symbol **I**, but are deemed acceptable to be entered into the Register of Ships.

The period of class assigned to class symbol **II** ships is maximum 3 years, see Ch 2, Sec 2, [5].

2.1.4 Except for special cases, class is assigned to a ship only when the hull, propulsion and auxiliary machinery installations, and equipment providing essential services have all been reviewed in relation to the requirements of the Rules.

3 Construction marks

3.1 General

3.1.1 The construction mark identifies the procedure under which the ship and its main equipment or arrangements have been surveyed for initial assignment of the class. The procedures under which the ship is assigned one of the construction marks are detailed in Ch 2, Sec 1.

3.1.2 One of the construction marks defined below is assigned separately to the hull of the ship and its appendages, to the machinery installation, and to some installations for which an additional classification notation (see [6] below) is assigned.

The construction mark is placed before the symbol **HULL** for the hull, before the symbol **MACH** for the machinery installations, and before the additional class notation granted, when such a notation is eligible for a construction mark.

When the same construction mark is assigned to both hull and machinery, the construction mark is assigned globally to the ship without indication **HULL** and **MACH** after the class symbol.

If the ship has no machinery installations covered by classification, the symbol **MACH** is not granted and the construction mark will be placed before the symbol **HULL**.

3.1.3 The construction marks refer to the original condition of the ship. However, the Society may change the construction mark where the ship is subjected to repairs, conversion or alterations.

3.2 List of construction marks

3.2.1 The mark ✠ is assigned to the relevant part of the ship, when it has been surveyed by the Society during its construction in compliance with the new building procedure detailed in Ch 2, Sec 1, [2.1].

In case of nuclear propulsion, the construction mark ✠ may be assigned to machinery according to the effective scope of Classification and specific survey conditions agreed upon by the Society, the Naval Authority and the Shipbuilder in a separate agreement specific to the ship.

3.2.2 The mark • is assigned to the relevant part of the ship, where the procedure for the assignment of classification is other than those detailed in [3.2.1], but however deemed acceptable.

4 Service notations

4.1 General

4.1.1 The service notations define the type and/or service of the ship which have been considered for its classification, according to the request for classification signed by the Interested Party. At least one service notation is to be assigned to every classed ship.

4.1.2 The assignment of any service notation to a new ship is subject to compliance with general rule requirements laid down in Part B and Part C of the Rules, in NR216 Materials and Welding and, for some service notations, in the additional requirements laid down in Part D.

4.1.3 A ship may be assigned several different service notations. In such case, the specific rule requirements applicable to each service notation are to be complied with. However, if there is any conflict in the application of the requirements applicable to different service notations, the Society reserves the right to apply the most appropriate requirements or to refuse the assignment of one of the requested service notations.

4.1.4 A service notation may be completed by one or more additional service features, giving further precision regarding the type of service of the ship, for which specific rule requirements are applied.

4.1.5 The different service notations which may be assigned to a ship are listed in [4.2] to [4.10].

4.2 Frigate

4.2.1 The service notation **frigate** is assigned to ships designed for world wide operations and used either as centres of command or as a part of a task force or as an independent unit. They may have a variety of roles as air defence, anti submarine, sea defence or shore support.

They typically have displacement of more than 2000 tonnes, a length of more than 90 meters and comply with severe requirements.

The additional requirements of Ch 4, Sec 2 and Part D, Chapter 1 are applicable to these ships.

4.3 Aircraft carrier

4.3.1 The service notation **aircraft carrier** is assigned to ships designed for world wide operations and used either as centres of command or as a part of a task force or as an independent unit. They have the role of supporting aircraft operations at sea, with the capability to launch, recover and accommodate airplanes, unmanned aerial vehicles and helicopters.

They typically have displacement in excess of 20 000 tonnes, a length of more than 170 meters and comply with severe requirements.

The additional requirements of Ch 4, Sec 3 and Part D, Chapter 2 are applicable to these ships.

4.4 Corvette

4.4.1 The service notation **corvette** is assigned to ships designed for worldwide operations and used either as part of a task force or as an independent unit. They may have a variety of roles as anti-air, anti-submarine and sea defence and they generally have a helicopter capability.

They typically have displacement between 1000 and 2500 tonnes, a length between 60 and 90 meters and a maximum speed of more than 25 knots.

The additional requirements of Ch 4, Sec 2 and Part D, Chapter 3 are applicable to these ships.

4.5 Auxiliary naval vessel

4.5.1 The service notation **auxiliary naval vessel** is assigned to ships designed for world wide operations and are intended for underway replenishment vessels and fleet support vessels which carry and may transfer at sea oil, and possibly other solid and liquid supplies, like freshwater, stores, spare parts and ammunition.

The additional requirements of Ch 4, Sec 4 and Part D, Chapter 4, are applicable to these ships.

4.6 Amphibious vessel

4.6.1 The service notation **amphibious vessel** is assigned to ships designed for world wide operations and used either as centres of command, or as a part of a task force, or as an independent unit. They have the role of supporting helicopter and landing craft operations together with the transport of troops and vehicles.

They typically have a displacement in excess of 20 000 tonnes but smaller units can also be considered for this service notation.

The additional requirements of Ch 4, Sec 5 and Part D, Chapter 5 are applicable to these ships.

4.7 Military OPV

4.7.1 The service notation **military OPV** is assigned to ships dedicated to patrol and combat missions, serving as an independent unit, possessing a weapons system and generally having no operational limits based on weather conditions or sea state.

They have a variety of roles such as protection of the Economic Exclusive Zone, defense against terrorist attacks and other surveillance duties. These vessels patrol at either low or high speed.

The additional requirements of Ch 4, Sec 2 and Part D, Chapter 6 are applicable to these ships.

4.8 Landing craft

4.8.1 The service notation **landing craft** is assigned to craft designed for delivering troops and equipment ashore and restricted to vessels that can be docked in an amphibious mothership (length <60m).

They typically have a versatile deck structure to accommodate a range of vehicles and other loads. They are usually equipped with loading / unloading ramps, have structure reinforced for beaching loads and have mooring and towing capability.

The notation **landing craft** is completed by **-MOTHERSHIP (name of mother ship class)** when the mothership is already known and the limits for overall dimensions of the landing craft are mentioned inside the request for classification.

Note 1: Navigation notations to be assigned to landing craft are restricted to **coastal area** or **sheltered area**.

The requirements of Part D, Chapter 7 are applicable to these ships.

4.9 Unmanned Surface Vessel (USV)

4.9.1 The service notation **USV** is assigned to unmanned surface units.

The type of service is to be specified after the service notation.

Example: **USV / minehunter**.

The scope of application and the requirements for the assignment of the service notation **USV** are given in NR681 Unmanned Surface Vessels.

4.10 Special service

4.10.1 The service notation **special service** is assigned to naval ships for which, by reason of their design or mission, the granting of a specific service notation mentioned in Part D is not considered relevant, but where NR483 can nevertheless be applied.

Specific Rules of the Society and in particular the Rules for the Classification of Steel Ships (NR467) may also be applied to these ships.

An additional service feature may be specified after the notation (e.g. **special service - hospital vessel**) to identify the particular service the ship is intended for. The scope and criteria of classification of such units are indicated in a memoranda.

4.11 Miscellaneous service features

4.11.1 Condition based maintenance

The additional service features **CBM** and **[CBM]** are assigned to ships where a Planned Maintenance Survey system for machinery (PMS) is implemented and on which at least one machinery item is to be surveyed under a Condition Based Maintenance scheme, according to the requirements of Ch 2, Sec 2, [5.4] and Ch 2, App 4.

The additional service features **CBM-P** and **[CBM-P]** are assigned in lieu of the notations **CBM** and **[CBM]** when the CBM scheme relies on at least one predictive condition monitoring system as defined in NI684.

The additional service features **[CBM]** and **[CBM-P]** are assigned to ships after the Owner's application for the CBM scheme has been received by the Society.

The additional service features **[CBM]** and **[CBM-P]** are replaced by respectively **CBM** or **CBM-P** when the installation survey and the implementation survey are carried out and found satisfactory in accordance with Ch 2, App 4, [3.1] and Ch 2, App 4, [3.2].

Consideration may be given by the Society, on a case by case basis, to withdraw **[CBM]** or **[CBM-P]** in case of significant delay for the Owner's request for the installation survey.

Note 1: See NI684 “Guideline for Condition Based Maintenance” for further details on requirements and class workflow.

The requirements for the assignment and maintenance of these additional service features are given in Ch 2, App 4.

5 Navigation notations

5.1 Navigation notations

5.1.1 Every classed ship is to be assigned one navigation notation as listed in [5.2].

5.1.2 The assignment of a navigation notation, including the reduction of scantlings or specific arrangements for restricted navigation notations, is subject to compliance with the requirements laid down in Part B, Part C and Part D of the Rules and in NR216 Materials and Welding.

5.1.3 The assignment of a navigation notation does not absolve the Interested Party from compliance with any international and national regulations established by the Naval Authority for a ship operating in national waters, or a specific area, or a navigation zone. Neither does it waive the requirements in Ch 1, Sec 1, [3.3.1].

5.2 List of navigation notations

5.2.1 The navigation notation **unrestricted navigation** is assigned to a ship intended to operate in any area and any period of the year.

5.2.2 The navigation notations **coastal area** or **sheltered area** are only assigned to ships with the service notation **landing craft** as defined in [4.8].

The navigation notation **coastal area** is assigned to ships intended to operate only within 20 nautical miles from the shore and with a maximum sailing time of six hours from a place of refuge, including a mother ship, or a safe sheltered anchorage.

The navigation notation **sheltered area** is assigned to ships intended to operate in sheltered waters, i.e. harbours, estuaries, roadsteads, bays, lagoons and generally calm stretches of water and when the wind force does not exceed 6 Beaufort scale.

6 Additional class notations

6.1 General

6.1.1 An additional class notation expresses the classification of additional equipment or specific arrangement, which has been requested by the Owner.

6.1.2 The assignment of such an additional class notation is subject to the compliance with additional rule requirements, which are detailed in Part E of the Rules.

6.1.3 Some additional class notations, due to the importance of relevant equipment or arrangements, are assigned a construction mark, according to the principles given in [3.1.2]. This is indicated in the definition of the relevant additional class notations.

6.1.4 The different additional class notations which may be assigned to a ship are listed in [6.2] to [6.15], according to the category to which they belong. These additional class notations are also listed in alphabetical order in Tab 1.

Additional class notations from other Bureau Veritas Rules, such as NR467 Rules for the Classification of Steel Ships for example, can also be applied to Naval ships subject to specific agreement of the Society on case by case basis.

Table 1 : List of additional class notations

Additional class notation	Reference for definition	Reference in NR483 or to other Rule Notes	Remarks
AIRTEST	[6.15.5]	Pt E, Ch 11, Sec 5	
ALM **(1)** **(ALM)** **(1)** **ALP** **(1)** **(ALP)** **(1)**	[6.15]	NR526	**ALM** may be completed by a combination of **-EN**, **-SUBSEA** and **-MR** **ALP** may be completed by **-MR**
ARMOUR	[6.2.1]	Pt E, Ch 1, Sec 1	
AUT-QAS **(1)**	[6.5.2]	Pt E, Ch 4, Sec 1	
AUT-PORT **(1)**	[6.5.3]	Pt E, Ch 4, Sec 2	
AUT-IAS **(1)**	[6.5.4]	Pt E, Ch 4, Sec 3	
AVM-APM **(1)**	[6.4.2]	Pt E, Ch 3, Sec 1	
AVM-DPS **(1)**	[6.4.3]	Pt E, Ch 3, Sec 2	
AVM-IPSx-(V)	[6.4.4]	Pt E, Ch 3, Sec 3	
AWT	[6.10.4]	Part E, Chapter 7	
BWE	[6.10.5]	Part E, Chapter 7	
BWT	[6.10.6]	Part E, Chapter 7	
CBRN **CBRN-AIR BLAST RESISTANCE**	[6.11.1]	Part E, Chapter 8	
CLEANSHIP **CLEANSHIP SUPER ( )**	[6.10.2] [6.10.3]	Part E, Chapter 7	between brackets, at least 3 eligible notations are to be assigned among the following ones: **AWT**, **BWT**, **GWT**, **OPS( )**, **NDO -x days**, **NOX-x%**, **OWS-x ppm**, **SOX-x%**
COMF-NOISE	[6.8.2]	Pt E, Ch 6, Sec 2	
COMF-VIB	[6.8.3]	Pt E, Ch 6, Sec 3	
FFS	[6.2.4]	Pt E, Ch 1, Sec 4	
FIRE( )	[6.13.3]	Pt E, Ch 10, Sec 3	The additional class notation **FIRE( )** is to be completed, between brackets, by one, more or all of the following notations: **F**, **T**, **S**
GREEN PASSPORT **GREEN PASSPORT EU**	[6.10.7]	NR528	
GWT	[6.10.8]	Part E, Chapter 7	
HELICOPTER	[6.15.2]	Pt E, Ch 11, Sec 2	
INTERNAL CONNECTIVITY	[6.15.4]	NR688	
INWATERSURVEY	[6.15.1]	Pt E, Ch 11, Sec 1	
LSA	[6.13.1]	Pt E, Ch 10, Sec 1	
MANOVR	[6.12.1]	Pt E, Ch 9, Sec 1	
MON-HULL	[6.7.2]	Pt E, Ch 5, Sec 1	
MON-SHAFT	[6.7.3]	Pt E, Ch 5, Sec 2	
NDO-x days	[6.10.9]	Part E, Chapter 7	
NOX-x%	[6.10.10]	Part E, Chapter 7	
NSC **NSC( )**	[6.15.3]	–	When partial compliance with the Naval Ship Code, the list of the chapters complied with is indicated between brackets
OPS( )	[6.10.11]	NR467, Pt F, Ch 14, Sec 5	**OPS( )** is to be completed, between brackets, by the design power supply voltage and frequency
(1) A construction mark is added to this notation.			

Additional class notation	Reference for definition	Reference in NR483 or to other Rule Notes	Remarks
OWS-x ppm	[6.10.12]	Part E, Chapter 7	
REF-STORE **(1)**	[6.9.1]	Pt E, Ch 11, Sec 3	
RS-P	[6.2.3]	Pt E, Ch 1, Sec 3	
SEA-KEEP	[6.12.3]	Pt E, Ch 9, Sec 3	To be completed by notations for the capabilities assessed along with their limiting sea states, amongst the notations listed in Tab 2
SHOCK **SHOCK STRENGTH** **SHOCK EQUIPMENT**	[6.2.2]	Pt E, Ch 1, Sec 2	
SOX-x%	[6.10.13]	Part E, Chapter 7	as an alternative, equivalent arrangements (e.g. exhaust gas cleaning systems) may be accepted
STAR **(1)**	[6.3.4]	Part E, Chapter 2	This cumulative notation supersedes the notations **STAR-HULL** and **STAR-MACH**, when both are assigned
STAR-HULL **(1)**	[6.3.2]	Pt E, Ch 2, Sec 1	This notation may be completed by the suffix **-IMO**, **-MIL** (see [6.12.1])
STAR-MACH **(1)**	[6.3.3]	Pt E, Ch 2, Sec 2	
STAR-MACH-PMS	[6.3.3]	Pt E, Ch 2, Sec 2	
SYS-NEQ **(1)** **SYS-NEQ-1** **(1)**	[6.6.1]	Pt E, Ch 11, Sec 4	
TOW	[6.13.2]	Pt E, Ch 10, Sec 2	
VLS	[6.12.2]	Pt E, Ch 9, Sec 2	Restricted to auxiliary naval vessels
(1) A construction mark is added to this notation.			

6.2 Military environment

6.2.1 ARMOUR

The additional class notation **ARMOUR** is assigned to ships fitted with a protection by armour, when the requirements of Pt E, Ch 1, Sec 1, [2] to Pt E, Ch 1, Sec 1, [4] are complied with.

The requirements for the assignment and maintenance of this notation are provided in Pt E, Ch 1, Sec 1 and Ch 5, Sec 2, [2] respectively.

6.2.2 SHOCK

The following additional class notations are assigned to ship for which shock-resistance capability measures are taken:

- The additional class notation **SHOCK STRENGTH** is granted to ship for which measures are taken to increase their survivability following threat damage to the structures from an assigned underwater non-contact explosion in compliance with the requirements of Pt E, Ch 1, Sec 2.
- The additional class notation **SHOCK EQUIPMENT** is granted to ship for which a list of specified pieces of equipment have been satisfactorily shock tested and subsequently fulfill the shock resilience criteria specified by the Naval Authority for the applicable design shock level in compliance with the requirements of Pt E, Ch 1, Sec 2.
- The additional class notation **SHOCK** is granted to ship for which hull strength and equipment are in compliance with both notations **SHOCK STRENGTH** and **SHOCK EQUIPMENT**.

6.2.3 Residual strength (RS-P)

The additional class notation **RS-P** is assigned to ships for which the residual hull girder ultimate strength under damage condition is evaluated according to minimum hull damage scenari and rule wave hull girder loads.

The requirements for the assignment of this notation are provided in Pt E, Ch 1, Sec 3.

6.2.4 Flooding fighting systems (FFS)

The additional notation **FFS** is assigned to ship fitted with pumping facilities able to cope with the ingress of a great amount of water resulting from a hull damage or a sea water pipe break.

The requirements for the assignment and maintenance of this notation are given Pt E, Ch 1, Sec 4 and in Ch 5, Sec 2, [3] respectively.

6.3 System of Trace and Analysis of Records (STAR)

6.3.1 General

STAR is a System of Trace and Analysis of Records integrating rational analysis with data and records from ship-in-service concerning planned inspection and ship maintenance.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in Article [3].

The requirements for the assignment of these notations are given in Part E, Chapter 2.

6.3.2 STAR-HULL

The additional class notation **STAR-HULL** is assigned to ships on which an Inspection and Maintenance Plan (IMP) for the hull is implemented.

The notation may be completed by the suffix **NB** when a structural tridimensional analysis has been performed for the hull structures, as defined in Pt B, Ch 7, App 1 or Pt B, Ch 7, App 2 or Pt B, Ch 7, App 3, as applicable, at the new building stage. The suffix **NB** is removed when the ship enters the **STAR-HULL** survey programme through the implementation of the Inspection and Maintenance Plan (IMP).

6.3.3 STAR-MACH

The additional class notation **STAR-MACH** is assigned to ships on which an Inspection and Maintenance Plan (IMP) for the machinery is implemented. This plan is based on a risk analysis review of the installation.

Where only a Planned Maintenance Scheme approved by the Society is implemented, the additional class notation **STAR-MACH-PMS** is assigned.

6.3.4 STAR notation (STAR)

When ships are granted both **STAR-HULL** and **STAR-MACH**, the two separate notations are superseded by the cumulative additional class notation **STAR**.

6.4 Availability of machinery (AVM)

6.4.1 General

The notations dealt with under this heading are relevant to systems and/or arrangements enabling the ship to carry on limited operations when single failure affects propulsion or auxiliary machinery or when an external event such as fire or flooding involving machinery spaces affects the availability of the machinery.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in Article [3].

The requirements for the assignment of these notations are given in Part E, Chapter 3.

6.4.2 AVM-APM (Alternative propulsion mode)

The additional class notation **AVM-APM** is assigned to ships which are fitted with systems and/or arrangements enabling them to maintain operating conditions during the normal service with some limitations in speed, range and comfort, in the case of any single failure of items relative to the propulsion or power generating system.

The limitations in operation and the types of single failure covered by this notation are specified in Pt E, Ch 3, Sec 1.

6.4.3 AVM-DPS (Duplicated propulsion system)

The additional class notation **AVM-DPS** is assigned to ships which are fitted with a duplicated propulsion system enabling them to maintain operating conditions with some limitations in power (but 50% of the main power necessary for nominal speed, booster not included is to be maintained), speed, range and comfort, in the case of any single failure of items relative to the propulsion or power generating system.

The loss of one compartment due to fire or flooding is not considered as a single failure case.

The limitations in operation and the types of failure which are covered by this notation are specified in Pt E, Ch 3, Sec 2.

6.4.4 AVM-IPSx-(V) Independent propulsion system

The additional class notation **AVM-IPSx-(V)** is assigned to ships which are fitted with an independent propulsion system enabling them to maintain operating conditions with some limitations in power (but 50% of the main power is to be maintained), speed, range and comfort, in the case of single failure of items relative to the propulsion or power generating system, where x indicates the number of flooded compartments and V the minimum speed in case of single failure.

The limitations in operation and the types of failure which are covered by this notation are specified in Pt E, Ch 3, Sec 3, [1.2].

Note 1: The loss of one compartment due to fire or flooding is considered as a single failure case.

6.5 Automated machinery systems (AUT)

6.5.1 General

The notations dealt with under this heading are relevant to automated machinery systems installed on board ships.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in Article [3].

The requirements for the assignment of these notations are given in Part E, Chapter 4.

6.5.2 Unattended machinery space (AUT-QAS)

The additional class notation **AUT-QAS** is assigned to ships which are fitted with automated installations enabling machinery spaces to remain periodically unattended in all sailing conditions including manoeuvring.

6.5.3 Automated operation in port (AUT-PORT)

The additional class notation **AUT-PORT** is assigned to ships which are fitted with automated installations enabling the ship's operation in port or at anchor without personnel specially assigned for the watch-keeping of the machinery in service.

6.5.4 Integrated machinery system (AUT-IAS)

The additional class notation **AUT-IAS** is assigned to ships fitted with automated installations enabling periodically unattended operation of machinery spaces and additionally with integrated systems for the control and monitoring of platform systems.

6.6 Integrated and digital systems

6.6.1 Centralised navigation equipment (SYS-NEQ)

The additional class notation **SYS-NEQ** is assigned to ships fitted with a centralized navigation control system so laid out and arranged that it enables normal navigation and manoeuvring operation of the ship by two persons in cooperation.

The additional class notation **SYS-NEQ-1** is assigned when, in addition, the installation is so arranged that the navigation and manoeuvring of the ship can be operated under normal conditions by one person for periodical one man watches. This notation includes specific requirements for prevention of accidents caused by the operator's unfitness.

The requirements for the assignment of these notations are provided in Pt E, Ch 11, Sec 4.

6.7 Monitoring equipment (MON)

6.7.1 General

The notations dealt with under this heading are relevant to hull and tailshaft monitoring equipment installed on board ships.

The requirements for the assignment of these notations are given in Part E, Chapter 5.

6.7.2 Hull stress monitoring (MON-HULL)

The additional class notation **MON-HULL** is assigned to ships which are fitted with equipment continuously monitoring ship's dynamic loads through measurements of motions in waves and stresses/deformations in the hull structure.

The notation may be completed by the suffix **+S** if the measurements are stored for further exploitation by the Owner.

6.7.3 Tailshaft monitoring system (MON-SHAFT)

The additional class notation **MON-SHAFT** is assigned to ships which are fitted with a temperature monitoring system for the tailshaft sterntube aft bearing. The assignment of this notation allows the ship to be granted a reduced scope for complete tailshaft surveys, see Ch 2, Sec 2, [6.6.4].

6.8 Comfort on board (COMF)

6.8.1 General

The notations dealt with under this heading are relevant to the assessment of comfort on board ships with regard to the noise and/or vibration.

The parameters which are taken into consideration for the evaluation of the comfort, such as the level of noise, the level of vibration, is indicated in a memoranda.

The requirements for the assignment and maintenance of these notations are given in Part E, Chapter 6.

6.8.2 Comfort with regard to noise (COMF-NOISE)

The additional class notation **COMF-NOISE** is assigned to ships satisfying levels of noise defined in Pt E, Ch 6, Sec 2. The assessment of noise levels is only carried out through design review and sea trials.

6.8.3 Comfort with regard to vibration (COMF-VIB)

The additional class notation **COMF-VIB** is assigned to ships satisfying levels of vibration defined in Pt E, Ch 6, Sec 3. The assessment of vibration levels is only carried out through design review and sea trials.

6.9 Refrigerating installations

6.9.1 Refrigerating installations for domestic supply (REF-STORE)

The additional class notation **REF-STORE** is assigned to ships fitted with refrigerating plants and spaces exclusively intended for the preservation of ship's domestic supply.

The requirements for the assignment of this notation is given in Pt E, Ch 11, Sec 3.

6.10 Environmental protection

6.10.1 General

The notations dealt with under this heading are assigned to ships fitted with equipment and arrangements enabling them to control and limit the emission of polluting substances in the sea and the air.

The requirements for the assignment of these notations are given in Part E, Chapter 7.

6.10.2 Pollution prevention (CLEANSHIP)

The additional class notation **CLEANSHIP** is assigned to ships so designed and equipped as to control and limit the emission of polluting substances in the sea and the air in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 2.

6.10.3 Pollution prevention (CLEANSHIP SUPER)

The additional class notation **CLEANSHIP SUPER** is assigned to ships so designed and equipped as to control and limit the emission of polluting substances in the sea and the air in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 2.

Note 1: At least 3 eligible notations are to be assigned among the following ones:

AWT, **BWT**, **GWT**, **OPS( )**, **NDO-x days**, **NOX-x%**, **OWS-x ppm**, **SOX-x%**.

Example:

CLEANSHIP SUPER (AWT, NOX-80%, SOX-60%)

6.10.4 Advanced Wastewater Treatment (AWT)

The additional class notations **AWT** is assigned to ships fitted with an Advanced Wastewater Treatment plant in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.5 Ballast Water Exchange (BWE)

The additional class notation **BWE** is assigned to ships designed for ballast water exchange complying with the requirements of BWM convention (2004) and in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.6 Ballast Water Treatment (BWT)

The additional class notation **BWT** is assigned to ships fitted with a Ballast Water Treatment plant in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.7 Green passport for ship recycling

The additional class notation **GREEN PASSPORT** or **GREEN PASSPORT EU** is assigned to ships for which requirements intended to facilitate ship recycling have been applied, encompassing the identification, quantification and localization of materials which may cause harm to the environment and people when the fittings or equipment containing such materials are removed, or when the ship is recycled, as detailed hereafter.

GREEN PASSPORT is assigned to ships for which such requirements have been applied in accordance with:

- the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009, and
- the European Regulation Reg (EU) N°1257/2013 on Ship Recycling, as amended, as applicable to ships flying the Flag of a non-EU member State.

GREEN PASSPORT EU is assigned to ships for which such requirements have been applied in accordance with:

- the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009, and
- the European Regulation Reg (EU) N°1257/2013 on Ship Recycling as applicable to ships flying the Flag of a EU member State.

The requirements for the assignment and maintenance of this notation are given in NR528 Green Passport.

6.10.8 Grey Water Treatment (GWT)

The additional class notation **GWT** is assigned to ships fitted with a treatment installation for grey waters in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.9 No Discharge Operation (NDO-x days)

The additional class notation **NDO-x days** is assigned to ships designed for no discharge operation during x days, in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

Note 1: **x days** is the number of consecutive days the ship is able to operate with the full complement of on-board people, including crew and passengers, without the need for discharging any substances into the sea. This number cannot be less than one day (24 hours).

6.10.10 NOx emissions control (NOX-x%)

The additional class notation **NOX-x%** is assigned to ships for which the average NOx emissions of engines are not to exceed x% of IMO Tier II limit in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.11 Onshore Power Supply (OPS)

The additional class notation **OPS( )** is assigned to ships fitted with shore connection systems allowing the ship to plug into an onshore power source (OPS) when berthed.

The assignment of the additional class notation **OPS( )** is mandatory for ships fitted with a HV Shore Power supply system.

The additional class notation **OPS( )** is to be completed between brackets by one or several shore supply characteristics the ship's installation is designed to receive:

- power supply voltage the ship can connect to, completed by AC and the ship's main frequency
- power supply voltage the ship can connect to, completed by DC.

Example:

OPS(440V AC 60Hz)

OPS(440V AC 60Hz / 6,6kV AC 60Hz / 11kV DC)

The requirements for the assignment and maintenance of this notation are given respectively in NR467, Pt F, Ch 14, Sec 5 and NR467, Pt A, Ch 5, Sec 18, [5].

6.10.12 High-performance Oily Water Separator (OWS-x ppm)

The additional class notation **OWS-x ppm** is assigned to ships fitted with an oily water separator producing effluents having a hydrocarbon content not exceeding x ppm (parts per million) in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

6.10.13 SOx emissions control (SOX-x%)

The additional class notation **SOX-x%** is assigned to ships for which the oil fuels used within and outside SECAs have a sulphur content not exceeding x% of the relevant IMO limit in accordance with the provisions of Pt E, Ch 7, Sec 1 and Pt E, Ch 7, Sec 3.

Note 1: As an alternative, equivalent arrangements (e.g. exhaust gas cleaning systems) may be accepted.

6.11 Protection against chemical, biological, radiological or nuclear risks (CBRN)

6.11.1 CBRN protection

The additional class notation **CBRN** may be assigned to ships intended for operations in atmospheres contaminated by chemical, biological or nuclear hazardous material and equipped with a citadel with a collective protection system that protects people inside from contamination thanks to its dedicated ventilating system.

The additional class notation **CBRN-AIR BLAST RESISTANCE** may be assigned to ships which, in addition to the above features, have their collective protection system designed to withstand air blast.

The requirements for the assignment and maintenance of these notations are given respectively in Part E, Chapter 8 and in Ch 5, Sec 10.

6.12 Manoeuvring, stability and sea-keeping

6.12.1 Ship manoeuvrability

The additional class notation **MANOVR** may be assigned to ships complying with manoeuvring capability standards.

The above is completed by the following notations according to the specified performance assured:

-IMO, for performance complying with IMO Resolution MSC.137(76)

-**MIL**, for performance complying with a higher level of manoeuvring standards.

The requirements for the assignment of this notation are given in Pt E, Ch 9, Sec 1.

6.12.2 VLS

The additional notation **VLS** may be assigned to auxiliary naval vessels, the stability of which is in compliance with military criteria, based on the V-lines method with 2 flooded compartments.

The requirements for the assignment of this notation are provided in Pt E, Ch 9, Sec 2.

6.12.3 SEA-KEEP

The confidential additional class notation **SEA-KEEP** is assigned to ships whose specified performance levels are assured up to a certain sea state, according to criteria given in NATO STANAG 4154 Ed. 4.

The **SEA-KEEP** notation is to be completed between brackets, by at least one of the following notations indicating the type of ship capability for which the sea-keeping performance has been evaluated:

- **FLY** for flight operations
- **RAS** for replenishment at sea
- **WEAP** for weapon systems operations
- **CREW** for crew capability
- **BOAT** for small craft operations.

These notations are to be completed, as applicable, by at least one notation detailing the specific capabilities assessed as given in Tab 2.

The notations detailing the specific capabilities assessed are to be completed by a notation **-X(L,M,H)** where **X** specifies the limiting sea state number and **L**, **M** and **H** further specify the degree of severity (Low, Medium, High) of the sea state considered among those characterized by the number, up to and including which the required sea-keeping performance is maintained.

Note 1: for assessment of crew capability, the limiting sea state notation **-X(L,M,H)** is to be added directly to the notation indicating the type of ship capability (e.g. **CREW-2(M)**)

For example, the additional notation **SEA-KEEP(FLY-CTOL-3(H)-FWAH-1(L)**, **RAS-CONREP-2(M))** is assigned to a ship that can satisfy the flight operation limits for "Conventional Take-Off and Landing" in seas up to and including high sea state 3, the flight operation limits for "Fixed Wing Aircraft Handling" in seas up to and including low sea state 1 and the replenishment at sea limits for "Connected replenishment" in seas up to and including medium sea state 2.

The requirements for the assignment of this notation are given in Pt E, Ch 9, Sec 3.

Table 2 : Additional class notations for sea-keeping assessment

Type of ship capability	Specific capability assessed	Notation **(1)**
Flight operations (**FLY**)	Conventional Take-Off and Landing	**-CTOL**
	Fixed Wing Aircraft Handling	**-FWAH**
	Helicopter and short take-off and vertical landing (STOVL) aircraft launch and recovery	**-HELOL**
	Helicopter and short take-off and vertical landing (STOVL) aircraft handling	**-HELOH**
Replenishment at sea (**RAS**)	Connected replenishment	**-CONREP**
	Fuelling at sea	**-FAS**
	Vertical replenishment	**-VERTREP**
Weapon systems operations (**WEAP**)	Radars	**-R**
	Sonar	**-S**
	Trainable missiles	**-TM**
	Vertical launch systems	**-VM**
	Torpedo systems	**-T**
	Support equipment	**-E**
	Guns	**-G**
Crew **(CREW)**	Crew performance	N.A.
Small craft operations (**BOAT**)	Stern and davit (or side) launch and recovery of small craft	**-DECK**
	Stern ramp launch and recovery of small craft	**-RAMP**

(1) To be completed in each case by the limiting sea state notation **-X(L,M,H)** where **X** indicates the limiting sea state number and one of **L**, **M** and **H** is to be specified to indicate the degree of severity (Low, Medium, High) of the limiting sea state.

Note 1: N.A. = Not applicable. In such cases the limiting sea state notation is assigned directly to the notation indicating the type of ship capability.

6.13 Safety equipment and installations

6.13.1 Life saving appliances (LSA)

The additional class notation **LSA** may be assigned to ships the life-saving equipment of which complies with the applicable provisions of Pt E, Ch 10, Sec 1.

Note 1: It is reminded that, except if **LSA** additional class notation is to be granted, life-saving appliances are out of the scope of classification.

6.13.2 Towing

The additional class notation **TOW** is assigned to ships fitted with towing and emergency towing equipment.

The requirements for the assignment and maintenance of this notation are given in Pt E, Ch 10, Sec 2 and Ch 5, Sec 12 respectively.

6.13.3 Enhanced fire protection (FIRE)

The additional class notation **FIRE** may be assigned to ships provided with enhanced fire protection features. It is always completed between brackets by one, or by a combination, of the following notations:

- **F**, for ships equipped with a sprinkler system in accommodation spaces, service spaces and control stations
- **T**, for ships on which the low flame-spread characteristics of surface materials have been assessed taking into account the layer combination
- **S**, for ships on which fire doors located on smoke extraction paths are planned to be kept open.

Examples:

FIRE(F)

FIRE(T, S)

FIRE(F, T, S)

The requirements for the assignment of these notations are given in Pt E, Ch 10, Sec 3.

Note 1: Ships assigned the additional class notation **FIRE** before 1st November 2023, are to be assigned the additional class notation **FIRE(F)** at the first renewal survey held after 1 November 2023, or before upon request from the Owner.

6.14 Lifting appliances

6.14.1 Ships fitted with lifting appliances additional class notations **ALP** or **ALM**, along with their possible complementary notations, according to the intended uses and conditions defined in [6.14.2] and [6.14.3].

The additional class notations **(ALP)** or **(ALM)** may be assigned by the Society in lieu of the notations **ALP** or **ALM** respectively, when the corresponding lifting appliances meet the requirements of specific National Regulations under the conditions defined in NR526.

The assignment of the aforementioned notations is voluntary. However, the Society may require the compliance of lifting appliances with the assigning conditions of one of the above mentioned additional class notations for the classification of ships, when one or several lifting appliances are of a primary importance for their operation, or when such appliances significantly influence their structure.

In compliance with [6.1.3], these notations are assigned a construction mark as defined in Article [3].

The lifting appliances (cranes, derrick systems, lifting platforms) covered by each notation and their complementary notations are to be indicated in a memorandum.

The requirements for the assignment and maintenance of these notations are given in NR526.

6.14.2 Lifting appliances intended to be used in harbour conditions

The additional class notation **ALP** is assigned to ships fitted with lifting appliances intended to be used primarily at harbour, for loading or unloading cargoes, equipment, spare parts or consumables.

Note 1: The additional class notation **ALP** may also be assigned to ships fitted with lifting appliances used in harbour or in similar conditions for lifting operations other than loading or unloading of the ship.

The additional class notation **ALP** may be completed by **-MR** when, in addition, at least one lifting appliance is intended to be used for lifting of personnel.

6.14.3 Lifting appliances intended to be used in offshore conditions

The additional class notation **ALM** is assigned to ships fitted with lifting appliances (exclusive of the lifting appliance covered by the requirements of [6.14.2]) intended to be used in offshore conditions for various lifting operations.

The additional class notation **ALM** may be completed by one or several of the following complementary notations:

- **-EN**, where at least one lifting appliance is equipped with a requested list of instrumentation and equipment for safety operations (indicator and alarms at the control station, limiting devices, overload protection systems and emergency operation systems) indicated in NR526, Ch 3, Sec 1, [5]
- **-SUBSEA**, where at least one lifting appliance is intended to be used for lifting of subsea equipment in compliance with some specific requirements
- **-MR**, where at least one lifting appliance is intended to be used for lifting of personnel.

6.15 Other additional class notations

6.15.1 In-water survey

The additional class notation **INWATERSURVEY** may be assigned to ships provided with suitable arrangements to facilitate the in-water surveys as provided in Ch 2, Sec 2, [3.4].

The requirements for the assignment of this notation are given in Pt E, Ch 11, Sec 1.

6.15.2 Helicopter deck

The additional class notation **HELICOPTER** may be assigned to ships provided with a helicopter deck when the requirements of Pt E, Ch 11, Sec 2 are complied with.

The requirements for the assignment and maintenance of this notation are given in Pt E, Ch 11, Sec 2 and Ch 5, Sec 13 respectively.

6.15.3 Naval Ship Code (NSC)

The additional class notation **NSC** is assigned to ships complying with the Naval Ship Code published by NATO as ANEP 77 (Allied Naval Engineering Publication).

When only partial compliance is required, the additional class notation **NSC ()** is to be assigned, indicating between brackets the chapters of the Naval Ship Code that are complied with. Chapters detailing the definitions, the use of the NSC and the certification process are deemed to apply automatically and are not needed to be indicated between brackets.

For example, **NSC (II, VI, VII)** means that Chapters II, VI and VII of the Naval Ship Code have been reviewed for assignment of the notation.

The documents to be submitted for review in order to assign additional class notation **NSC** or **NSC ()** are those required by the relevant chapters of the Naval Ship Code.

When the ship is assigned an additional class notation **NSC** or **NSC ()**, a Naval Ship Safety Certificate, indicating the applicable version of the Code, may be issued by the Society on behalf of the Naval Authority, when delegated.

6.15.4 Internal Connectivity

The additional class notation **INTERNAL CONNECTIVITY** may be assigned to ships for which the on-board network infrastructure enables internal connectivity.

The requirements for the assignment and the maintenance of this notation are given in Rule Note NR688 Internal Connectivity.

Note 1: The scope of the notation is limited to a list of Internal Connectivity Areas (ICAs) to be specified by the applicant. This list of ICAs is to be indicated in a memorandum.

6.15.5 Compartment air test (AIRTEST)

The additional class notation **AIRTEST** may be assigned to ships where watertight boundaries have been subjected to leak test using a positive air pressure differential and maximum allowable pressure loss as a criteria.

The requirements for the assignment and maintenance of this notation are given in Pt E, Ch 11, Sec 5 and Ch 5, Sec 14.

7 Other notations

7.1

7.1.1 The Society may also define other notations by means of provisional requirements and guidelines, which may then be published in the form of tentative rules.

8 Explicit request of the Naval Authority

8.1

8.1.1 Some non compulsory requirements of the Rules are applicable only upon explicit request of the Naval Authority.

Same as for the additional class notations, these requirements are to be listed on the request for classification to be applicable.

Example: see Pt C, Ch 1, Sec 6, Tab 5: Value of K_A.

CHAPTER 2
ASSIGNMENT, MAINTENANCE, SUSPENSION AND WITHDRAWAL OF CLASS

Section 1 Assignment of Class

Section 2 Maintenance of Class

Section 3 Suspension and Withdrawal of Class

Appendix 1 Planned Maintenance Scheme

Appendix 2 CSM and PMS Systems: Surveys Carried out by the Chief Engineer

Appendix 3 Thickness Measurements: Extent, Determination of Locations, Acceptance Criteria

Appendix 4 Condition Monitoring and Condition Based Maintenance

Section 1 Assignment of Class

1 General

1.1 Criteria

1.1.1 Class is assigned to a ship upon a survey, with the associated operations, which is held in order to verify whether it is eligible to be classed on the basis of the Rules of the Society (see Ch 1, Sec 1, [1.3.1]). This may be achieved through:

- the completion of the new building, during which a survey has been performed
- a specific admission to class survey, in cases where a ship is classed by a recognized Classification Society or is not classed at all.

Special consideration will be given to ships transferring class from another recognized Classification Society who have appropriate Military or Navy Ship Rules.

1.2 Confidentiality

1.2.1 The drawing approval activities and the necessary interventions for the class assignment are performed by authorized persons.

The drawings and documents required for the classification of a ship are dealt with according to the level of confidentiality required by the Owner or Naval Authority.

2 New building procedure

2.1 Ships surveyed by the Society during construction

2.1.1 When a ship is surveyed by the Society during construction, it is to comply with those requirements of the Rules which are in force and applicable depending on the class of the ship, taking into account the provisions of Ch 1, Sec 1, [2.1] and Ch 1, Sec 1, [2.5].

2.1.2 The Society:

- approves the plans and documentation submitted as required by the Rules
- proceeds, if required, with the appraisal of the design of materials and equipment used in the construction of the ship and their inspection at works
- carries out surveys or obtains appropriate evidence to satisfy itself that the scantlings and construction meet the rule requirements in relation to the approved drawings
- attends tests and trials provided for in the Rules
- assigns the construction mark ✠; refer to Ch 1, Sec 2, [3.2.1].

2.1.3 The Society defines in specific Rules which materials and equipment used for the construction of ships built under survey are, as a rule, subject to appraisal of their design and to inspection at works, and according to which particulars.

2.1.4 As part of his interventions during the ship's construction, the Surveyor will:

- conduct an overall examination of the parts of the ship covered by the Rules
- examine the construction methods and procedures when required by the Rules
- check selected items covered by the rule requirements
- attend tests and trials where applicable and deemed necessary.

2.1.5 Use of materials, machinery, appliances and items

As a general rule, all materials, machinery, boilers, auxiliary installations, equipment, items etc. (generally referred to as "products") which are covered by the class and used or fitted on board ships surveyed by the Society during construction are to be new and, where intended for essential services as defined in Ch 1, Sec 1, [1.2.1], tested by the Society.

Second hand materials, machinery, appliances and items may be used subject to the specific agreement of the Society and the Owner.

The requirements for the selection of materials to be used in the construction of the various parts of a ship, the characteristics of products to be used for such parts and the checks required for their acceptance are to be as stated in Part C and NR216 Materials and Welding, as applicable, or in other Parts of the Rules or as specified on approved plans. In particular, the testing of products manufactured according to quality assurance procedures approved by the Society and the approval of such procedures are governed by the requirements of NR216 Materials and Welding, Ch 1, Sec 1, [3] of the Rules.

2.1.6 Defects or deficiencies and their repair

The Society may, at any time, reject items found to be defective or contrary to rule requirements or require supplementary inspections and tests and/or modifications, notwithstanding any previous certificates issued.

All repairs are subject to the preliminary agreement of the Society. When the limits of tolerance for defects are specified in the Rules concerned or by the Manufacturer, they are to be taken into account for repairs.

It is incumbent upon the Interested Party to notify the Society of any defects noted during the construction of the ship and/or of any item not complying with the applicable requirements or in any case unsatisfactory. Proposals regarding remedial actions intended to be adopted to eliminate such defects or unsatisfactory items are to be submitted to the Society and, if accepted, carried out to the Surveyor's satisfaction.

2.1.7 Equivalence of Rule testing under certain conditions

Notwithstanding the provisions of [2.1.4], the Society may, at its discretion and subject to conditions and checks deemed appropriate, accept certain materials, appliances or machinery which have not been subjected to rule testing.

2.2 Other cases

2.2.1 When the procedure adopted does not comply with that detailed in [2.1] but the Society deems that it is acceptable for the assignment of class, the construction mark • is assigned in accordance with Ch 1, Sec 2, [3.2.2].

2.3 Documentation

2.3.1 Documentation relevant to the class applied for is to be submitted for the approval of the Society.

2.3.2 The documentation to be submitted is specified in the relevant chapters of the Rules.

The lists of requested plans, documents and other items related to classification are not exhaustive and are intended as guidance for specifying the set of information to be submitted, rather than lists of actual titles. The Society may require that additional information be submitted if deemed necessary for the verification of rule requirements, especially in the case of non-conventional design.

2.3.3 The documentation submitted to the Society is examined in relation to the class applied for in the request for classification.

Note 1: Should the Interested Party subsequently wish to have the class, in particular the service notation or navigation notation, granted to the ship modified, plans and drawings are generally to be re-examined.

2.3.4 A copy of the submitted plans will be returned duly stamped, with remarks related to the compliance with the rule requirements should the need arise.

2.3.5 As a rule, modifications of the approved plans regarding items covered by classification are to be submitted.

2.3.6 Design data to be submitted to the Society are to incorporate all information necessary for the assessment of the design of the ship for the purpose of assignment of class. It is the responsibility of the Interested Party to ascertain that the design data are correct, complete and compatible with the use of the ship.

2.3.7 Design calculations are to be provided, when called for, as supporting documents to the submitted plans.

2.3.8 Design data and calculations are to be adequately referenced. It is the duty of the Interested Party to ascertain that the references used are correct, complete and applicable to the design of the ship.

2.3.9 The submitted plans are to contain all necessary information for checking the compliance with the requirements of the Rules.

2.3.10 In the case of conflicting information, submitted documentation will be considered in the following order of precedence: design data, plans, design calculations.

2.3.11 It is the responsibility of the Interested Party to ascertain that drawings used for the procurement, construction and other works are in accordance with the approved plans.

2.3.12 Upon specific agreement between the Society and the Interested Parties, three-dimensional models may be submitted in place of two-dimensional plans. In this case, the Society may require that additional documentation containing information that cannot be specified in three-dimensional models be submitted.

3 Ships classed after construction

3.1 Class admission process and requirements

3.1.1 The class of the ship will be assigned upon a preliminary review of the documentation listed in [3.1.3] and subsequent satisfactory completion of the surveys, the extent and scope of which are given below.

3.1.2 Surveys

The extent and scope of the admission to class survey is to be not less than those required at the class renewal survey of a ship of the same age and type; in addition all other periodical surveys should be performed together with those inspections which are linked to specific service notations and/or additional class notations and/or special installations the ship is provided with.

Special consideration will be given to ships transferring class from another recognized Classification Society who have appropriate Military or Navy Ship Rules.

3.1.3 Documentation

As a general rule, the documentation to be supplied to the Society is not to be less than the following.

a) Main plans:
- general arrangement
- capacity plan
- loading cases, calculations of still water bending moments, and relevant documents, particulars of loading calculator and instruction booklet as per Society's requirements, according to the case
- stability documents, if applicable (refer to Part B, Chapter 3).

b) Hull structure plans:
- midship section
- profile and deck plan
- watertight bulkheads
- rudder and rudder stock
- shell expansion
- hatch covers.

c) Machinery plans:
- engine room general arrangement
- diagram of fuel- (transfer, service), bilge-, ballast-, lubricating oil-, cooling-, steam- and feed-, general service and starting compressed air piping
- diagram of fire-fighting systems
- drawings of boilers and air receivers
- drawings of shaft line, reduction gear and propeller
- drawings of steering gear
- torsion vibration calculations as per conditions laid down in Pt C, Ch 1, Sec 9. Such documents are required only for ships less than 2 years old or for older ships the propelling system of which has been modified during the two years preceding the classification.

d) Electrical installation plans:
- master plan of power distribution, lighting and emergency power circuits
- single line diagram of networks and switchboards
- location and arrangement of electrical equipment in hazardous areas.

Alternative technical data may be accepted by the Society in lieu of specific items of the listed documentation not available at the time of the transfer of class.

3.1.4 Where appropriate within reasonable limits, a proven service record (log book) of satisfactory performance during a period of adequate length may be used as a criterion of equivalence. Special consideration will be given to ships of recent construction.

3.1.5 For installations or equipment covered by additional service and/or class notations, the Society will determine the documentation to be submitted.

3.1.6 In addition, the Society may base its judgement upon documentation such as certificates issued or accepted by the former Classification Society, if any, and certificates issued by the flag Administration or by a recognized organization on its behalf; moreover, other documents and/or plans may be specifically required to be supplied to the Society in individual cases.

4 Date of initial classification

4.1 Definitions

4.1.1 Date of build

For a new building the date of build is the year and month at which the new construction survey process is completed. Where there is a substantial delay between the completion of the construction survey process and the ship commencing active service, the date of commissioning may be also specified.

If modifications are carried out, the date of build remains assigned to the ship. Where a complete replacement or addition of a major portion of the ship (e.g. forward section, after section, main cargo section) is involved, the following applies:

- the date of build associated with each major portion of the ship is indicated on the classification certificate
- survey requirements are based on the date of build associated with each major portion of the ship.

4.1.2 Date of initial classification for new buildings

As a general rule, for new buildings the date of initial classification coincides with the date of issuance of classification certificates which is close to the date of the transfer of property between the Shipbuilder and the Owner.

4.1.3 Date of initial classification for existing ships

In principle, for existing ships the date of initial classification is the date of completion of the admission to class survey.

5 Reassignment of class

5.1 Conditions

5.1.1 At the request of the Owner, a ship which was previously classed with the Society, subsequently withdrawn from class and has not been classed since may have the class reassigned subject to an admission to class survey. If applicable and appropriate, account may be taken of any periodical surveys held in the former period of class with the Society.

Section 2 Maintenance of Class

1 Foreword

1.1 Terminology

1.1.1 Boilers

Where used in these Rules, the word boiler(s) refers to boiler(s) burning coal or fuel.

2 General principles of surveys

2.1 Survey types

2.1.1 Classed ships are submitted to surveys for the maintenance of class. These surveys include the class renewal survey, intermediate and annual survey, bottom survey (either survey in dry condition or in-water survey), tailshaft survey, boiler survey, and surveys for the maintenance of additional class notations, where applicable. Such surveys are carried out at the intervals and under the conditions laid down in this Section. In addition to the above periodical surveys, ships are to be submitted to occasional surveys whenever the circumstances so require; refer to [6].

2.1.2 The different types of periodical surveys are summarized in Tab 1. The intervals at which the periodical surveys are carried out are given in the items referred to in the second column of Tab 1. The relevant extent and scope are given in Part A, Chapter 3 and Part A, Chapter 4 for all ships and for service notations, respectively, while surveys related to additional class notations are given in Part A, Chapter 5.

Where there are no specific survey requirements for additional class notations assigned to a ship, equipment and/or arrangements related to these additional class notations are to be examined, as applicable, to the Surveyor's satisfaction at each class renewal survey for the class.

The surveys are to be carried out in accordance with the relevant requirements in order to confirm that the hull, machinery, equipment and appliances comply with the applicable Rules and will remain in satisfactory condition based on the understanding and assumptions mentioned in Ch 1, Sec 1, [3.3].

Where the conditions for the maintenance of the class, service notations and additional class notations are not complied with, the class and/or the service notation and/or the additional class notations as appropriate will be suspended and/or withdrawn in accordance with the applicable Rules given in Ch 2, Sec 3.

Note 1: It is understood that requirements for surveys apply to those items that are required according to the Rules or, even if not required, are fitted on board.

2.1.3 Unless specified otherwise, any survey other than bottom survey and tailshaft survey may be effected by carrying out partial surveys at different times to be agreed upon with the Society, provided that each partial survey is adequately extensive. The splitting of a survey into partial surveys is to be such as not to impair its effectiveness.

Table 1 : List of periodical surveys

Type of survey	Reference in this Section	Reference to scope of survey
Class renewal - hull	[5]	Ch 3, Sec 3 and Part A, Chapter 4 **(1)**
Class renewal - machinery	[5]	Ch 3, Sec 3 and Part A, Chapter 4 **(1)**
Class renewal - additional class notations	[2.1]	Part A, Chapter 5 **(2)**
Annual - hull	[6.2]	Ch 3, Sec 1 and Part A, Chapter 4 **(1)**
Annual - machinery	[6.2]	Ch 3, Sec 1 and Part A, Chapter 4 **(1)**
Annual - additional class notation	[2.1]	Part A, Chapter 5 **(2)**
Intermediate - hull	[6.3]	Ch 3, Sec 2 and Part A, Chapter 4 **(1)**
Intermediate - machinery	[6.3]	Ch 3, Sec 2 and Part A, Chapter 4 **(1)**
Stability and lightweight check	[6.4]	Ch 3, Sec 3, [2]
Bottom - dry condition	[6.5]	Ch 3, Sec 4
Bottom - in water	[6.5]	Ch 3, Sec 4
Tailshaft - complete	[6.6]	Ch 3, Sec 5
Tailshaft - modified	[6.6]	Ch 3, Sec 5
Boiler - complete	[6.7]	Ch 3, Sec 6
(1) As applicable, according to the service notation assigned to the ship **(2)** As applicable, according to the additional class notations assigned to the ship.		

2.2 Change of periodicity, postponement or advance of surveys

2.2.1 The Society reserves the right, after due consideration, to change the periodicity, postpone or advance surveys, taking into account particular circumstances.

2.2.2 When a survey becomes overdue during a voyage, the following applies:

a) In the case of a class renewal survey, the Society may, under exceptional circumstances, grant an extension to allow for completion of this survey provided there is documented agreement to such an extension prior to the expiry date of the Certificate of Classification, adequate arrangements have been made for the attendance of the Surveyor at the first port of call and the Society is satisfied that there is technical justification for such an extension. Such an extension will be granted only until arrival at the first port of call after the expiry date of the Certificate of Classification.

b) In the case of annual and intermediate surveys, no postponement is granted. Such surveys are to be completed within their prescribed windows; see [3.1.3].

c) In the case of all other periodical surveys and recommendations, extension of class may be granted until the arrival of the ship at the port of destination.

2.3 Extension of scope of survey

2.3.1 The Society and/or its Surveyors may extend the scope of the provisions in Part A, Chapter 3 to Part A, Chapter 5, which set forth the technical requirements for surveys, whenever and so far as considered necessary, or modify them in the case of special ships or systems.

2.3.2 The extent of any survey also depends upon the condition of the ship and its equipment. Should the Surveyor have any doubt as to the maintenance or condition of the ship or its equipment, or be advised of any deficiency or damage which may affect the class, then further examination and testing may be conducted as considered necessary.

2.4 General procedure of survey

2.4.1 The general procedure of survey consists in:

- an overall examination of the parts of the ship covered by the rule requirements
- checking selected items covered by the rule requirements
- attending tests and trials where applicable and deemed necessary by the Surveyor.

2.4.2 When a survey results in the identification of significant corrosion, structural defects or damage to hull, machinery and/or any piece of its equipment which, in the opinion of the Surveyor, affect the ship's class, remedial measures are to be implemented before the ship continues in service (see also [3.10]).

Note 1: The Society's survey requirements cannot be considered as a substitute for specification and acceptance of repairs and maintenance, which remain the responsibility of the Owner.

Note 2: During the surveys, the Surveyor does not check that the spare parts are kept on board, maintained in working order and suitably protected and lashed.

2.5 Appointment of another Surveyor

2.5.1 In compliance with the provisions of Ch 1, Sec 1, [2.5.1], should a disagreement arise between the Owner and the Surveyor during a survey, the Society may, at the request of the Owner, designate another Surveyor.

2.6 Alterations or additions to approved systems

2.6.1 When an alteration or addition to an approved system is proposed, documentation is to be submitted and approved by the Society before the work of alteration or addition is commenced.

2.6.2 Where the modifications may affect compliance with the rules, they are to be carried out under survey and the installation and testing are to be to the Surveyor's satisfaction.

3 Definitions and procedures related to surveys

3.1 General

3.1.1 Period of class

Period of class means the period starting either from the date of the initial classification, see Ch 2, Sec 1, [4], or from the credited date of the last class renewal survey, and expiring at the limit date assigned for the next class renewal survey.

3.1.2 Anniversary date

Anniversary date means the day of the month of each year in the period of class which corresponds to the expiry date of the period of class.

3.1.3 Survey time window

Survey time window, or more simply window, mean the fixed period during which annual and intermediate surveys are to be carried out.

3.1.4 Overdue surveys

Each periodical survey is assigned a limit date specified by the relevant requirements of the Rules (end of survey interval or end date of window) by which it is to be completed.

A survey becomes overdue when it has not been completed by its limit date.

Examples:

- Anniversary date: 15th April

  The 2000 annual survey can be validly carried out from 16th January 2000 to 15th July 2000. If not completed by 15th July 2000, the annual survey becomes overdue.
- Last bottom survey 20th October 2000 (periodicity 3 years)

  The next bottom survey is to be carried out before 20th April 2003. If not completed by 20th April 2003, the bottom survey becomes overdue.

3.1.5 Recommendations

Any defect and/or deficiency affecting the class and to be dealt with within a specific period of time is indicated as a recommendation. A recommendation is pending until it is cleared. Where it is not cleared by its limit date, the recommendation is overdue.

3.1.6 Memoranda

Those defects and/or deficiencies which do not affect the maintenance of class and which may therefore be cleared at the Owner's convenience and any other information deemed noteworthy for the Society's convenience are indicated as memoranda. Memoranda are not to be regarded as recommendations.

3.1.7 Exceptional circumstances

"Exceptional circumstances" means:

- unavailability of dry-docking facilities, or
- unavailability of repair facilities, or
- unavailability of essential materials, equipment or spare parts, or
- delays incurred by action taken to avoid severe weather conditions.

3.2 Terminology related to hull survey

3.2.1 Ballast tank

A ballast tank is a tank which is used solely for salt water ballast.

3.2.2 Spaces

Spaces are separate compartments such as holds and tanks.

3.2.3 Overall survey

An overall survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

3.2.4 Close-up survey

A close-up survey is a survey where the details of structural components are within the close visual inspection range of the Surveyor, i.e. normally within reach of hand.

3.2.5 Transverse section

A transverse section includes all longitudinal members contributing to longitudinal hull girder strength, such as plating, longitudinals and girders at the deck, side shell, bottom, inner bottom, longitudinal bulkheads, and sloped plating in upper and lower side tanks, as well as relevant longitudinals, as applicable for the different ships. For a transversely framed ship, a transverse section includes adjacent frames and their end connections in way of transverse sections.

3.2.6 Representative tanks or spaces

Representative tanks or spaces are those which are expected to reflect the condition of other tanks or spaces of similar type and service and with similar corrosion protection systems. When selecting representative tanks or spaces, account should be taken of the service and repair history on board and identifiable suspect areas.

3.2.7 Substantial corrosion

Substantial corrosion is an extent of corrosion such that assessment of the corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

3.2.8 Suspect areas

Suspect areas are locations showing substantial corrosion and/or considered by the Surveyor to be prone to rapid wastage.

3.2.9 Coating

A corrosion prevention system is normally considered either:

- a full hard coating, or
- a full hard coating supplemented by anodes.

Protective coating should usually be epoxy coating or equivalent. Other coating systems may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the Manufacturer's specifications.

Refer to [3.5.7] for access to tanks with soft coating.

3.2.10 Coating condition

Coating condition is defined as follows:

- good: condition with only minor spot rusting
- fair: condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for poor condition
- poor: condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

3.2.11 Cargo area (oil replenishment ships)

The cargo area is that part of the ship which contains cargo tanks, slop tanks and cargo/ballast pump rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces.

3.2.12 Cargo area (dry cargo ships)

The cargo area is that part of the ship which includes all cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

3.2.13 Prompt and thorough repair

A “Prompt and Thorough Repair” is a permanent repair completed at the time of survey to the satisfaction of the Surveyor, therein removing the need for the imposition of any associated recommendation. See also [3.10].

3.3 Procedures for thickness measurements

3.3.1 When required as per the scope of surveys defined below, thickness measurements are normally to be carried out under the responsibility of the Owner, in the presence of the Surveyor.

However, the Surveyor may accept thickness measurements not carried out under his supervision.

3.3.2 The thickness measurements are to be carried out by a company authorised by the Society.

The Society reserves the right to limit the scope of authorisation of the Company.

Note 1: The specific Rules of the Society give details about the authorisation.

3.3.3 A thickness measurement report is to be prepared. The report is to give the location of measurements, the thickness measured and the corresponding original thickness. Furthermore, the report is to include the date when the measurements were carried out, the type of measuring equipment, the names and the qualification of the operators and their signatures.

The report is validated by the Surveyor.

3.4 Agreement for in-water survey

3.4.1 The in-water surveys referred to in the Rules are to be carried out by a certified company accepted by the Society and authorized.

Note 1: Rule Note NR533 gives details about the certification.

3.4.2 On the Owner request, a survey program based on close-up in-water hull surveys can be applied with the Society agreement.

For the program application, an on-board person with appropriated professional qualification has to be responsible of the program management.

The surveys of the hull elements and components covered by the program can be performed by on-board divers who have been given by the Society an authorization note, after receiving an appropriated training.

3.5 Conditions for surveys

3.5.1 The Owner is to provide the necessary facilities for the safe execution of the surveys, as per Ch 1, Sec 1, [3.2.2].

3.5.2 For their internal examination, tanks and spaces are to be safe for access, i.e. gas freed, ventilated, etc.

Tanks and spaces are to be sufficiently illuminated, clean and free from water, scale, dirt, oil residues, etc. to reveal significant corrosion, deformation, fractures, damage or other structural deterioration.

3.5.3 A tank entry permit is to be issued prior to entering the tank. Adequate ventilation is to be maintained during the survey, and the required ventilation is to be specified on the entry permit. If the tanks are connected by a common venting system or an IG system, the tank inspected is to be isolated to prevent a transfer of gas from other tanks.

3.5.4 A communication system is to be arranged between the survey party in the tank and the responsible officer on deck.

3.5.5 Rescue and safety equipment such as explosimetre, breathing apparatus, resuscitators, smoke masks, rescue lines, stretcher, etc. is to be provided at the tank hatch, or, if more than one tank is being surveyed, at a central location on deck.

3.5.6 Surveys of tanks by means of boats or rafts may only be undertaken at the discretion of the Surveyor. In such case, the following additional conditions apply:

- a safety meeting is to be held prior to entering the tank, and applicable safety procedures and responsibilities are to be discussed to ensure that the survey is carried out under controlled conditions, in particular concerning the movement of the surface of the water in the tank
- the surface of the water in the tank should be calm (under all foreseeable conditions the expected rise of water within the tank should not exceed 0,25 m) and the water level either stationary or falling. On no account is the level of the water to be rising while the boat is in use
- the tank is to contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable
- at no time should the water be allowed within one metre of the deepest under-deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses should be contemplated only if a deck access manhole is fitted in the bay being examined, so that an escape route for the survey party is available at all times
- only rough duty, inflatable life boats, having residual buoyancy and stability even if one chamber is ruptured, are to be used
- the work-boat is to be tethered to the access ladder and an additional person stationed down the access ladder with a clear view of the work-boat
- all personnel in the compartment are to be provided with personal flotation devices.

3.5.7 When examination of associated structure is required, the following applies:

- ceilings in holds and floors in the engine room are to be lifted to the necessary extent for examination of the structure
- cement or other protective sheathing is to be removed when there is any doubt as to the condition of the plating underneath or when adherence to plating is not tight
- in the case of solid ballast spaces, the solid ballast is to be partially removed for examination of the condition of the structure in way. Should doubts arise, the Surveyor may require more extensive removal of the solid ballast
- where soft coatings have been applied, safe access is to be provided for the Surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft coating is to be removed.

3.6 Access to structures

3.6.1 For overall survey, means are to be provided to enable the Surveyor to examine the structure in a safe and practical way.

3.6.2 For close-up survey, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- hydraulic arm vehicles such as conventional cherry pickers, lifts and movable platforms
- portable ladders
- boats or rafts
- other equivalent means.

3.7 Equipment for surveys

3.7.1 One or more of the following fracture detection methods may be required if deemed necessary by the Surveyor:

- radiography (X or γ rays)
- ultrasonic test
- magnetic particle test
- dye penetrant test.

3.8 Surveys at sea and anchorage

3.8.1 Surveys at sea or at anchorage may be accepted provided the Surveyor is given the necessary assistance by the personnel on board. Precautions and procedures for carrying out the survey are to be in accordance with [3.5], [3.6] and [3.7].

3.9 Repairs and maintenance during voyage

3.9.1 Where repairs to hull, machinery or other equipment, which affect or may affect the class, are to be carried out by a riding crew during a voyage, they are to be planned in advance. A complete repair procedure including the extent of proposed repair and the need for the Surveyor's attendance during the voyage is to be submitted to the Society for approval sufficiently in advance. Failure to notify the Society in advance of the repairs may result in the suspension of class of the ship.

3.9.2 The above is not intended to include maintenance to and overhaul of the hull, machinery and equipment in accordance with the Manufacturer's recommended procedures and established marine practice, which does not require the Society's agreement. However, any repair resulting from such maintenance and overhauls which affects or may affect the class is to be noted in the ship's log and submitted to the attending Surveyor for use in determining further survey requirements.

3.10 Repairs

3.10.1 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Surveyor, will affect the ship's structural, watertight or weathertight integrity, is to be promptly and thoroughly (see [3.2.13]) repaired.

Areas to be considered include:

- side shell frames, their end attachments or adjacent shell plating
- deck structure and deck plating
- bottom structure and bottom plating
- watertight or oiltight bulkheads, or
- hatch covers or hatch coamings.

3.10.2 For locations where adequate repair facilities are not available, consideration may be given to allow the ship to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

4 Certificate of Classification: issue, validity, endorsement and renewal

4.1 Issue of Certificate of Classification

4.1.1 A Certificate of Classification, bearing the class notations assigned to the ship and an expiry date, is issued to any classed ship.

4.1.2 A Provisional Certificate of Classification may serve as a Certificate of Classification in some cases, such as after an admission to class survey, after a class renewal survey, or when the Society deems it necessary.

4.1.3 The Certificate of Classification is to be made available to the Society's Surveyors upon request.

4.1.4 Issuance of the first Certificate of Classification is notified to the Classification Committee for its advice.

4.2 Validity of Certificate of Classification, maintenance of class

4.2.1 According to Ch 1, Sec 1, [2.4], the Society alone is qualified to confirm the class of the ship and the validity of its Certificate of Classification.

4.2.2 During the class period, a Certificate of Classification is valid when it is not expired.

The class is maintained during a certain period or at a given date, when during the said period or at such date the conditions for suspension or withdrawal of class are not met.

4.2.3 At the request of the Owner, a statement confirming the maintenance of class may be issued by the Society based on the information in its records for that ship at the time.

This statement is issued on the assumption that the Owner has complied with the Rules, in particular with [7].

Should any information which would have prevented the Society from issuing the statement and which was not available at the time subsequently come to light, the statement may be cancelled.

Attention is drawn to Ch 2, Sec 3, [1.2], whereby the Society, upon becoming aware of a breach of the Rules, is empowered to suspend class from the date of the breach, which may be prior to the date of the statement.

4.2.4 According to the same conditions as in [4.2.3], a statement declaring that the class is maintained "clean and free from recommendation" may be issued by the Society when there is no pending recommendation at that date.

4.2.5 Classification-related documents and information are liable to be invalidated by the Society whenever their object is found to differ from that on which they were based or to be contrary to the applicable requirements. The Owner is liable for any damage which may be caused to any third party from improper use of such documents and information.

4.3 Endorsement of Certificate of Classification

4.3.1 Text of endorsement

When surveys are satisfactorily carried out, the Certificate of Classification is generally endorsed accordingly.

Each endorsement normally consists of sections for the description of:

- the surveys held
- the imposed, deleted and postponed recommendations (including the assigned limit date as applicable)
- the unchanged existing recommendations (given for information only).

Where applicable, memoranda are also endorsed in the Certificate of Classification.

4.3.2 Possible modifications to endorsements

The Society reserves the right to modify the endorsements made by Surveyors.

4.4 Status of surveys and recommendations

4.4.1 Information given in the Certificate of Classification, associated endorsements, Rules and specific documents enables the Owner to identify the status of surveys and recommendations.

4.4.2 The omission of such information does not absolve the Owner from ensuring that surveys are held by the limit dates and pending recommendations are cleared to avoid any inconvenience which is liable to result from the suspension or withdrawal of class; see Ch 2, Sec 3.

5 Class renewal survey

5.1 General principles

5.1.1 Class renewal surveys are to be carried out at five-year (class symbol **I**) or three-year (class symbol **II**) intervals.

5.1.2 For surveys completed within three months before the limit date of the class renewal survey, the next period of class will start from this limit date. For surveys completed more than three months before the limit date, the period of class will start from the survey completion date.

In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the Owner elects to carry out only the overdue surveys, the next period of class will start from the expiry date of the renewal survey. If the Owner elects to carry out the next due renewal survey, the period of class will start from the survey completion date.

5.1.3 A new period of class is assigned to the ship after the satisfactory completion of the class renewal survey, and a new Certificate of Classification is issued for the new period of class.

5.1.4 Concurrent crediting to both Intermediate Survey and Class Renewal Survey for surveys and thickness measurements of spaces is not acceptable.

5.2 Normal survey system (SS)

5.2.1 When the normal system is applied to ships with a 5 year period of class, the class renewal survey may be commenced at the fourth annual survey and continued during the following year with a view to completion by its due date. In this case the survey may be carried out by partial surveys at different times. The number of checks to be performed at each partial survey and the interval between partial surveys are to be agreed by the Society. In general, the first partial survey should include a significant number of thickness measurements, where required by the Rules.

5.2.2 A class renewal survey may be commenced before the fourth annual survey at the request of the Owner. In this case, the survey is to be completed within fifteen months. The conditions for the execution of partial surveys are the same as those referred to in [5.2.1].

5.3 Continuous survey system (CS)

5.3.1 The request by the Owner for admission to the continuous survey system will be considered by the Society and agreement depends on the type and age of hull and machinery. This system may apply to the class renewal survey of hull, machinery or other installations such as refrigerating installations covered by an additional class notation.

5.3.2 The continuous survey system is not applicable to the class renewal survey of the hull of ships over 20 years old. However, consideration may be given, at the discretion of the Society, to the applicability of the continuous survey system to the class renewal survey of the hull of ships over 20 years old.

5.3.3 When the continuous survey system is applied, appropriate notations are entered in the Certificate of Classification and the Register of Ships.

5.3.4 Ships subject to the continuous survey system are provided with lists of items to be surveyed under this system; these lists are attached to the Certificate of Classification.

5.3.5 For items inspected under the continuous survey system, the following requirements generally apply:

a) the interval between two consecutive surveys of each item is not to exceed five years

b) the items are to be surveyed in rotation, so far as practicable ensuring that approximately equivalent portions are examined each year

c) the Society may credit for continuous survey results of inspections carried out before the admission to the continuous survey scheme

d) each item is to be surveyed at one time, as far as practicable; the Society may, however, allow possible repair work to be carried out within a certain period.

5.3.6 For ships under continuous survey, items not included in the continuous survey cycle are to be inspected according to the provisions given in [5.2].

5.3.7 Upon application by the Owner, the Society may agree, subject to certain conditions, that some items of machinery which are included in the continuous survey cycle are examined by the Chief Engineer where the Society is not represented. The Chief Engineer is to be certified for this purpose by the Society and his examination is to be followed by a confirmatory survey carried out by a Surveyor. The conditions for the application of this procedure are given in Ch 2, App 2.

5.3.8 The continuous survey system does not supersede the annual surveys and other periodical and occasional surveys.

5.3.9 A general examination of the ship, as detailed in Ch 3, Sec 1 for annual surveys, is to be carried out at the end of the period of class.

5.3.10 For laid-up ships, specific requirements given in [9.1] apply.

5.3.11 The continuous survey system may be discontinued at any time at the discretion of the Society, or at the request of the Owner, and a specific arrangement devised.

5.4 Planned maintenance survey system for machinery (PMS)

5.4.1 A planned maintenance scheme may be considered as an alternative to the continuous survey system for machinery and is limited to components and systems covered by it. When such a system approved by the Society is implemented, a survey scheme other than those normally adopted and with intervals different from those of the continuous survey system as detailed in [5.3] may be accepted.

5.4.2 The conditions for approval of the planned maintenance scheme, the determination of survey item intervals and the general scope of surveys are detailed in Ch 2, App 1.

5.4.3 When the planned maintenance scheme is applied, appropriate notations are entered on the Certificate of Classification and in the Register of Ships.

5.4.4 The planned maintenance scheme does not supersede the annual surveys and other periodical and occasional surveys.

5.4.5 A general examination of the machinery, as detailed in Ch 3, Sec 1 for annual surveys, is to be carried out at the end of the period of class.

5.4.6 The planned maintenance scheme may be discontinued at any time at the discretion of the Society, or at the request of the Owner, and a specific arrangement devised.

5.4.7 Surveys of machinery may be carried out on a condition based maintenance (CBM) scheme basis on vessels operating on an approved PMS survey system.

5.4.8 The conditions for approval of the condition monitoring and condition based maintenance survey schemes and the general scope of surveys are detailed in Ch 2, App 4.

5.5 STAR-MACH survey system

5.5.1 When the additional class notation **STAR-MACH** is assigned, the class renewal survey covering machinery installation and other arrangement covered by the notation is replaced by the survey system described in Pt E, Ch 2, Sec 2 for the maintenance of this notation.

5.5.2 When the survey system linked to **STAR-MACH** notation is applied, appropriate notations are entered on the Certificate of Classification and in the Register of Ships.

5.5.3 This survey system does not supersede the annual surveys and other periodical and occasional surveys.

5.5.4 A general examination of the installation covered by the notation, as detailed in Ch 3, Sec 1 for annual surveys, is to be carried out at the end of the period of class.

6 Other periodical surveys

6.1 General

6.1.1 The different types of periodical surveys are summarized in Tab 1.

6.2 Annual surveys

6.2.1 Annual surveys are to be carried out within three months before or after each anniversary date.

6.3 Intermediate surveys

6.3.1 An intermediate survey, where applicable, is to be carried out within the window from three months before the second to three months after the third anniversary date.

6.3.2 The intermediate survey is applicable at any period of class to ships which are five years old and over.

6.3.3 The intermediate survey is not applicable to ships with class symbol **II**.

6.3.4 Concurrent crediting to both Intermediate Survey and Class Renewal Survey for surveys and thickness measurements of spaces is not acceptable.

6.4 Ship lightweight and stability check

6.4.1 The ship lightweight and stability check aim to verify the that the ship is in conformity with respect to the state defined by the design drawings.

The checking is performed through a verification of the light ship mass, of the hull girder deformation in still water and of the stability.

6.4.2 The verification of the light ship mass is performed through a displacement measurement as defined in Pt B, Ch 3, App 1.

6.4.3 The verification of the hull girder deformation is performed through a measurement of the global vertical hull girder deformation by the way of reading aft, forward and midship draught marks or a method defined in agreement between the Owner and the Society.

This measurement is performed in still water and generally at the same time than the ship lightweight check.

6.4.4 The verification of the stability is performed through the determination of the initial righting lever arm by a stability check as defined in Pt B, Ch 3, App 1.

6.5 Bottom survey

6.5.1 Bottom survey means the examination of the outside of the ship's bottom and related items. This examination may be carried out with the ship either in dry dock (or on a slipway) or afloat: in the former case the survey will be referred to as dry-docking survey, while in the latter case as in-water survey.

6.5.2 The Owner is to notify the Society whenever the outside of the ship's bottom and related items can be examined in dry dock or on a slipway.

6.5.3 For ships classed with the class symbol **I**, there are to be two examinations of the outside of the ship's bottom and related items in each period of class of five years.

In all cases, the interval between any two such examinations is not to exceed 36 months.

An extension of examination of the ship's bottom of three months beyond the due date can be granted in exceptional circumstances, as defined in [3.1.7].

6.5.4 For ships under the normal survey system, one of the bottom surveys to be performed in each period of class is to be carried out in conjunction with the class renewal survey and is to be a dry-docking survey.

The Society may allow the bottom survey carried out between class renewal surveys to be replaced by an in-water survey, subject to the provisions of Ch 3, Sec 4. Special consideration is to be given to ships of 15 years of age and over before being permitted to have such in-water examinations.

6.5.5 For ships under the continuous survey system of hull (CSH), one of the bottom surveys to be performed in each period of class is to be carried out in conjunction with the end of class period.

This bottom survey may be an in-water survey, subject to the provisions of Ch 3, Sec 4 and provided that the previous bottom survey performed in the period of class was a dry-docking survey. Special consideration is to be given to ships of 15 years of age and over before being permitted to have such in-water examinations.

6.6 Tailshaft survey

6.6.1 Definition

Tailshaft survey means survey of propeller shafts and tube shafts (hereafter referred to as tailshafts) as well as survey of other propulsion systems.

6.6.2 Tailshaft complete survey

Tailshafts are to be submitted to complete examination at the periodicity specified below and summarized in Fig 1, based on the type of shaft and its design.

a) Where the tailshaft is fitted with continuous liners or equivalent protective coating, or approved oil sealing glands, or made of corrosion-resistant material, the periodicity of complete surveys is:
   - three years for single shafting arrangements
   - four years for multi-shafting arrangements.

b) These periodicities may be increased to five years in the following cases:
   - where the propeller is fitted keyless to the shaft taper, the shaft is protected from sea water, the design details are approved, and a non-destructive examination of the forward part of the aft shaft taper is performed at each survey by an approved crack-detection method
   - where the propeller is fitted to a keyed shaft taper the design details of which comply with the applicable requirements in Pt C, Ch 1, Sec 7, and a non-destructive examination of the after end of the cylindrical part of the shaft (from the after end of the liner, if any), and of about one third of the length of the taper from the large end is performed at each survey by an approved crack-detection method
   - where the propeller is fitted to a solid flange coupling at the aft end of the shaft, the shaft and its fittings are not exposed to corrosion, the design details are approved, and a non-destructive examination of the after flange fillet area of the shaft is performed at each survey by an approved crack-detection method.

c) In all other cases the periodicity of complete surveys is three years.

6.6.3 Tailshaft modified survey

A modified survey of the tailshaft is an alternate way of examination whose scope is given in Ch 3, Sec 5. It may be accepted for tailshafts described in [6.6.2] provided that:

For oil lubricated shafts:

- they are fitted with oil lubricated bearings and approved oil sealing glands
- the shaft and its fittings are not exposed to corrosion
- the design details are approved
- the clearances of the aft bearing are found to be in order
- the oil and the oil sealing arrangements prove effective
- lubricating oil analyses are carried out regularly at intervals not exceeding six months and oil consumption is recorded at the same intervals.

The modified survey is to be carried out five years from the last complete survey with a window period of plus or minus six months.

The next complete survey is to be carried out ten years from the last complete survey.

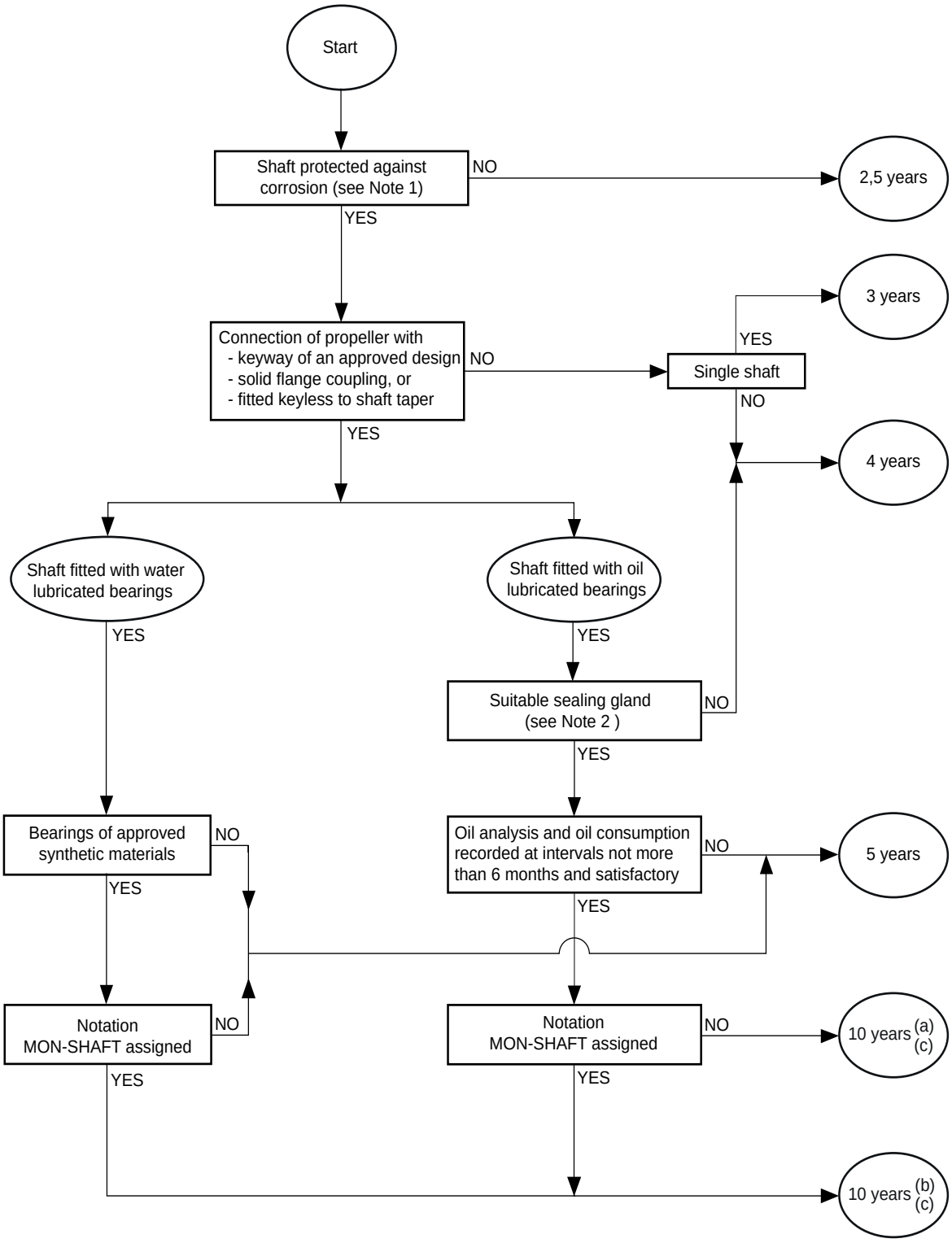
For water lubricated shafts:

- the design details are approved
- the integrity of the coating and the watertightness of its junctions to liners are found to be in order
- the bearings arrangement allows the liners surfaces to be visually checked in way of bearings without shaft removal
- the liners are found to be in order in way of bearings.

The modified survey is to be carried out five years from the last complete survey with a window period of plus or minus six months.

The next complete survey is to be carried out ten years from the last complete survey.

Figure 1 : Periodicity of complete survey of tailshaft



(a) : with shaft withdrawn, subject to modified survey at 5 years plus minus 6 months

(b) : with shaft in place, subject to modified survey at 5 years plus minus 6 months.

(c) : the periodicity cannot exceed the maximum recommended by the designer and manufacturer of the tailshaft and bearing system.

Note 1: Shafts protected against corrosion are those:

- made of corrosion resistant material, or
- fitted with continuous liners or systems considered as equivalent, or
- fitted with oil lubricated bearings and oil sealing glands.

Note 2: Suitable sealing glands are glands which are type approved by the Society with regard to protection of the sterntube against ingress of water.

6.6.4 Tailshaft Monitoring System (MON-SHAFT)

Where, in addition to the conditions stated in [6.6.3] for modified survey, the additional class notation **MON-SHAFT** is assigned, the tailshaft need not be withdrawn at both the complete and modified survey provided that all condition monitoring data is found to be within permissible limits and the remaining requirements for the respective surveys are complied with.

6.6.5 Other propulsion systems

Driving components serving the same purpose as the tailshaft in other propulsion systems, such as directional propellers, vertical axis propellers, water jet units, dynamic positioning systems and thruster assisted mooring systems, are to be submitted to periodical surveys at intervals not exceeding five years.

6.7 Boiler survey

6.7.1 Boilers and thermal oil heaters are to be surveyed twice in every five-year period. The periodicity of the boiler survey is three years (36 months).

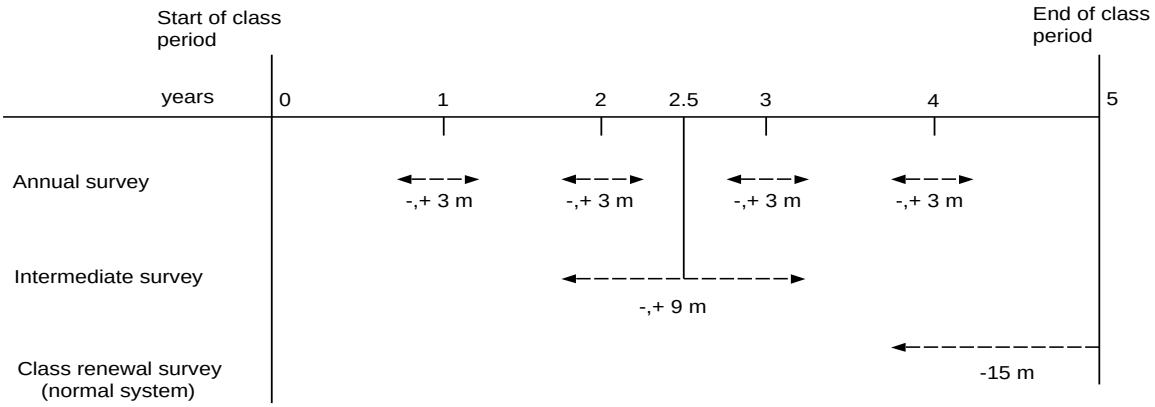
6.7.2 For ships of eight years of age and over fitted with one single boiler supplying steam for main propulsion, the interval between two boiler surveys may be specially considered.

6.7.3 Boilers are also submitted to an external inspection as a part of the annual survey of machinery.

6.8 Links between anniversary dates and annual surveys, intermediate surveys and class renewal surveys

6.8.1 The link between the anniversary dates, the class renewal survey (when carried out according to the normal system), and the annual and intermediate surveys is given in Fig 2.

Figure 2 : Links between anniversary date and annual, intermediate and class renewal surveys



7 Occasional surveys

7.1 General

7.1.1 An occasional survey is any survey which is not a periodical survey. The survey may be defined as an occasional survey of hull, machinery, boilers, refrigerating plants, etc., depending on the part of the ship concerned.

Where defects are found, the Surveyor may extend the scope of the survey as deemed necessary.

7.1.2 Occasional surveys are carried out at the time of, for example:

- updating of classification documents (e.g. change of the Owner, name of the ship, flag)
- damage or suspected damage
- repair or renewal work
- alterations or conversion
- quality system audits
- postponement of surveys or recommendations.

7.2 Damage and repair surveys

7.2.1 In the event of damage which affects or may affect the class of the ship, the Owner is to apply to the Society for a survey. Such application is to be made as soon as possible to enable the Surveyor to ascertain the extent of the damage and necessary repairs, if any.

Note 1: Whenever a ship is fitted with an helicopter platform which is made in aluminium or other low melting metal construction which is not made equivalent to steel, and a fire occurred on the said platform or in close proximity, the platform is to be subject to a structural survey to determine its suitability for further use.

7.2.2 If, after sustaining damage, the ship calls at a port where the Society is not represented, the Owner is to notify the Society forthwith, supply all available information regarding the damage and make arrangements for the ship to be surveyed in the nearest port where the Society is represented.

7.2.3 All repairs to hull, machinery and equipment which may be required in order for a ship to retain its class are to be to the satisfaction of the Surveyor.

During repairs or maintenance work, the Owner is to arrange so that any damage, defects or non-compliance with the rule requirements are reported to the Surveyor during his survey.

7.2.4 Damages and partial or temporary repairs considered acceptable by the Surveyor for a limited period of time are the subject of an appropriate recommendation.

7.2.5 Damages or repairs required by the Surveyor to be re-examined after a certain period of time are the subject of an appropriate recommendation.

7.3 Conversions, alterations and repairs

7.3.1 Conversions, alterations or repairs of/to structures and arrangements affecting the class are to be carried out in accordance with the requirements of the Society and to its satisfaction. Where necessary, documentation is to be submitted to the Society and/or made available to the attending Surveyor.

7.3.2 Materials and equipment used for conversions, alterations or repairs are generally to meet the requirements of the Rules for new ships built under survey; see Ch 2, Sec 1, [2.1.5].

7.4 Quality System audits

7.4.1 The Society reserves the right to carry out occasional surveys in order to conduct audits either as deemed necessary in pursuance of its internal Quality System.

7.4.2 These surveys may also be attended by auditors external to the Society.

7.4.3 The scope of these surveys is determined by the Society.

8 Change of ownership

8.1

8.1.1 In the case of change of ownership, the ship retains its current class with the Society provided that:

- the Society is informed of the change sufficiently in advance to carry out any survey deemed appropriate, and
- the new Owner signs the appropriate request, involving acceptance of the Society's general conditions and Rules. This request covers inter alia the condition of the ship when changing ownership.

Note 1: The ship's class is maintained without prejudice to those provisions in the Rules which are to be enforced in cases likely to cause suspension or withdrawal of the class such as particular damages or repairs to the ship of which the Society has not been advised by the former or, as the case may be, new Owner.

Note 2: No information whatsoever related to the class of the ship will be provided or confirmed to any third party, unless the appropriate request for information is duly completed and signed by the party making the request and the authorisation of the current Owner is obtained.

9 Lay-up and re-commissioning

9.1 General principles

9.1.1 A ship put out of commission may be subject to specific requirements for maintenance of class, as specified below, provided that the Owner notifies the Society of the fact.

If the Owner does not notify the Society of the laying-up of the ship or does not implement the lay-up maintenance program, the ship's class will be suspended and/or withdrawn when the due surveys are not carried out by their limit dates in accordance with the applicable requirements given in Ch 2, Sec 3.

9.1.2 The lay-up maintenance program provides for a "laying-up survey" to be performed at the beginning of lay-up and subsequent "annual lay-up condition surveys" to be performed in lieu of the normal annual surveys which are no longer required to be carried out as long as the ship remains laid-up. The minimum content of the lay-up maintenance program as well as the scope of these surveys are given in Ch 3, App 1. The other periodical surveys which become overdue during the lay-up period may be postponed until the re-commissioning of the ship.

9.1.3 Where the ship has an approved lay-up maintenance program and its period of class expires, the period of class is extended until it is re-commissioned, subject to the satisfactory completion of the annual lay-up condition surveys as described in [9.1.2].

9.1.4 The periodical surveys carried out during the lay-up period may be credited, either wholly or in part, at the discretion of the Society, having particular regard to their extent and dates. These surveys will be taken into account for the determination of the extent of surveys required for the re-commissioning of the ship and/or the expiry dates of the next periodical surveys of the same type.

9.1.5 When a ship is re-commissioned, the Owner is to notify the Society and make provisions for the ship to be submitted to the following surveys:

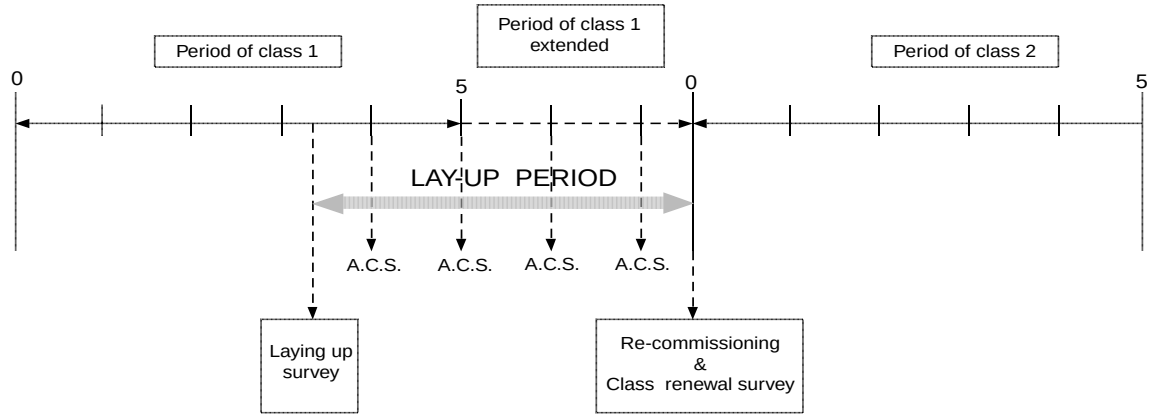
- an occasional survey prior to re-commissioning, the scope of which depends on the duration of the lay-up period
- all periodical surveys which have been postponed in accordance with [9.1.2], taking into account the provisions of [9.1.4].

9.1.6 Where the previous period of class expired before the re-commissioning and was extended as stated in [9.1.3], in addition to the provisions of [9.1.5] a complete class renewal survey is to be carried out prior to re-commissioning. Those items which have been surveyed in compliance with the class renewal survey requirements during the 15 months preceding the re-commissioning may be credited. A new period of class is assigned from the completion of this class renewal survey.

9.1.7 The principles of intervals or limit dates for surveys to be carried out during the lay-up period, as stated in [9.1.1] to [9.1.6], are summarized in Fig 3.

9.1.8 The scope of the laying-up survey and annual lay-up condition surveys are described in detail in Ch 3, App 1.

Figure 3 : Survey scheme of a case of a lay-up going beyond the expiry date of the period of class



Note 1: A.C.S. means annual lay-up condition survey.

Section 3 Suspension and Withdrawal of Class

1 General

1.1 Discontinuance of class

1.1.1 Terminology

The class may be discontinued either temporarily or permanently. In the former case it is referred to as “suspension” of class, in the latter case as “withdrawal” of class. In both these cases, the class is invalidated in all respects. In the case of withdrawal, a specific notation is entered in the supplement to the Register of Ships, until the ship is deleted from the Register.

1.2 Suspension of class

1.2.1 Military operations

When a ship is engaged in a particular operation, such as for example an operation considered with combat risks, the normal requirements for surveys are no more applicable, within the condition that the Owner notified this fact to the Society. During the notified period, the class is suspended.

At the end of the notified period the class is reinstated once the due, during the suspension period, items and/or surveys have been dealt with. The endorsement on the Certificate of Classification has to confirm that all concerned surveys have been performed and mention the period of the suspension of class.

Information given in the Certificate of Classification, associated endorsements, Rules and specific documents enables the Owner to identify the status of surveys and recommendations.

It is the Owner responsibility to verify that the ship parts not covered by the classification are in a satisfactory working state.

1.2.2 The class may be suspended either automatically or following the decision of the Society, or on the Owner request (see [1.2.1]). In any event, the ship will be considered as not retaining its class from the date of suspension until the date when class is reinstated.

1.2.3 The class may be automatically suspended when one or more of the following circumstances occur:

- when a ship is not operated in compliance with the rule requirements, such as in cases of services or conditions not covered by the service notation, or trade outside the navigation restrictions for which the class was assigned
- when a ship has the draught marks placed on the sides in a position higher than that assigned, or, in cases of ships where draught marks are not assigned, the draught is greater than that assigned
- when the Owner fails to inform the Society in order to submit the ship to a survey after defects or damages affecting the class have been detected
- when repairs, alterations or conversions affecting the class are carried out either without requesting the attendance of the Society or not to the satisfaction of the Surveyor. For voyage repairs, reference is to be made to Ch 2, Sec 2, [3.9]
- in case a freeboard has been assigned to the ship, when a ships proceeds to sea with less freeboard than that assigned.

Suspension of class with respect to the above cases will remain in effect until such time as the cause giving rise to suspension has been removed. Moreover, the Society may require any additional surveys deemed necessary taking into account the condition of the ship and the cause of the suspension.

1.2.4 In addition, the class is automatically suspended:

- when the class renewal survey has not been completed by its limit date or within the time granted for the completion of the survey, unless the ship is under attendance by the Society’s Surveyors with a view to completion prior to resuming trading, and unless a specific action plan has been agreed for completion of the survey
- when the annual or intermediate surveys have not been completed by the end of the corresponding survey time window (see Ch 2, Sec 2, [3.1.3]) unless a specific action plan has been agreed for completion of the survey. Continuous survey item(s) due or overdue at the time of the annual surveys is (are) to be dealt with unless a postponement is granted by agreement with the Society, and unless a specific action plan has been agreed for completion of the survey.

Suspension of class with respect to the above cases will remain in effect until such time as the class is reinstated once the due items and/or surveys have been dealt with.

1.2.5 In addition to the circumstances for which automatic suspension may apply, the class of a ship may also be suspended following the decision of the Society:

- when a recommendation is not dealt with within the time limit specified, unless it is postponed before the limit date by agreement with the Society
- when one or more surveys are not held by their limit dates (see Ch 2, Sec 2, [3.1.4]) or the dates stipulated by the Society also taking into account any extensions granted in accordance with the provisions of Part A
- when, due to reported defects, the Society considers that a ship is not entitled to retain its class even on a temporary basis (pending necessary repairs or renewals, etc.)
- when the ship has not been maintained in proper condition, as set forth in Ch 1, Sec 1, [3.3.1]
- in other circumstances which the Society will consider on their merits (e.g. in the event of non-payment of fees or where the Owner fails to subject the ship to the occasional survey as per the requirement in Ch 2, Sec 2, [7.2.1]).

Suspension of class decided by the Society takes effect from the date when the conditions for suspension of class are met and will remain in effect until such time as the class is reinstated once the due items and/or surveys have been dealt with.

1.3 Withdrawal of class

1.3.1 The Society will withdraw the class of a ship after consultation of the Classification Committee in the following cases:

- at the request of the Owner
- when the causes that have given rise to a suspension currently in effect have not been removed after due notification of suspension to the Owner
- when the ship is reported as a constructive total loss
- when the ship is lost
- when the ship is reported scrapped.

Withdrawal of class takes effect from the date on which the circumstances causing such withdrawal occur.

1.3.2 When the withdrawal of class of a ship comes into effect, the Society will:

- forward the Owner written notice
- delete the ship from the Register of Ships
- notify the Naval Authority.

1.4 Suspension/withdrawal of additional class notations

1.4.1 If the survey requirements related to maintenance of additional class notations are not complied with, the suspension or withdrawal may be limited to the notations concerned.

The same procedure may apply to service notations of ships which are assigned with more than one service notation.

1.4.2 The suspension or withdrawal of an additional class notation or a service notation (where a ship is assigned with more than one service notation) generally does not affect the class.

Appendix 1 Planned Maintenance Scheme

1 General

1.1

1.1.1 A Planned Maintenance Scheme (hereafter referred to as PMS) is a survey system for machinery items which may be considered as an alternative to the Continuous Machinery Survey system (hereafter referred to as CMS), as described in Ch 2, Sec 2, [5.3].

1.1.2 This survey scheme is to be approved by the Society before being implemented. When the PMS system is applied, the scope and periodicity of the class renewal survey are tailored for each individual item of machinery and determined on the basis of recommended overhauls stipulated by the manufacturers, documented experience of the operators and, where applicable and fitted, condition monitoring. For instance, within the scope of a PMS system the following cases may occur:

- switchboard A is surveyed based on the regular expiry date of the class renewal survey
- lubricating oil pump B is surveyed based on CMS
- diesel engine C is surveyed based on running hours
- turbo pump D is surveyed based on condition monitoring.

1.1.3 However, the survey intervals for items surveyed under the PMS system should not exceed those specified for the CMS. For certain components or items of machinery, the survey intervals based on the CMS system need not be taken into consideration, provided that an approved condition monitoring system is in effect for these parts.

1.1.4 When the condition monitoring of machinery and components included in the approved PMS shows that their condition and performance are within the allowable limits, no overhaul is necessary, unless specified by the Manufacturer.

1.1.5 On board the ship there is to be a person responsible for the management of the PMS for the purpose of which he is to possess the appropriate professional qualifications. This person is usually the Chief Engineer; however, another person designated by the Owner may be accepted by the Society provided that his qualifications are considered equivalent to those of the Chief Engineer.

The surveys of machinery items and components covered by the PMS may be carried out by personnel on board who have been issued a statement of authorisation, under the conditions and limits given in Ch 2, App 2.

Items surveyed by the authorised person will be subject to the confirmatory survey as detailed in Ch 2, App 2.

1.1.6 The conditions and procedures for the approval of a PMS are indicated in Article [2].

2 Conditions and procedures for the approval of the system

2.1 General

2.1.1 The PMS is to be approved by the Society. To this end the Owner is to make a formal request to the Society and provide the documentation and information specified in [2.2], combined in a manual describing the proposed scheme and including sample copies of the different documents to be used during the implementation of the scheme.

2.1.2 When using computerised systems, access for the purpose of updating the maintenance documentation and the maintenance programmes is only granted to the person responsible for the PMS or another person authorised by him.

The computerised systems are to include a back-up procedure, which is to be activated at regular intervals.

The functional application of these systems is to be approved by the Society.

2.2 Documentation

2.2.1 The documentation to be submitted is the manual mentioned above, which is to include:

a) a description of the scheme and its application on board as well as the proposed organisation chart identifying the areas of responsibility and the people responsible for the PMS on board

b) the list of items of machinery and components to be considered for classification in the PMS, distinguishing for each the principle of survey periodicity used as indicated in [1.1.2]

c) the procedure for the identification of the items listed in b), which is to be compatible with the identification system adopted by the Society

d) the scope and time schedule of the maintenance procedures for each item listed in b), including acceptable limit conditions of the parameters to be monitored based on the manufacturers' recommendations or recognised standards and laid down in appropriate preventive maintenance sheets

e) the original reference data, monitored on board, for machinery undergoing maintenance based on condition monitoring

f) the list and specifications of the condition monitoring equipment, including the maintenance and condition monitoring methods to be used, the time intervals for maintenance and monitoring of each item and acceptable limit conditions

g) the document flow and pertinent filing procedure.

2.3 Information on board

2.3.1 The following information is to be available on board:

a) all the documentation listed in [2.2], duly updated

b) the maintenance instructions for each item of machinery, as applicable (supplied by the manufacturer or by the shipyard)

c) the condition monitoring data of the machinery, including all data since the last dismantling and the original reference data

d) reference documentation (trend investigation procedures etc.)

e) the records of maintenance performed, including conditions found, repairs carried out, spare parts fitted

f) the list of personnel on board in charge of the PMS management.

2.4 Annual report

2.4.1 An annual report covering the year's service is to be supplied to the Society. It is to include the following information:

- the list of items of machinery and components (item b) in [2.2.1]) and the procedure for their identification
- the preventive maintenance sheets
- the condition monitoring data, including all data since the last dismantling and the original reference data of the machinery checked through condition monitoring
- any changes to the other documentation in [2.2].

All the documentation is to be signed by the person responsible mentioned in [1.1.5].

3 Implementation of the system

3.1

3.1.1 When the documentation submitted has been approved and the PMS system has been implemented on board and used for a sufficient period (which is not to exceed one year) so that all personnel become familiar with it, a survey is to be carried out in order to start the system and make it officially operational. The scope of this survey, referred to as Implementation Survey, is given in [5.1.1].

3.1.2 Upon the successful outcome of the Implementation Survey, the PMS is considered approved. The relevant annex to the Certificate of Classification of the ship is updated and the survey notation PMS is entered in the Register of Ships.

4 Retention and withdrawal of the system

4.1

4.1.1 The PMS system is retained throughout the class period provided that:

- an annual report covering the year's service is supplied to the Society in accordance with [2.4]
- an annual audit in accordance with [5.2] is satisfactorily completed
- any change to the approved PMS is submitted to the Society for agreement and approval.

4.1.2 The survey arrangement for machinery according to the PMS may be withdrawn by the Society if the PMS is not satisfactorily operated on account of either the maintenance records or the general condition of the machinery or the failure to observe the agreed intervals between overhauls.

4.1.3 The Owner may discontinue the PMS at any time by informing the Society in writing. In this case, the items which have been inspected under the PMS since the last annual audit will be credited for class at the discretion of the attending Surveyor.

4.1.4 In the case of sale or change of management of the ship, the approval of the PMS will be reconsidered.

5 Surveys

5.1 Implementation survey

5.1.1 The implementation survey is to be carried out by a Surveyor of the Society, as stated in [3.1.1], within one year from the date of the documentation approval.

5.1.2 The scope of this survey is to verify that:

- the PMS is implemented in accordance with the approved documentation and is suitable for the type and complexity of the components and systems on board
- the documentation required for the annual audit is produced by the PMS
- the requirements of surveys and testing for retention of class are complied with
- the shipboard personnel are familiar with the PMS procedures.

Upon the successful outcome of the survey confirming the proper implementation of the PMS, the system is considered operational subject to the submission to the Society of a report describing the system.

5.2 Annual audit

5.2.1 Once the PMS system is implemented, the continued compliance with the requirements for checks, overhauls and repairs, where needed, indicated in [2] is to be verified by means of annual audits in order to confirm the validity of the approved survey scheme system.

5.2.2 The annual audit is to be carried out in conjunction with the annual class surveys.

5.2.3 The purpose of this audit is to verify that the scheme is being correctly operated, in particular that all items (to be surveyed in the relevant period) have actually been surveyed in due time. A general examination of the items concerned is carried out.

5.2.4 The maintenance files and functioning records are examined to verify that the machinery has been functioning satisfactorily since the previous survey or audit or, if necessary, that the necessary measures have been taken in response to machinery operating parameters exceeding acceptable tolerances, and that the overhaul intervals have been observed.

5.2.5 Written reports of breakdown or malfunction are to be made available.

5.2.6 The description of the repairs, if any, carried out is to be examined. Any machinery part or component which has been replaced by a spare due to damage is to be retained on board, where possible. On this occasion such replaced parts are to be submitted to the examination of the Surveyor.

5.2.7 Where condition monitoring equipment is in use, functions tests, confirmatory inspections and random check readings are to be carried out as far as practicable and reasonable at the discretion of the Surveyor.

5.2.8 The Surveyor also checks that the personnel on board in charge of the PMS have the appropriate authorisation (see Ch 2, App 2).

5.2.9 A report containing the description of the overhaul and repair activity carried out throughout the period since the preceding audit, and signed by the person responsible, is to be submitted to the attending Surveyor.

5.2.10 If the Surveyor is not satisfied with the results the PMS is achieving, i.e. with the degree of accuracy as regards the maintenance records and/or the general condition of the machinery, he forwards the Society a report recommending the changes to the survey scheme and explaining the reasons for his suggestions.

5.2.11 Upon the satisfactory outcome of this audit, the Surveyor confirms the validity of the PMS, endorses the Certificate of Classification in accordance with Ch 2, Sec 2, [4.3] and decides which items can be credited for class.

5.3 Damage and repairs

5.3.1 Damage to components or items of machinery covered by the PMS which may affect the class is to be reported to the Society. A Surveyor will attend on board, survey the damaged items and, on the basis of the survey results, decide whether recommendations are to be imposed.

5.3.2 All parts of machinery or components which need to undergo substantial repairs are to be surveyed before, during and after the repairs, as deemed appropriate by the Surveyor.

5.3.3 In the case of outstanding recommendations or records of unrepaired damage which may affect the PMS, the relevant items are to be taken out of the PMS until the recommendations have been fulfilled or the repairs carried out.

6 Machinery items surveyed on the basis of condition monitoring

6.1

6.1.1 The extent of condition-based maintenance and associated monitoring equipment to be included in the maintenance scheme is decided by the Owner. The minimum parameters to be checked in order to monitor the condition of the various machinery for which this type of maintenance is accepted are indicated in [6.1.2] to [6.1.5].

6.1.2 For the main diesel engine the parameters to be checked are the following:

- power output
- rotational speed
- indicator diagram (where possible)
- fuel oil temperature and/or viscosity
- charge air pressure
- exhaust gas temperature for each cylinder
- exhaust gas temperature before and after the turbochargers
- temperatures and pressure of engine cooling systems
- temperatures and pressure of engine lubricating oil system
- rotational speed of turbochargers
- vibrations of turbochargers
- results of lubricating oil analysis
- crankshaft deflection readings
- temperature of main bearings.

6.1.3 For the main and auxiliary steam turbines the parameters to be checked are the following:

- turbine bearing vibrations
- power output
- rotational speed
- plant performance data, i.e. steam conditions at the inlet and outlet of each turbine, saturated, superheated and desuperheated steam conditions at the outlet of boilers, condenser vacuum, sea temperature.

6.1.4 For the auxiliary diesel engines the parameters to be checked are the following:

- exhaust gas temperature before and after the turbochargers
- temperatures and pressure of engine cooling systems
- temperatures and pressure of engine lubricating oil system
- rotational speed of turbochargers
- crankshaft deflection readings.

6.1.5 For other auxiliary machinery the parameters to be checked are the following, as applicable:

- inlet and outlet temperatures of cooling systems
- inlet and outlet temperatures of heating systems
- vibrations and performance data of pumps and fans
- differential pressure at filters.

Appendix 2 CSM and PMS Systems: Surveys Carried out by the Chief Engineer

1 Conditions

1.1

1.1.1 The basic conditions for the acknowledgment of surveys carried out by Chief Engineers are specified hereafter. Consideration may be given to other conditions on a case by case basis.

1.1.2 An Owner's attestation, confirming that the Chief Engineer is duly qualified to carry out the inspection of the machinery items when the CSM system or PMS system, as applicable, is implemented on-board ships in accordance with the requirements in [2.1.1] and [2.1.2], is to be made available to the Surveyor on-board.

2 Limits of the interventions

2.1

2.1.1 For ships where the CSM system is implemented, the following items of the class renewal survey for machinery cannot be inspected by the Chief Engineer:

- pressure vessels
- main and auxiliary turbines
- main reduction gears
- crankshafts, with associated main bearings and bottom end connecting rod bearings, of main propulsion internal combustion engines. However, bottom end connecting rod bearings of diesel engines having trunk pistons may be inspected by the Chief Engineer when the complete associated cylinder is inspected in the course of the engine maintenance program
- turbochargers of main propulsion internal combustion engines
- intermediate shafting and associated bearings.

Generally, within a 10-year cycle comprising two consecutive class cycles, all the items surveyed under CSM are to be inspected once by the Society’s Surveyors.

2.1.2 For ships where the PMS system is implemented, all items covered by the system can be surveyed by the Chief Engineer, with the exception of pressure vessels.

2.1.3 In no case may the surveys of tailshafts and boilers, which are items not included in the scope of the class renewal survey, be carried out by the Chief Engineer.

3 Procedure for carrying out surveys

3.1 General

3.1.1 As regards the procedure for carrying out surveys, the Owner is to inform the Chief Engineer that surveys are to be conducted in accordance with the Rules of the Society and, specifically, the requirements for class renewal surveys related to machinery and systems contained in Ch 3, Sec 3, [4].

It is the responsibility of the ship’s Captain and Chief Engineer to decide the date and place for the survey of each component in order to avoid possible accidents (fire included) in the event of damage to the unit(s) remaining in service.

Some guidelines for the Chief Engineer relevant to the dismantling and inspections of main components of the machinery installation are given below.

The items and/or machinery which, as a result of the surveys, are replaced due to wear, damage or defects, are to be kept on board until they are inspected by a Surveyor of the Society.

3.2 Main diesel engines

3.2.1 The following items are to be surveyed as indicated:

- the top and bottom halves of the main bearings are to be removed and inspected, and the clearances are to be taken, recorded and compared with the limits recommended by the engine builder
- the top and bottom halves of crankpin bearings are to be examined, and the clearances are to be taken, recorded and compared with the limits recommended by the engine builder
- crankpins, journals and webs are to be examined for crack detection, mainly at the fillets and in the vicinity of the lubricating oil holes
- crankshaft deflections are to be taken and recorded at regulars intervals, enabling verification of the trend when they are taken in the presence of the Society's Surveyor. This operation is to be effected bearing in mind that during the readings the journals are to be steady on their bearings
- other parts exposed to wear or operating incidents are to be carefully examined and the results recorded. In particular, the wear of liners is to be measured and recorded.

3.3 Auxiliary diesel engines

3.3.1 The survey generally consists of the complete dismantling of the engine and a careful examination of those items most liable to be exposed to wear or operating incidents. In particular:

- crankshaft deflections and wear of cylinder liners are to be measured
- the crankshaft is to be checked by means of dye penetrant in way of fillets and lubricating oil holes
- all top halves of the main bearings together with at least two bottom halves are to be dismantled
- crankcase explosion relief valves, if fitted, are to be checked.

3.4 Reciprocating compressors

3.4.1 The survey is to include:

- the dismantling of pistons and valves for inspection
- the examination and testing of the nest of cooler tubes
- the verification of safety relief valves after reassembling.

3.5 Coolers, condensers, heaters

3.5.1 The survey is to include:

- the dismantling of the covers
- the examination of the nest of tubes
- the testing of the nest of tubes, if necessary.

3.6 Electrical switchboard

3.6.1 The survey is to include:

- the cleaning of the switchboard
- the verification of the connection assemblies, locking device tightening and busbar tightening
- the examination of the condition of the circuit-breakers, switches and fuses
- the verification of the contacts and screens
- the checking of the measuring instruments, which are to be re-calibrated or replaced, if inaccurate
- the insulation resistance test.

3.7 a.c. and d.c. generators

3.7.1 The survey is to include:

- the removal of protection plates and brush carriers
- the cleaning of field coils and armature windings
- the verification of proper contact of brushes, which are to be renewed if excessively worn
- the verification of commutators and sliprings
- the measurement of air gap clearances
- the checking of journals and bearings
- the insulation resistance test.

3.8 Other items (pumps, electric motors, etc.)

3.8.1 The survey is generally to include the complete dismantling for inspection of the main parts exposed to wear or operating incidents, such as bearings, casings, impellers and rotors.

4 Records of surveys carried out

4.1

4.1.1 The surveys carried out by the Chief Engineer are to be recorded in the engine/machinery log-book and a survey report is to be prepared for each item surveyed.

The report is generally to be drawn up in English; however, for ships trading in specific restricted areas the use of the language of the country concerned will be accepted.

The report may be provided in hard copy or using a computerised recording system.

4.1.2 The report is to indicate the following information:

- identification data:
  - name of ship and register number
  - name of Chief Engineer and Owner's attestation
  - date and place (port or voyage leg) of the survey
  - reference of the item in the CSM or PMS list, and description of the item
- inspection conducted:
  - the type of inspection carried out: visual external examination, internal examination after dismantling, overhaul
  - readings performed, when applicable: clearances, measurements, working pressure, or other working parameters of the equipment
  - inspection findings: corrosion, fractures, pieces of equipment worn out, broken or missing
- maintenance and repairs carried out and parts replaced
- results of tests performed after the inspection, such as working test, pressure test.

For sake of completeness, other documentation such as sketches, photos, measurement reports may be attached to the report.

The report is to be signed by the Chief Engineer.

5 Confirmatory survey

5.1

5.1.1 A confirmatory survey, to be carried out by a Surveyor of the Society, is to be requested according to the following principle:

- for ships under the CSM system, within a reasonably short time from the date of the surveys carried out by the Chief Engineer, and, in any case, in the first port which is under the jurisdiction of an Office of the Society
- for ships under the PMS system, at the next annual audit (see Ch 2, App 1, [5.2]).

5.1.2 The Surveyor is to be supplied with a copy of this survey report and also shown the engine log-book.

5.1.3 The Surveyor carries out an external examination of the relevant items and parts replaced and, if applicable, attends running tests. If doubts arise, the Surveyor may request dismantling as deemed necessary.

5.1.4 If the persons on board are authorized to survey the main engine crankshaft and bearings (see [2.1.2]), the Surveyor performs the following:

- check of condition monitoring records (see Ch 2, App 1, [6.1.2])
- check of crankshaft deflection readings
- check of bearing clearances (where possible)
- checks for signs of wiped or broken white metal in the crankcase or filters
- check of the witness marks of shrink fits of crankshafts
- check of the bedplate structure (inside and outside)
- check that the condition of crankpins, journals and associated bearings is duly recorded.

5.1.5 Where the confirmatory survey is performed with an abnormal delay, the inspection is to be more extensive and, if necessary, the due surveys are to be completely repeated.

5.1.6 The date of the execution of the surveys will be assumed to be the date of the confirmatory survey.

6 Suspension of the Chief Engineer's authorization

6.1

6.1.1 Where the condition of the items surveyed by the Chief Engineer as specified in his or her reports does not correspond to the findings of the attending Surveyor, the Society may suspend the Chief Engineer's authorization.

6.1.2 The Society may also suspend the Chief Engineer's authorization in case of doubt on the general maintenance of the machinery installation.

Appendix 3 Thickness Measurements: Extent, Determination of Locations, Acceptance Criteria

1 General

1.1 Aim of the Appendix

1.1.1 Thickness measurements are a major part of surveys to be carried out for the maintenance of class, and the analysis of these measurements is a prominent factor in the determination and extent of the repairs and renewals of the ship's structure.

1.1.2 The Appendix is intended to provide Owners, companies performing thickness measurements and the Society's Surveyors with a uniform means with a view to fulfilling Rule requirements for thickness measurements. In particular, it will enable all the above-mentioned parties to carry out:

- the planning and preparation
- the determination of extent and location, and
- the analysis

of the thickness measurements in cooperation.

1.1.3 This Appendix is also to be used for the thickness measurements of ships assigned the notation **STAR-HULL** (see Ch 5, Sec 3 and Part E, Chapter 2). However, the acceptance criteria for thickness measurements specific to this notation are given in Pt E, Ch 9, Sec 3.

1.2 Scope of the Appendix

1.2.1 Separate Articles below provide the following information:

- references to rule requirements and some additional information on the extent of the thickness measurements to be performed during surveys according to types of ships and related surveys (see Article [2])
- locations of the measurements for the main parts of the ship (see Article [3])
- how to analyse the results of thickness measurements (see Article [4]).

Tables and sketches are also given to detail the above points according to the types of ships.

2 Rule requirements for the extent of measurements

2.1 General

2.1.1 For the maintenance of class, thickness measurements may be required during annual, intermediate and class renewal surveys.

Tab 1 gives the references to the requirements for minimum thickness measurements indicated in Part A, Chapter 3 and Part A, Chapter 4 for each service notation and related to the different types of surveys.

Some additional explanations are also given about the wording used in the Rules as well as the general principles of the required thickness measurements during class renewal surveys.

Table 1 : References to rule requirements related to thickness measurements

SERVICE NOTATION	TYPE OF SURVEY		
	CLASS RENEWAL	INTERMEDIATE	ANNUAL
All service notations	Ch 3, Sec 3, [3.6] and Ch 3, Sec 3, Tab 2: systematic measurements and suspect areas Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 3, Tab 3 as guidance	Ch 3, Sec 2, Tab 1: thickness measurements to be taken if deemed necessary by the Surveyor Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 3, Tab 3 as guidance	Ch 3, Sec 1, [2.1.2]: areas of substantial corrosion identified at previous surveys Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 3, Tab 3 as guidance

2.2 Class renewal survey

2.2.1 The thickness measurements required by the Rules consist of:

- systematic thickness measurements, i.e. measurements of different parts of the structure in order to assess the overall and local strength of the ship
- measurements of suspect areas as defined in Ch 2, Sec 2, [3.2.8]
- additional measurements on areas determined as affected by substantial corrosion as defined in Ch 2, Sec 2, [3.2.7].

3 Number and locations of measurements

3.1 General

3.1.1 Considering the extent of thickness measurements as required by the Rules and indicated in [2], the locations of the points to be measured are given here for the most important items of the structure. Thus the number of points can be estimated.

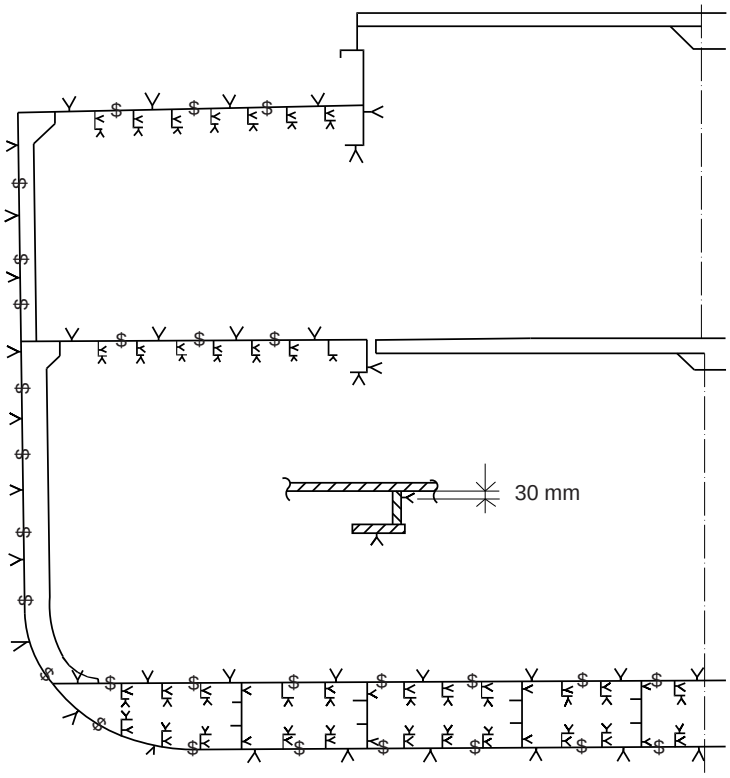
3.2 Locations of points

3.2.1 Tab 2 provides explanations and/or interpretations for the application of those requirements indicated in the Rules which refer to both systematic thickness measurements related to the calculation of global hull girder strength.

Table 2 : Interpretations of rule requirements for the locations and number of points to be measured

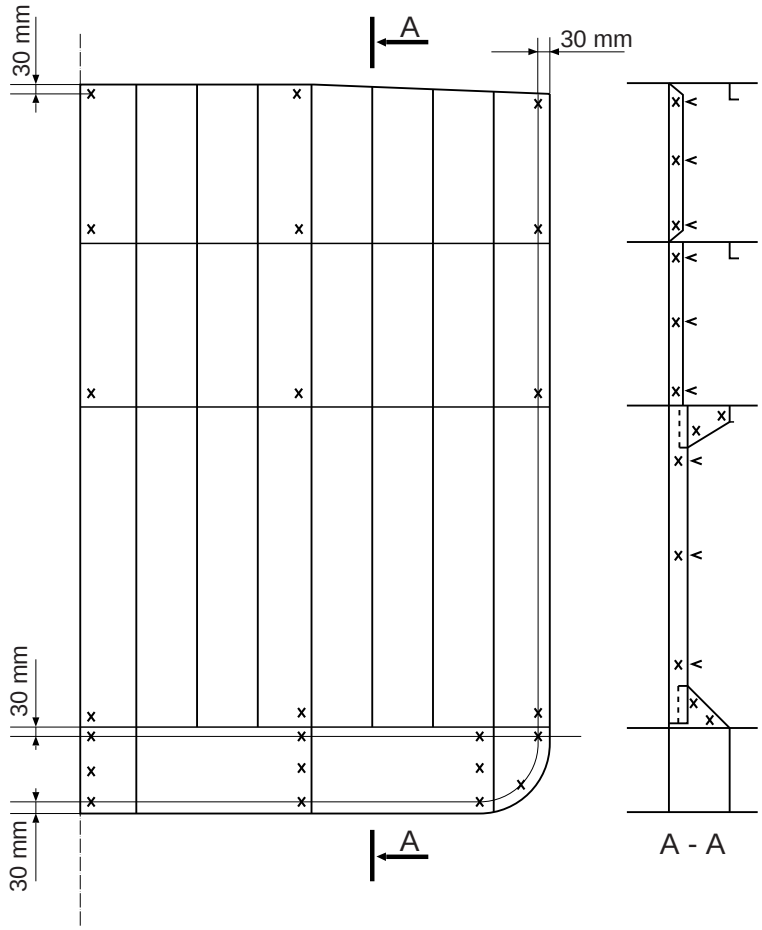
SYSTEMATIC MEASUREMENTS		
ITEM	INTERPRETATION	FIGURE
Selected plates on deck, tank top, bottom, double bottom and wind-and-water	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	No figure
All deck, tank top and bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	No figure
Transverse section	Refer to the definition given in Ch 2, Sec 2, [3.2.5]	Fig 1
Bulkheads	"Selected bulkheads" means at least 50% of the bulkheads	Fig 2
Selected internal structure such as floors and longitudinals, transverse frames, web frames, deck beams, 'tweendecks, girders	The internal structural items to be measured in each space internally surveyed are to be at least 10%	Fig 3

Figure 1 : Transverse section of a military ship



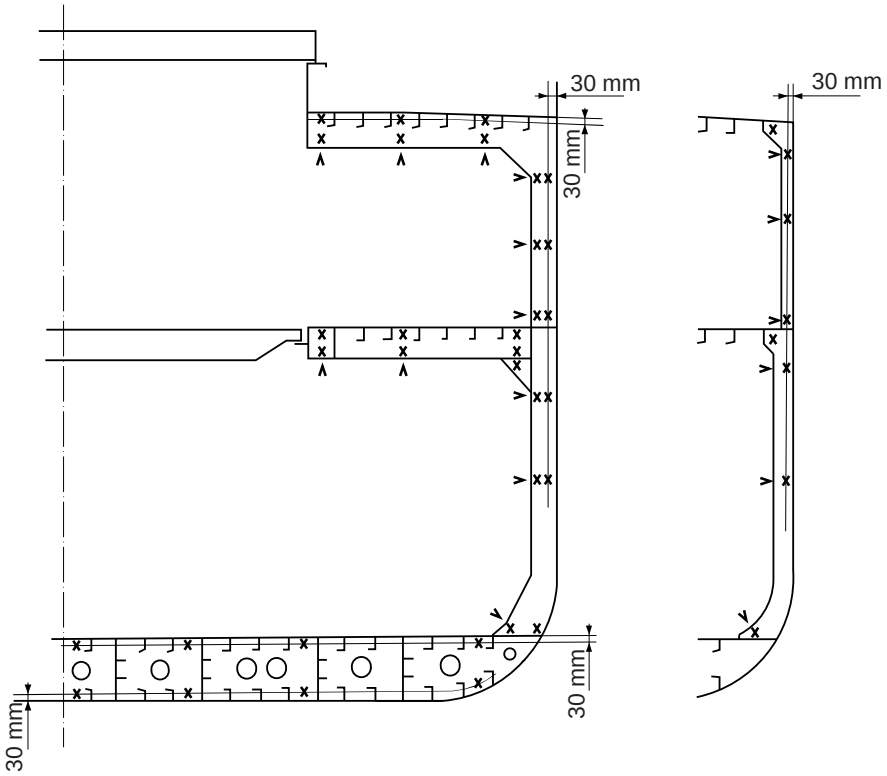
Measurements are to be taken on both port and starboard sides of the selected transverse section

Figure 2 : Locations of measurements on bulkheads of military ships



One stiffener out of three to be measured as per view A - A

Figure 3 : Locations of measurements on selected internal structural elements of military ships



4 Acceptance criteria for thickness measurements

4.1 General

4.1.1 Acceptance criteria stipulate limits of wastage which are to be taken into account for reinforcements, repairs or renewals of steel structure. These limits are generally expressed for each structural item as a maximum percentage of acceptable wastage (W). When the maximum percentage of wastage is indicated, the minimum acceptable thickness (t_{min}) is that resulting from applying this percentage to the rule thickness (t_{rule}), according to the following formula:

$$t_{min} = \left(1 - \frac{W}{100}\right) t_{rule}$$

However, when the rule thickness is not available, the as-built thickness can be used.

Only for criteria related to an item (see [4.3.4] b), the Society may establish a list of renewal thicknesses tailored to the different structural items. In such a case these thicknesses are used in lieu of the minimum thicknesses calculated from the percentage of wastage.

Note 1: In any case, at the request of the Owner, the Society may perform a direct calculation based on the current measurements.

4.1.2 In cases where the ship has some structural elements with reduced wear margins (e.g. due to ship conversion, increase of draught), the minimum acceptable thickness for these elements is to be calculated with reference to the rule scantlings without taking account of any reduction originally agreed.

4.1.3 Decisions on steel renewals are taken by the attending Surveyor applying the criteria given in this Article and based on his judgement and the actual condition of the ship. Should advice be needed to support his decision, the Surveyor may refer to the relevant technical office of the Society.

4.2 Criteria

4.2.1 The acceptance criteria for the minimum thicknesses are divided into:

- criteria on local and global strength, given in [4.3]
- criteria on buckling strength, given in [4.4]
- criteria on pitting, given in [4.5].

4.2.2 Each measured structural item is to be checked against these four criteria, as far as applicable. When the criteria are not met, reinforcements, repairs and renewals are to be carried out as appropriate.

4.3 Local and global strength criteria

4.3.1 Local and global strength criteria are given for the following ship types:

- **military ship**
- **oil replenishment ship**.

These criteria may also be used for other ship types taking into consideration the equivalence or similarity of structural elements and their contribution to local and/or global strength.

4.3.2 For the evaluation of the ship longitudinal strength, it is a prerequisite that fillet welding between longitudinal members and deck, side and bottom plating is maintained effective so as to keep continuity of hull structures.

4.3.3 Each structural item to be assessed is illustrated in a typical transverse section (see Fig 4).

These structural items are also listed in Tab 3 and grouped according to their position and contribution to the local or global strength of the ship.

4.3.4 Each structural item is to be assessed according to four different criteria which vary with regard to the domain under which it is considered, namely:

a) an isolated area, which is meant as a part of a single structural item. This criterion takes into consideration very local aspects such as grooving of a plate or web, or local severe corrosion; however, it is not to be used for pitting for which separate criteria are considered (see [4.5])

b) an item, which is meant as an individual element such as a plate, a stiffener, a web, etc. This criterion takes into consideration the average condition of the item, which is assessed by determining its average thickness using the various measurements taken on the same item

c) a group of items, which is meant as a set of elements of the same nature (plates, longitudinals, girders) contributing either to the longitudinal global strength of the ship in a given zone or to the global strength of other primary transverse elements not contributing to the ship longitudinal strength, e. g. bulkheads, hatch covers, web frames

d) a zone, which is meant as all and only longitudinal elements contributing to the longitudinal strength of the ship; in this regard, the three main zones are defined as deck zone, neutral axis zone and bottom zone. This criterion takes into consideration the average condition of all groups of items belonging to the same zone.

4.3.5 The assessment of the thickness measurements is to be performed using the values given in Tab 3, for each structural element with regard to the four criteria defined above, in the following order:

a) assessment of isolated areas (column 1 in the tables). If the criterion is not met, the wasted part of the item is to be dealt with as necessary.

b) assessment of items (column 2 in the tables). If the criterion is not met, the item is to be dealt with as necessary in the measured areas as far as the average condition of the item concerned is satisfactory. In cases where some items are renewed, the average thicknesses of these items to be considered in the next step are the new thicknesses.

c) assessment of groups of items (column 3 in the tables). If the criterion is not met, a sufficient number of elements are to be renewed in order to obtain an increased average thickness satisfying the considered criterion of the group (generally the elements to be renewed are those most wasted). As an example, for the assessment of the group "deck plates" all deck plates are measured and an average thickness of each of them is estimated. Then the average of all these values is to satisfy the criteria given for this group.

d) assessment of zones (column 4 in the tables). In principle, the criterion of the zone is met when all groups of items belonging to the zone meet their own criteria (see c) above). However, a greater diminution than those given in column 3 may be accepted for one group of items if, considering the other groups of items belonging to the same zone, the overall diminution of the zone does not exceed the criterion given for it in column 4.

Example: The deck zone consists of two groups of items:

- deck plating, which has an average diminution of 12% (criterion 10%)
- deck longitudinals, which has an average diminution of 4% (criterion 10%).

Even though the deck plating group exceeds its acceptance criterion, the average diminution of the zone, which can be very roughly estimated at 8%, is acceptable and thus the deck plating group can be accepted as it is.

Note 1: This criterion applicable to the zones is based on the general rule that the current hull girder section modulus is not to be less than 90% of the rule section modulus within 0,4L amidships. When the zone criterion is used, the assessment is made on the basis of the original modulus instead of the rule modulus. At the request of the Owner, a direct calculation using the ship's current thicknesses may be performed by the Society in order to accept greater diminutions than those given for this criterion.

4.3.6 These criteria take into consideration two main aspects:

- the overall strength of the hull girder
- the local strength and integrity of the hull structure, such as hatch covers, bulkheads, etc.

Figure 4 : Military ship: layout of items to be assessed

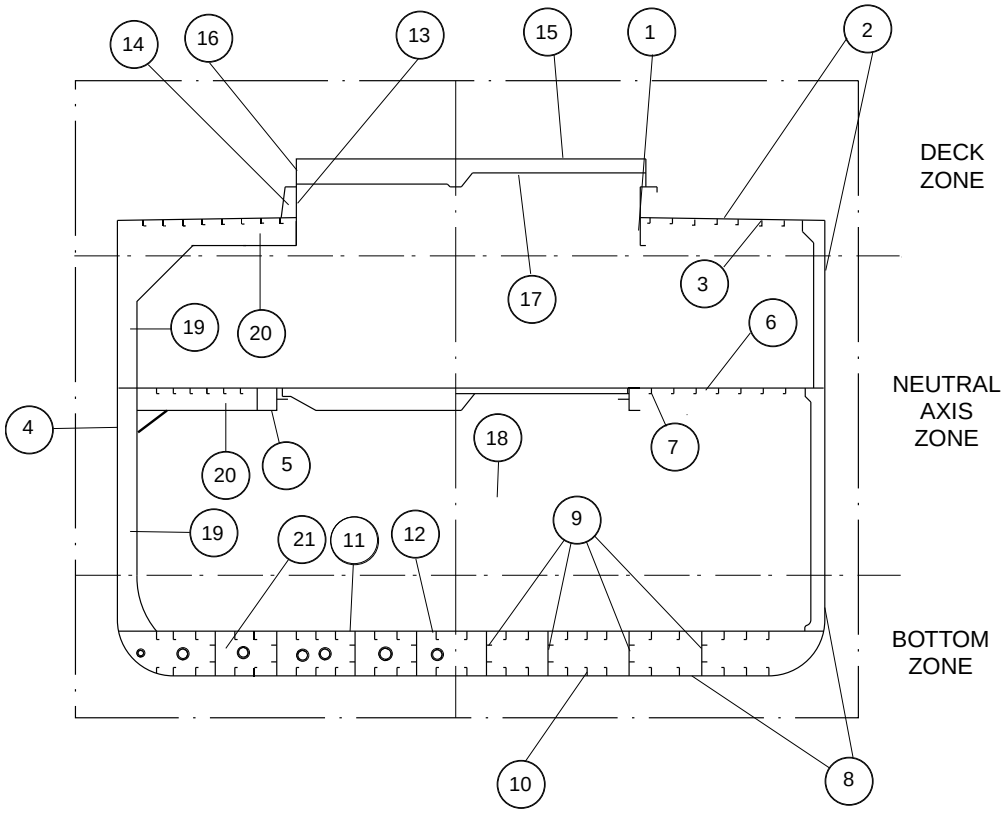


Table 3 : Local and global acceptance criteria for military ships (given in % of wastage)

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)					
	DECK ZONE **(1)**	–	–	–	10
1	Hatch coaming underdeck girder web underdeck girder flange	– 25 20	– 20 15	10 – –	– – –
2	Upperdeck plating, deck stringer plates and sheer strakes	30	20	10	–
3	Deck longitudinal-++-s web flange	– 30 25	– 20 15	10 – –	– – –
	NEUTRAL AXIS ZONE **(1)**	–	–	–	15
4	Side shell plating	25	20	15	–
5	'Tweendeck hatch girder web flange	– 25 20	– 20 15	15 – –	– – –
6	'Tweendeck plating	30	20	15	–
7	'Tweendeck longitudinals web flange	– 30 25	– 20 15	15 – –	– – –
	BOTTOM ZONE **(1)**	–	–	–	10
8	Bilge and bottom strakes and keel plate	25	20	10	–
9	Bottom girders	25	20	10	–
10	Bilge and bottom longitudinals web flange	– 30 25	– 20 15	10 – –	– – –
11	Inner bottom plating	30	20	10	–
12	Inner bottom longitudinals web flange	– 30 25	– 20 15	10 – –	– – –
OTHER ITEMS					
13	Hatch coaming plating **(2)**	25	20	–	–
14	Hatch coaming brackets	30	25	–	–
15	Hatch cover top plating	25	20	15	–
16	Hatch cover skirt plating	30	20	–	–
17	Hatch cover stiffeners	30	20	–	–
18	Transverse bulkheads **(3)** plating stringer web stringer flange stiffener web stiffener flange brackets	 30 30 25 30 25 30	 20 20 15 20 15 20	 15 – – – – –	 – – – – – –

(1) Each zone is to be evaluated separately.
(2) If continuous, to be included in item 1.
(3) For deep tank bulkheads, the values "average of item" and "average of group" are to be increased by 5 (%).

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
19	Side frames web flange brackets	 30 25 30	 20 15 20	 – – –	 – – –
20	Deck/'tweendeck frames web flange	 30 25	 20 15	 – –	 – –
21	Floors plating	 30	 20	 –	 –
22	Forward and aft peak bulkheads plating stiffener web stiffener flange	 30 30 25	 20 20 15	 15 – –	 – – –
(1) Each zone is to be evaluated separately. **(2)** If continuous, to be included in item 1. **(3)** For deep tank bulkheads, the values "average of item" and "average of group" are to be increased by 5 (%).					

4.4 Buckling strength criterion

4.4.1 This criterion is applicable to ships having a length greater than 120 metres.

In addition to the evaluation of structural elements according to [4.3], the structural items contributing to the longitudinal strength of the ship, such as deck and bottom plating, deck and bottom girders, etc., are also to be assessed with regard to their buckling strength. The values shown in Tab 4 are not to be exceeded.

Note 1: The minimum thickness will be specially considered for ships built with excess hull girder section modulus.

Table 4 : Buckling strength criterion

ITEMS		RATIO	MATERIAL (R_{eH})		
			235	315	355 and 390
Bottom and deck plates		s / t	56,0	51,0	49,0
Longitudinals	flat bar web	h_w / t_w	20,0	18,0	17,5
Flanged longitudinals / girders	web	h_w / t_w	56,0	51,0	49,0
Flanged longitudinals / girders	symmetrical flange	b_f / t_f	34,0	30,0	29,0
Flanged longitudinals / girders	asymmetrical flange	b_f / t_f	17,0	15,0	14,5
Symbols: R_{eH} : Minimum yield stress of the material, in N/mm^2; h_w : Web height, in mm; t_w : Web thickness, in mm;		s : Longitudinal spacing, in mm; b_f : Flange breadth, in mm;	t : Actual plate thickness, in mm; t_f : Flange thickness, in mm;		

4.5 Pitting

4.5.1 The maximum acceptable depth for isolated pits is 35% of the as-built thickness.

4.5.2 For areas with different pitting intensity, the intensity diagrams shown in Fig 5 are to be used to identify the percentage of affected areas.

For areas having a pitting intensity of 50% or more, the maximum average depth of pits is 20% of the as-built thickness. For intermediate values between isolated pits and 50% of affected area, the interpolation between 35% and 20% is made according to Tab 5.

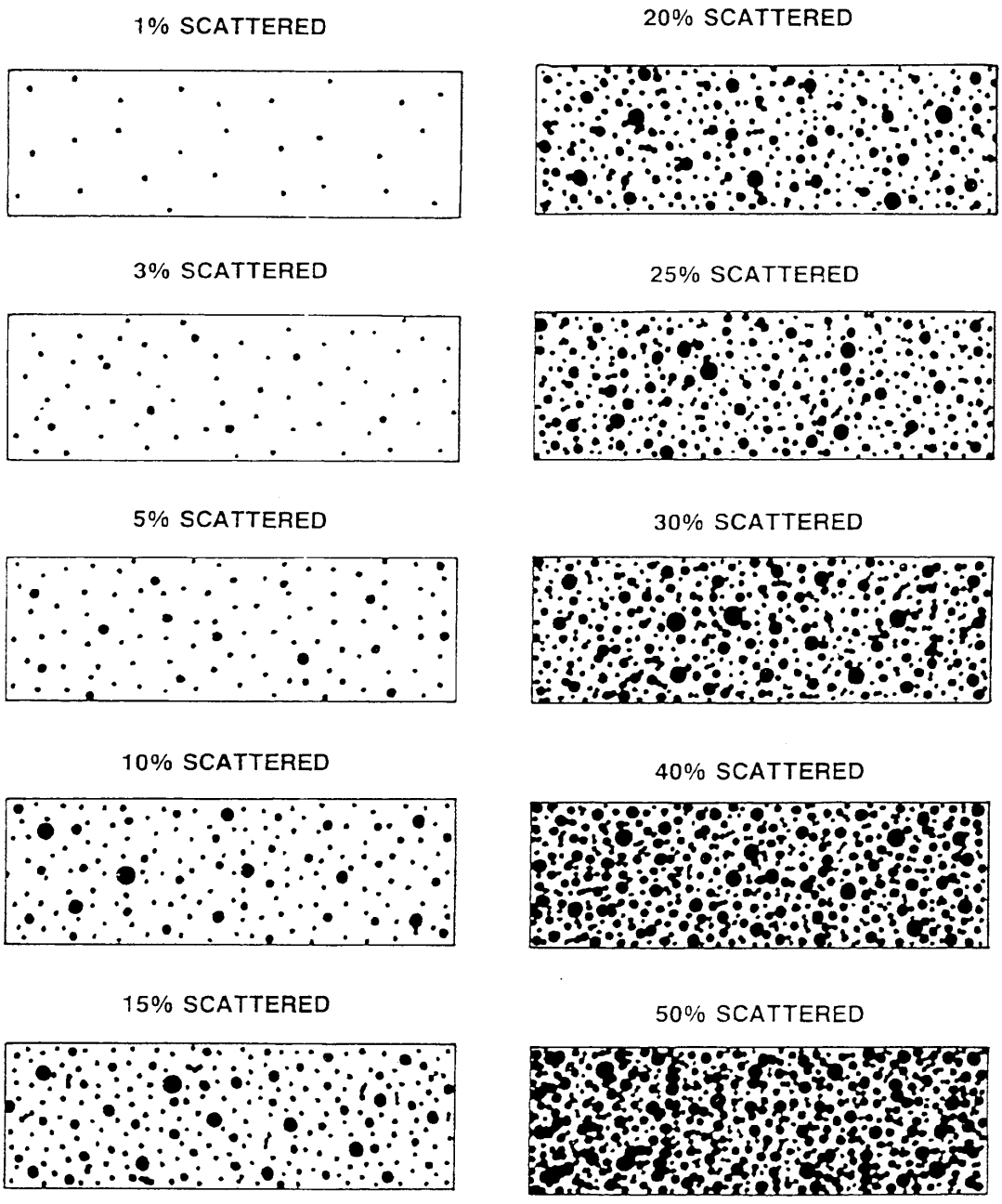
4.5.3 In addition, the thickness outside the pits in the area considered is to be assessed according to [4.3] and [4.4].

Note 1: Application of filler material (plastic or epoxy compounds) is recommended as a means to stop or reduce the corrosion process, but it is not considered an acceptable repair for pitting exceeding the maximum allowable wastage limits. Welding repairs may be accepted when performed in accordance with procedures agreed with the Society.

Table 5 : Pitting intensity and corresponding maximum average depth of pitting

Pitting intensity (%)	Maximum average pitting depth (% of the as-built thickness)
Isolated	35,0
5	33,5
10	32,0
15	30,5
20	29,0
25	27,5
30	26,0
40	23,0
50	20,0

Figure 5 : Pitting intensity diagrams (from 1% to 50% intensity)



Appendix 4 Condition Monitoring and Condition Based Maintenance

1 General

1.1 Application

1.1.1 These requirements apply to the approved Condition Monitoring and Condition Based Maintenance schemes where the condition monitoring results are used to influence the scope and/or frequency of Class survey.

1.1.2 This scheme may be applied to components and systems covered by continuous survey system for machinery (CSM), and other components and systems as requested by the owner. The extent of Condition Based Maintenance and associated monitoring equipment to be included in the maintenance scheme is decided by the Owner.

1.1.3 These requirements can be applied only to vessels operating on approved PMS survey scheme.

1.1.4 The scheme may be applied to any individual items and systems. Any items not covered by the scheme are to be surveyed and credited in accordance with the requirements of Part A, Chapter 3, Part A, Chapter 4 and Part A, Chapter 5 as applicable.

1.1.5 Ships complying with the requirements of this Appendix are granted one of the notations **CBM**, **[CBM]**, **CBM-P** or **[CBM-P]** as defined in Ch 1, Sec 2, [4.11.1].

Note 1: See NI684 "Guideline for Condition Based Maintenance" for further details on requirements and class workflow.

1.2 Definitions

1.2.1 The following standard terms are defined in ISO 13372:2012.

1.2.2 Condition monitoring

Acquisition and processing of information and data that indicate the state of a machine over time. The machine state deteriorates if faults or failures occur.

1.2.3 Diagnostic

Examination of symptoms and syndromes to determine the nature of faults or failures.

1.2.4 Condition based maintenance

Maintenance performed as governed by condition monitoring programmes.

1.3 Condition monitoring (CM)

1.3.1 Where an approved condition monitoring system is fitted, credit for survey may be based on acceptable condition monitoring results. The condition monitoring results are to be reviewed during the annual audit.

1.3.2 Limiting parameters are to be based on the Original Equipment Manufacturers guidelines (OEM), or a recognised international standard.

1.3.3 The condition monitoring system is to provide an equivalent or greater degree of confidence in the condition of the machinery to traditional survey techniques.

1.3.4 The condition monitoring system is to be approved in accordance with the Society's procedures.

1.3.5 A condition monitoring system may be used to provide a greater understanding of equipment condition, and a condition based maintenance scheme may be used to obtain maintenance efficiency. Class approval is required where owners wish to change the survey cycle based on CM/CBM.

1.3.6 Software systems can use complex algorithms, machine learning and knowledge of global equipment populations/defect data in order to identify acceptability for continued service or the requirement for maintenance. These systems may be independent of the OEM recommended maintenance and condition monitoring suggested limits. Approval of this type of software is to be based on OEM recommendations, industry standards and Society experience.

1.3.7 The Society retains the right to test or open-up the machinery, irrespective of the CM results, if deemed necessary by Surveyor during annual and renewal audits.

1.4 Condition based maintenance (CBM)

1.4.1 Where an owner wishes to base their equipment maintenance on a CBM approach, this is to meet the requirements of the ISM Code.

1.4.2 Where an approved planned maintenance and CBM scheme is in operation, the CSM and other survey intervals may be extended based on OEM maintenance recommendations and acceptable condition monitoring results.

1.4.3 Limiting parameters (alarms and warnings) are to be based on the OEM guidelines, or a recognised international standard.

1.4.4 The CBM scheme is to provide an equivalent or greater degree of confidence in the condition of the machinery to traditional maintenance techniques.

1.4.5 The scheme is to be approved in accordance with the Society's procedures.

1.4.6 Software systems can use complex algorithms, machine learning and knowledge of global equipment populations/defect data in order to identify acceptability for continued service or the requirement for maintenance. These systems may be independent of the OEM recommended maintenance and condition monitoring suggested limits. Approval of this type of software is to be based on OEM recommendations, industry standards and Society experience. In that case, written agreement from the OEM is to be provided to the Society.

2 Procedures and conditions for approval of CM and CBM

2.1 Onboard responsibility

2.1.1 The Chief Engineer is to be the responsible person on board in charge of the CM and CBM.

2.1.2 Documentation on the overhaul of items covered by CM and CBM schemes are to be reported by the Chief Engineer.

2.1.3 Access to computerized systems for updating of the maintenance documentation and maintenance program is only to be permitted by the Chief Engineer or other authorized person.

2.1.4 All personnel involved in CM and CBM is to be appropriately qualified.

Note 1: CM does not replace routine surveillance or the Chief Engineer's responsibility for taking decisions in accordance with his judgement.

2.2 Equipment and systems requirements

2.2.1 CM equipment and systems are to be approved in accordance with the Rule Note NR674 Condition Monitoring Systems.

2.2.2 The CM/CBM scheme and its extent, are to be approved by the Society.

2.2.3 The CBM scheme is to be capable of producing a condition report, and maintenance recommendations.

2.2.4 A system is to be provided to identify where limiting parameters (alarms and warnings) are modified during the operation of the scheme.

2.2.5 Unless otherwise agreed by the Naval Authority, CM and CBM schemes using remote monitoring and diagnosis are not permitted.

2.2.6 CBM schemes are to identify defects and unexpected failures that were not prevented by the CM system.

2.2.7 Systems are to include a method of backing up data at regular intervals.

2.3 Documentation and information

2.3.1 The following documentation is to be made available to the Society for the approval of the scheme:

a) procedure for changes to software system and CM parameters

b) listing of equipment to be included in the scheme

c) listing of acceptable condition monitoring parameters

d) description of CBM scheme

e) listing, specifications and maintenance procedures for condition monitoring equipment

f) baseline data for equipment with condition monitoring

g) qualification of authorized personnel and company responsible for analysing CM results.

2.3.2 In addition to the above documentation the following information is to be available on board:

a) all the documentation in [2.3.1], duly updated

b) maintenance instructions (manufacturer's and shipyard's)

c) condition monitoring data including all data since last opening of the machine and the original base line data

d) reference documentation (trend investigation procedures etc.)

e) records of maintenance including repairs and renewals carried out

f) records of changes to software systems and parameters

g) sensors calibration records / certification / status.

2.4 Approval validity

2.4.1 An annual audit is to be carried out to maintain the validity of the CM/CBM scheme.

2.4.2 The survey arrangement for machinery under CM/CBM can be cancelled by the Society if the scheme is not being satisfactorily carried out either from the maintenance records or the general condition of the machinery.

2.4.3 Items under CM/CBM scheme can be cancelled from CM/CBM scheme and moved to CSM scheme by the Society if the scheme is not found to be satisfactorily maintained either from maintenance records or the general condition of the machinery, during annual and renewal audits.

2.4.4 In the case of sale or change of management of the ship or transfer of class, the approval of CM/CBM is to be reconsidered.

2.4.5 The ship owner may, at any time, cancel the CM/CBM scheme by informing the Society in writing. In this case the items which have been inspected under this scheme since the last annual audit may be credited for class at the discretion of the attending surveyor.

3 Surveys

3.1 Installation survey

3.1.1 Condition monitoring equipment is to be installed and surveyed in accordance with the Society's rules, and a set of base line readings is to be taken.

3.2 Implementation survey

3.2.1 The implementation survey is to be carried out by the Surveyor no earlier than 6 months after installation survey and no later than the first class annual survey.

3.2.2 During the implementation survey the following is to be verified by the surveyor:

a) the CM/CBM scheme is implemented according to the approval documentation, including a comparison with baseline data

b) the scheme is producing the documentation required for the annual audit and the requirements of surveys and testing for the maintenance of class are complied with

c) the onboard personnel are familiar with operating the scheme

d) records of any limiting parameters (alarms and warnings) that have been modified during the operation of the scheme

e) records of any failures of monitored equipment are to be reviewed to ensure that the condition monitoring scheme is effective / sufficient.

3.2.3 When this survey is carried out and the implementation is found in order, a report describing the scheme is to be submitted to the Society and the scheme may be put into service.

3.3 Annual audit

3.3.1 An annual audit of the CM and CBM scheme is to be carried out by a Surveyor concurrently with the class annual survey.

3.3.2 The purpose of this audit is to be to verify that the scheme is being correctly operated and that the machinery has been functioning satisfactorily since the previous audit. This is to include any limiting parameters (alarms and warnings) that have been modified since the last audit. A general examination of the concerned items is to be carried out.

3.3.3 The performance, condition monitoring and maintenance records are to be examined to verify that the machinery has functioned satisfactorily since the previous survey, or action has been taken in response to machinery operating parameters exceeding acceptable tolerances.

3.3.4 Written details of breakdown or malfunction are to be made available.

3.3.5 At the discretion of the surveyor, function tests, confirmatory surveys and random check readings, where Condition Monitoring / Condition Based Maintenance equipment is in use, are to be carried out as far as practicable and reasonable.

3.3.6 The familiarisation of the Chief Engineer and other authorized personnel involved with the CM/CBM system is to be verified.

3.3.7 Calibration status of sensors and equipment is to be verified.

3.3.8 Verification that the suitability of the CM/CBM scheme has been reviewed following defects and failures is to be carried out.

3.3.9 An annual report covering the year's service is to be supplied to the Society. It is to include the following information:

- the list of items of machinery and components and the procedures for their identification
- the preventive maintenance sheets
- the condition monitoring data, including all data since the last dismantling and the original reference data of the machinery checked through condition monitoring
- any change to the documentation listed in [2.3]
- full trend analysis (including spectrum analysis for vibrations) of machinery displaying operating parameters exceeding acceptable tolerances.

3.4 Damage and repairs

3.4.1 Damage to components or items of machinery is to be reported to the Society. The repairs of such damaged components or items of machinery are to be carried out to the satisfaction of the Surveyor.

3.4.2 Details of repairs and maintenance carried out are to be examined. Any machinery part, which has been replaced by a spare one, due to damage, is to be retained on board where possible until examined by the Surveyor.

3.4.3 Defect and failure data is to be reviewed in order to ensure the system output is appropriate. Where necessary, following review of the failure data, there is to be a method of amending the CM and CBM scheme.

3.4.4 For bearings surveyed under the continuous survey system, when a certified monitoring system is in place such a condition based monitoring or manufacturers approved bearing wear monitoring, then there is no need to turn out the bearings unless the monitoring systems are not working properly, suggest there may have been bearings problems or the monitoring data is not available and verifiable over a period covering the CSM cycle.

CHAPTER 3
SCOPE OF SURVEYS (ALL SHIPS)

Section 1 Annual Survey

Section 2 Intermediate Survey

Section 3 Class Renewal Survey

Section 4 Bottom Survey

Section 5 Tailshaft Survey

Section 6 Boiler Survey

Section 7 Survey of Watertight Cable Transits

Appendix 1 Class Requirements and Surveys of Laid-up Ships

Section 1 Annual Survey

1 General

1.1

1.1.1 The requirements of this Section apply to annual surveys of all ships. The specific requirements for annual surveys related to service notations and additional class notations assigned to ships are addressed in Part A, Chapter 4 and Part A, Chapter 5, respectively.

1.1.2 At the time of annual surveys, the ship is to be generally examined. The survey is to include a visual inspection of the hull, equipment and machinery of the ship and some operational tests thereof, so far as necessary and practicable in order to verify that the ship is in a acceptable general condition and is properly maintained. This survey is carried out alongside without dismantling.

1.1.3 Owners are reminded that, in compliance with the requirements in Ch 2, Sec 2, [7.3], any modification to the ship's hull, equipment and machinery affecting its classification is to be made known to the Society.

2 Hull

2.1 Hull and hull equipment

2.1.1 The survey is to include a general external examination and testing, where appropriate, of the following items, as applicable:

- outer shell plating above the waterline, relevant shell doors and accessible parts of the rudder(s)
- plating of main deck and exposed decks, superstructures, with their openings and means of closure
- hatchways and other openings on exposed decks, with their coamings and their means of closure and securing arrangements (for details see [2.3])
- sidescuttles and deadlights, chutes and other openings with their means of closure
- bulwarks, guard rails, freeing ports, gangways and lifelines, ladders
- scuppers and sanitary discharges, valves on discharge lines and their controls
- ventilators, air pipes, overflow pipes and gas vent pipes, with their means of closure and flame screens, where required
- when a freeboard has been assigned to the ship, freeboard marks on the ship's sides
- deck equipment such as lifeboat davit foundations, bollards, fairleads, hawse pipes, etc., masts and associated rigging, including lightning conductors
- windlass and equipment of chain cables or wire ropes for anchors
- watertight bulkheads, their watertight doors and associated local and remote controls, and their watertight penetrations
- main and auxiliary steering arrangements, including their associated equipment and control systems, and manoeuvring gear
- fire divisions and fire doors, dampers in ventilation ducts, means of closure of skylights and other openings
- confirmation that emergency escape routes from accommodation and service spaces are satisfactory
- engine room
- where fitted, helicopter deck and its supporting structure, safety net and arrangements for the prevention of sliding
- availability of loading manual or, where required, electronic loading instrument, including standard test
- availability of approved stability documentation.

Note 1: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested at working nominal pressure where doubts arise.

2.1.2 Suspect areas identified at previous class renewal surveys are to be examined. Areas of substantial corrosion identified at previous class renewal or intermediate surveys are to be subjected to thickness measurements.

2.1.3 Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey, see Ch 3, Sec 3, [3.5.2], or the intermediate survey, see Ch 3, Sec 2, Tab 1.

Thickness measurements are to be carried out as considered necessary by the Surveyor.

2.2 Survey of watertight cable transits

2.2.1 The Cable Transit Seal Systems Register, as detailed in Ch 3, Sec 7, is to be reviewed to confirm it is being maintained and, as far as practicable, the transits are to be examined to confirm their satisfactory condition.

2.2.2 Where there are records entered since the last annual survey of any disruption to the cable transits or installation of new cable transits, the satisfactory condition of those transits is to be confirmed by review of records and, if deemed necessary, by examination. The results are to be recorded in the Cable Transit Seal Systems Register against the specific cable transit.

2.3 Hatch covers and coamings

2.3.1 The Owner or his representative is to declare to the attending Surveyor that no significant changes have been made to the hatch covers, hatch coamings and their securing and sealing devices without prior approval of the Society.

The survey of hatch covers and coamings is to include:

a) when fitted with portable covers, or wooden or steel pontoons, checking of the satisfactory condition of:
- wooden covers and portable beams, carriers or sockets for the portable beams, and their securing devices
- steel pontoons
- tarpaulins
- cleats, battens and wedges
- hatch securing bars and their securing devices
- loading pads/bars and the side plate edge
- guide plates and chocks
- compression bars, drainage channels and drain pipes (if any)

b) when fitted with mechanically operated steel covers, checking of the satisfactory condition of:
- hatch covers
- tightness devices of longitudinal, transverse and intermediate cross junctions (gaskets, gasket lips, compression bars, drainage channels and, if any, drain pipes)
- clamping devices, retaining bars, cleating
- chain or rope pulleys
- guides
- guide rails and track wheels
- stoppers, etc.
- wires, chains, gypsies, tensioning devices
- hydraulic system essential to closing and securing
- safety locks and retaining devices
- the operation of hatch covers, by means of random examination: stowage and securing in open condition, proper fit, locking and efficiency of sealing in closed position, operational testing of hydraulic and power components, wires, chains and link drives

c) checking of the satisfactory condition of hatch coaming plating and its stiffeners.

3 Machinery and systems

3.1 General machinery installations

3.1.1 The survey of general machinery installations is to cover the following items:

- general examination of machinery and boiler spaces with particular attention to the fire and explosion hazards; confirmation that emergency escape routes are practicable and not blocked
- general examination of the machinery, steam, hydraulic, pneumatic and other systems and their associated fittings, for confirmation of their proper maintenance
- testing of the means of communication and order transmission between the navigating bridge and the machinery control positions and other control stations
- confirmation that the rudder angle indicator on the bridge is in working order
- examination, as far as practicable, of the bilge pumping systems and bilge wells, including operation of the pumps, remote reach rods and level alarms, where fitted
- visual examination of the condition of any expansion joints in sea water systems
- external examination of pressure vessels other than boilers and their appurtenances, including safety devices, foundations, controls, relieving gear, high pressure piping, insulation and gauges.

3.1.2 When the ship is equipped with a refrigerating plant (whether or not covered by an additional class notation), the annual survey is to include the external examination of:

- pressure vessels of the installation to the same extent as indicated in [3.1.1]
- refrigerant piping, as far as practicable

- for refrigerating machinery spaces using ammonia as refrigerant:
  - ventilation system including functional test
  - water-spraying fire-extinguishing system; see [3.4.2] item d)
  - bilge system including functional test
  - electrical equipment, confirming its proper maintenance
  - gas detection system
  - breathing apparatus and protective clothing.

3.1.3 When the ship is equipped with thruster installations, the annual survey is to include:

- an external examination of the machinery installation
- an operating test of the complete installation.

3.2 Boilers

3.2.1 For main and auxiliary boilers, the annual survey consists of an external examination of boilers and their appurtenances, including safety devices, foundations, controls, relieving, high pressure and steam escape piping, insulation and gauges.

3.2.2 For thermal oil heaters, a functional test while in operation is to be carried out, during which the following items are checked:

- the heater for detection of leakages
- the condition of the insulation
- the operation of indication, control and safety devices
- the condition of remote controls for shut-off and discharge valves

A satisfactory analysis of the quality of oil is to be made available to the Surveyor.

3.2.3 For exhaust gas thermal oil heaters, in addition to the requirements of [3.2.2], a visual examination and a tightness testing to the working pressure of the heater tubes are to be carried out.

3.3 Electrical machinery and equipment

3.3.1 The survey of electrical machinery and equipment is to cover the following items:

- general examination, visually and in operation, as feasible, of the electrical installations for power and lighting, in particular main and emergency generators, electric motors, switchboards, switchgears, cables and circuit protective devices, indicators of electrical insulation and automatic starting, where provided, of emergency sources of power
- checking, as far as practicable, the operation of emergency sources of power and, where they are automatic, also including the automatic mode.

3.3.2 The survey is also to cover the bridge control of propulsion machinery, and related arrangements (alarms and safety devices), when fitted.

The survey of an automated installation covered by an additional class notation is detailed in Part A, Chapter 5.

3.3.3 The survey is also to cover the computerized systems. This survey includes:

- Verification by the Surveyor regarding the management of change in operation. Procedures for management of change and relevant change records (see Pt C, Ch 3, Sec 3, [6]) are to be made available at the time of the survey

Note 1: In the cases where the change requires approval from the Society up front, the relevant procedures and documentation for the change in question may be verified at that time.

- checking that revision of software mentioned in the records corresponds with revision effectively used for at least one computerized system chosen at the satisfaction of the Surveyor.

3.3.4 For ships where the electrical distribution system includes harmonic filters, the survey is to include:

- Annual measurement, as a minimum, of the harmonic distortion levels of main busbars under seagoing conditions as close to the periodical machinery survey as possible so as to give a clear representation of the condition of the entire plant to the Surveyor. Harmonic distortion readings are to be carried out when the greatest amount of distortion is indicated by the measuring equipment. An entry showing which equipment was running and/or filters in service is to be recorded in the log so this can be replicated for the next periodical survey. Harmonic distortion levels are also to be measured following any modification to the ship's electrical distribution system or associated consumers by suitably trained ship's personnel or by a qualified outside source.
- Verification that records of all above measurements are made available to the Surveyor at each periodical survey.

Note 1: Those requirements apply at any scheduled machinery periodical survey having a due date on or after 1st July 2017 for ships contracted for construction before 1st July 2017.

- For ships contracted for construction on or after 1st July 2017, verification that the facilities used for continuous monitoring of the levels of harmonic distortion experienced on the main busbars as well as alerting the crew when the level of harmonic distortion exceeds the acceptable limits are working properly and review of corresponding records.

3.3.5 For Li-ion batteries of a capacity above 20kWh or used as an emergency source or transitional source, the survey is to include:

a) general examination of the battery pack(s)

b) general examination of the battery monitoring system

c) general examination of the battery support system

d) general examination of the battery compartment, including visual check of the safety measures and functions related to battery spaces, i.e. battery installation, ventilation, fire safety measures and alarms

e) check of State of Health (SOH) of battery system according to the Manufacturer's specification and verification that the battery capacity has been regularly recorded and complies with the parameters specified by the Manufacturer

f) random testing of sensors and alarms associated with the battery system

g) undertaking of measurement of insulation of battery packs

h) additional checks as required by the Manufacturer specification and to the satisfaction of the Surveyor (e.g. when some specific part of the battery is or has been replaced such as battery cells or BMS).

3.3.6 For batteries used for electrical supply of pods, the survey is to include:

a) verification of proper working of monitoring systems

b) verification of proper working of alarms and default settings and related functions and/or interfacing to the other ship systems

c) disconnection of the electrical storage system (ESS) in different operating modes and verification of the triggering of the automatic start of the stand-by source, when needed

d) test of the fire detection system of the battery compartment

e) test of the gas detection system of the battery compartment

f) examination of the fire-extinguishing system of the battery compartment, as applicable, in accordance with the relevant requirements given in [3.4]

g) verification that accessibility for common maintenance and battery overhaul, if any, is maintained (human access and space for overhaul devices).

3.3.7 For ships which are fitted with installations for the charging of electric vehicles, the survey is to include:

a) a general examination of the charging stations with a visual inspection of the safety measures and functions related to the recharging area (e.g. visual check on the charging stations and their cable assemblies, fire safety measures and alarms, ventilation, possibility of emergency disconnection of the charging stations)

b) verification that the charging equipment, cables and sockets are maintained according to the maintenance plan

c) verification of proper working of alarms involving default settings and malfunctions related to the charging stations and cable assemblies

d) examination and testing, as feasible at random, of the fixed fire detection and fire alarm system

e) checking of portable thermal imaging cameras, fire blankets and water fog applicators and confirmation that they are stored in the appropriate location

f) in case the recharging area is located on the weather deck, the following items are to be checked with respect to the fixed water monitors covering this area:

- general examination of all parts of the water monitor system (pumps, piping system, valves and other fittings)
- checking for proper operation of the system, including local manual control and remote control
- general examination of foundations of water monitors.

3.4 Fire protection, detection and extinction

3.4.1 The survey of fire prevention and other general arrangements is to cover the following items:

- checking that fire control plans are properly posted
- examination and testing, as feasible, of the operation of manual and/or automatic fire doors, where fitted
- checking, as far as practicable, that the remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, the remote controls for stopping fans in accommodation spaces and the means of cutting off power to the galley are in working order
- examination of the closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnel, where applicable
- examination, as far as practicable, and testing, as feasible and at random, of the fire and/or smoke detection systems.

3.4.2 The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the service notation assigned, are the following:

a) water fire system
   - examination of the fire main system and confirmation that each fire pump including the emergency fire pump can be operated separately so that the two required powerful jets of water can be produced simultaneously from different hydrants, at any part of the ship whilst the required pressure is maintained in the fire main
   - checking that fire hoses, nozzles, applicators, spanners and international shore connection (where fitted) are in satisfactory working condition and situated at their respective locations

b) fixed gas fire-extinguishing system (CO_2 , Halon or other gas)
   - external examination of gas receivers of the fixed fire-extinguishing systems and their accessories, including the removal of insulation for insulated low pressure gas containers
   - examination of fixed fire-fighting system controls, piping, instructions and marking; checking for evidence of proper maintenance and servicing, including date of last system tests
   - test of the alarm triggered before the gas is released

c) sprinkler system
   - examination of the system, including piping, valves, sprinklers and header tank
   - test of the automatic starting of the pump activated by a pressure drop
   - check of the alarm system while the above test is carried out

d) water-spraying system
   - examination of the system, including piping, nozzles, distribution valves and header tank
   - test of the starting of the pump activated by a pressure drop (applicable only for machinery spaces)

e) fixed foam systems (low or high expansion)
   - examination of the foam system
   - test to confirm that the minimum number of jets of water at the required pressure in the fire main is obtained when the system is in operation
   - checking the supplies of foam concentrate and receiving confirmation that it is periodically tested (not later than three years after manufacture and annually thereafter) by the manufacturer or an agent

f) dry powder system
   - examination of the dry powder system, including the powder release control devices
   - checking the supplies of powder contained in the receivers and that it has maintained its original smoothness
   - checking that the pressure of propelling inert gas contained in the relevant bottles is satisfactory.

3.4.3 As far as other fire-fighting equipment is concerned, it is to be checked that:

- semi-portable and portable fire extinguishers and foam applicators are in their stowed positions, with evidence of proper maintenance and servicing, and detection of any discharged containers
- firemen's outfits are complete and in satisfactory condition.

3.4.4 Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area
- fire fighting appliances and arrangements (to be surveyed as per [3.4.2], according to the equipment installed
- overall examination of refuelling systems and hangar facilities for cleanliness and absence of leaks, condition of gutters and drainage arrangement.

3.4.5 For ships which are fitted with a storage space for electric vehicles with aggregated battery capacity equal to or higher than 20 kWh, the survey is to include:

a) checking of fire-fighter's outfits, portable thermal imaging camera, foam extinguishers and portable water curtain nozzles and confirmation that they are stored in the appropriate location

b) examination of the deck drainage arrangements in the dedicated EV storage area

c) verification of proper working of the video monitoring system

d) general examination of the back-up water spray system, including the storage position of the spool pieces.

e) checking of the decontamination shower and equipment

f) test of the flame recognition software

g) test of the fixed gas detection system

h) examination and test of the fixed water-based fire-fighting system

i) checking of the portable gas detectors and fire blankets and confirmation that they are stored in the appropriate location.

Section 2 Intermediate Survey

1 General

1.1 Application

1.1.1 The requirements of this Section apply to intermediate surveys of all ships. The specific requirements for intermediate surveys related to service notations and additional class notations assigned to ships are addressed in Part A, Chapter 4 and Part A, Chapter 5, respectively.

1.1.2 The intermediate survey is to include examination and checks on a sufficiently extensive part of the structure to show that the structures of the ship are in satisfactory condition so that the ship is expected to operate until the end of the current period of class, provided that the ship is properly maintained and other surveys for maintenance of class are duly carried out during this period.

2 Hull

2.1 Surveys and testings

2.1.1 The requirements given in Tab 1 for the survey and testing of salt water ballast tanks are to be complied with.

Table 1 : Intermediate survey of hull (all ships)

ITEM	Age of ship (in years at time of intermediate survey)	
	5 < age ≤ 10	10 > age
SALT WATER BALLAST SPACES	Representative spaces internally examined Thickness measurements, if considered necessary by the Surveyor See **(1) (2) (3)**	All spaces internally examined Thickness measurements, if considered necessary by the Surveyor Tightness of inner bottom plating of cargo holds in way of double bottom salt water ballast tanks checked See **(1) (3)**

(1) If no visible structural defects are present, the examination is limited to verifying that the protective coating remains efficient.

(2) Where the protective coating is found to be in poor condition, as defined in Ch 2, Sec 2, [3.2.10], where a soft coating has been applied or where a protective coating has never been applied, i.e.neither at the time of construction nor thereafter, the examination is to be extended to other ballast spaces of the same type.

(3) For salt water ballast spaces other than double bottom tanks, where a protective coating is found to be in poor condition, as defined in Ch 2, Sec 2, [3.2.10], and is not renewed, where soft coating has been applied or where a protective coating has never been applied, i.e.neither at the time of construction nor thereafter, maintenance of class is to be subject to the spaces in question being internally examined at annual surveys. The Society may consider waiving such internal examination at annual surveys of tanks protected with soft coating, whose size is 12 m^3 or less.

For salt water ballast double bottom tanks, where such breakdown of coating is found and is not renewed, where soft coating has been applied or where a protective coating has never been applied, i.e. neither at the time of construction nor thereafter, maintenance of class may be subject to the tanks in question being internally examined at annual intervals.

Note 1: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested should doubts arise.

Section 3 Class Renewal Survey

1 General

1.1

1.1.1 The requirements of this Section apply to class renewal surveys of all ships. The specific requirements for class renewal surveys related to service notations and additional class notations assigned to ships are addressed in Part A, Chapter 4 and Part A, Chapter 5, respectively.

1.1.2 The class renewal survey is to include sufficiently extensive examination and checks to show that the structures, main and auxiliary machinery, systems, equipment and various arrangements of the ship are in satisfactory condition or restored to such condition as to allow the ship to operate for the new period of class to be assigned, provided that the ship is properly maintained and other surveys for maintenance of class are duly carried out during this period.

The examinations of the hull are to be supplemented by thickness measurements and testing as deemed necessary, to ensure that the structural integrity remains effective and sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

1.1.3 The Owner is to provide the necessary facilities to enable this class renewal survey. The conditions for survey as detailed in Ch 2, Sec 2, [3.5] to Ch 2, Sec 2, [3.7] are to be met.

1.1.4 When the ship is under the continuous survey system for hull or machinery, the scope of the class renewal survey as described in this Section is carried out on a continuous basis over the period of class according to the procedure laid down in Ch 2, Sec 2, [5.3].

When the machinery installation is surveyed under the Planned Maintenance System, a specific program of survey replaces the scope of the class renewal survey of machinery and systems as laid down in [4], according to the procedure laid down in Ch 2, Sec 2, [5.4].

When the additional class notation **STAR-MACH** is assigned, a specific program of survey replaces the scope of the class renewal survey of the installations covered by the notation, as specified in Pt E, Ch 2, Sec 2.

1.1.5 Upon completion of the class renewal survey, or at the end of the period of class (if the relevant part of the ship is surveyed under the continuous survey system), a general examination of the ship having the same scope as that of an annual survey, as detailed in Ch 3, Sec 1, is to be carried out.

2 Stability and ship lightweight

2.1 Ship lightweight check

2.1.1 A light ship mass check has to be performed as indicated in Ch 2, Sec 2, [6.4.2].

2.2 Hull girder deflection

2.2.1 A measurement of the hull girder vertical deformation has to be performed, at each visit, as indicated in Ch 2, Sec 2, [6.4.3].

2.3 Stability check

2.3.1 A ship stability check may be required as indicated in Ch 2, Sec 2, [6.4.4] when the results of the lightship check shows a significant difference with the previous one.

3 Hull and hull equipment

3.1 Bottom survey in dry condition

3.1.1 A bottom survey in dry condition is to be carried out, as detailed in Ch 3, Sec 4, [2], and in addition the requirements given in [3.1.3] to [3.1.5] are to be complied with.

3.1.2 For ships of unusual characteristics or engaged on special services, means of underwater inspection equivalent to the bottom survey in dry condition may be considered as an alternative by the Society, particularly when a suitable high resistance paint is applied to the underwater portion of the hull or an approved system of impressed current for external cathodic protection is fitted.

3.1.3 Anchors, windlass(es) and chain cables are to be ranged and examined, and the required complement and condition are to be checked. When the ship is more than 5 years old, chain cables are to be gauged.

Any length of chain cable which is found to be damaged or excessively worn is to be renewed.

3.1.4 Sea valves and cocks are to be opened up for internal examination.

3.1.5 Thickness measurements of the outer shell plating, as and if required within the scope of the related class renewal survey, are to be carried out (refer to [3.6]).

3.2 Decks, hatch covers and equipment

3.2.1 Decks are to be examined, particular attention being given to the areas where stress concentration or increased corrosion are likely to develop, such as hatch corners and other discontinuities of structure.

Deck erections such as hatch coamings, deckhouses and superstructures are to be examined.

The sheathing of wood-sheathed steel decks may be removed, at the Surveyor's discretion, in the case of doubt as to the condition of plating underneath.

Due attention is to be given to the examination in way of end and side openings and related shell and inner doors.

3.2.2 The survey of hatch covers and coamings is to include:

- checking of the satisfactory operation of all mechanically operated hatch covers: stowage and securing in open condition, proper fit, locking and efficiency of sealing in closed position, operational testing of hydraulic and power components, wires, chains and link drives
- checking of the effectiveness of sealing arrangements of all hatch covers by means of hose testing or equivalent
- thickness measurements of coaming and attached stiffeners, hatch cover plating and stiffeners (see Tab 2).

3.2.3 The survey of hull equipment is to cover the following points:

- windlass and chain stoppers, with disassembly as deemed necessary to verify the condition of the equipment and control and safety devices, hawse pipes
- steering arrangements, including steering gear, control and indication devices, operational tests and disassembly as deemed necessary; in the case of chain and rod gears, chains, rods, sheaves, pins and rollers are to be examined for wear
- connection of masts and standing rigging to the hull structure as well as condition of structure underneath.

3.2.4 Piping systems outside tanks and compartments are to be visually examined and pressure tested as necessary, as per the requirements laid down for the class renewal survey of machinery and systems; see [4.5].

3.3 Survey of watertight cable transits

3.3.1 The requirements for class renewal survey of watertight cable transits may be undertaken by the attending Surveyor or by a certified firm accepted by the Society.

Note 1: Rule Note NR533, Approval of Service Suppliers gives details about the certification.

All transits are to be examined to confirm their satisfactory condition and the Cable Transit Seal Systems Register is to be reviewed to confirm it is being maintained. The class renewal survey is to be recorded in the Cable Transit Seal Systems Register, in which a single record entry will be sufficient to record the survey of all transits.

From review of the Cable Transit Seal Systems Register, where there are records entered since the last class renewal survey of any disruption to the cable transits or installation of new cable transits (except which are reviewed and examined at previous annual surveys), the satisfactory condition of those transits is to be confirmed by the attending Surveyor by review of records and examination of the transits; the results are to be recorded in the Cable Transit Seal Systems Register against each of those cable transits.

In case the cable transits have been examined by an approved service supplier, the attending Surveyor is to review the Cable Transit Seal Systems Register in order to ascertain that it has been properly maintained by the Owner and correctly endorsed by the service supplie.

3.4 Dry compartments

3.4.1 'Tweendecks, cofferdams, pipe tunnels and duct keels, void spaces and other dry compartments which are integral to the hull structure are to be internally examined, ascertaining the condition of the structure, bilges and drain wells, sounding, venting, pumping and drainage arrangements.

The number of compartments to be examined is fixed at 5% of the total, with a minimum of five. They are to be selected on a rotational basis from one class renewal survey to the other.

3.4.2 Machinery and boiler spaces, pump rooms and other spaces containing machinery are to be internally examined, ascertaining the condition of the structure. Particular attention is to be given to tank tops, shell plating in way of tank tops, brackets connecting side shell frames and tank tops, and bulkheads in way of tank tops and bilge wells. Where wastage is evident or suspected, thickness measurements are to be carried out, and renewals or repairs effected when wastage exceeds allowable limits.

Piping systems inside these spaces are to be dealt with according to [4.5].

3.4.3 Chain lockers are to be internally examined, while the anchor chains are ranged as required for the bottom survey in dry condition (see [3.1.3]). The pumping arrangement of the chain lockers is to be tested.

3.5 Tanks

3.5.1 The type and number of tanks to be internally examined at each class renewal survey are detailed in Tab 1, according to the age of the ship.

This internal examination is to ascertain the condition of the structure, bilges and drain wells, sounding, venting, pumping and drainage arrangements, including piping systems and their fittings. Due attention is to be given to plating or double plates below the lower end of sounding and suction pipes.

Where the inner surface of the tanks is covered with cement or other compositions, the removal of coverings may be waived provided they are examined, found sound and adhering satisfactorily to the steel structures.

Note 1: For examination of independent (non-structural) tanks, refer to [4.5.9].

Note 2: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested when the ship is more than 12 years old.

Table 1 : Requirements for internal examination of structural tanks at class renewal survey

Type and use of structural tanks	Age of ship (in years at time of class renewal survey)			
	age ≤ 5	5 < age ≤ 10	10 < age ≤15	age > 15
Peaks (all use)	all	all	all	all
Salt water ballast tanks (all types)	all	all	all	all
Fresh water tanks	none	one	half	all
Fuel oil - diesel oil tanks	none	one	two	half **(1)**
Lubricating oil tanks	none	none	one	half **(1)**

(1) Half of the tanks considered are to be internally examined every 5 years (tanks not internally examined may be examined externally from accessible boundaries); at the next class renewal survey the tanks not inspected at the previous survey are to be internally examined, and so on alternatively, so that each tank is internally examined every second class renewal survey.

Note 1: Independent non-structural tanks are to be surveyed according to [4.5.9].

Note 2: The extent of the survey of tanks dedicated to liquids other than those indicated in this table will be considered by the Society on a case-by-case basis according to the nature of the liquids.

3.5.2 For salt water ballast spaces other than double bottom tanks, where a protective coating is found to be in poor condition, as defined in Ch 2, Sec 2, [3.2.10] and is not renewed, where soft coating has been applied or where a protective coating has never been applied, i.e. neither at the time of construction nor thereafter, maintenance of class is to be subject to the spaces in question being internally examined at annual surveys. The Society may consider waiving such internal examination at annual surveys of tanks protected with soft coating, whose size is 12 m^3 or less.

For salt water ballast double bottom tanks, where such breakdown of coating is found and is not renewed, where soft coating has been applied or where a protective coating has never been applied, i.e.neither at the time of construction nor thereafter, maintenance of class may be subject to the tanks in question being internally examined at annual intervals.

3.5.3 Double bottom tanks, peak tanks, wing tanks, deep tanks and other integral or independent tanks which are intended to contain sea water or fresh water are to be filled to overflow level, for testing.

3.5.4 Tanks which are intended to contain liquids other than water such as fuel oil tanks are to be filled to the top of the tank, for testing.

3.5.5 Other testing procedures, in particular those specified in Pt B, Ch 11, Sec 3, [2] for the initial survey during construction, may be accepted.

For integral tanks which are intended to contain liquid cargoes such as edible oil, the Surveyor may waive the requirement specified in [3.5.4] subject to a satisfactory internal examination.

3.6 Thickness measurements

3.6.1 Thickness measurements are to be carried out according to the procedure detailed in Ch 2, Sec 2, [3.3].

The extent of thickness measurements is detailed in Tab 2, according to the age of the ship.

3.6.2 When the structure is coated and the coating is found to be in good condition, as defined in Ch 2, Sec 2, [3.2.10], the Surveyor may, at his discretion, accept a reduced program of thickness measurements in the corresponding areas. Other effective protective arrangements may also be considered.

3.6.3 When thickness measurements indicate substantial corrosion, the number of thickness measurements is to be increased to determine the extent of substantial corrosion. Tab 3 may be used as guidance for additional thickness measurements.

Table 2 : Requirements for thickness measurements at class renewal survey

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
	Within the cargo length area or 0,5 L amidships: - selected deck plates - 1 transverse section - selected bottom plates - selected wind and water strakes	Within the 0,5 L amidships: - each deck plate - 2 transverse sections - selected tank top plates - selected bottom plates - all wind and water strakes	Within 0,5 L amidships: - each deck plate - 3 transverse sections **(3)** - each tank top plate - each bottom plate - all wind and water strakes
		Outside the cargo length area or 0,5 L amidships: - selected deck plates - selected wind and water strakes - selected bottom plates	
	Collision bulkhead, forward machinery space bulkhead, aft peak bulkhead **(1) (2)**		All transverse and longitudinal bulkheads **(1) (2)**
	In engine room: - sea chests - sea water manifold		
		Selected cargo hold bulkheads (transverse and longitudinal) **(1)**	All cargo hold bulkheads (transverse and longitudinal) **(1)**
		Selected internal structure such as floors and longitudinals, transverse frames, web frames, deck beams, tweendecks, girders, etc. Measurements may be increased if the Surveyor deems it necessary	

(1) Including plates and stiffeners.

(2) Measurements may be waived or reduced after satisfactory visual examination, when such bulkheads form the boundaries of dry (void) spaces.

(3) The number of transverse sections may be reduced at the Surveyor's discretion for ships of length under 90 m.

Table 3 : Guidance for additional thickness measurements in way of substantial corrosion areas

Structural member	Extent of measurements	Pattern of measurements
Plating	Suspect area and adjacent plates	5 point pattern over 1 square metre
Stiffeners	Suspect area	3 measurements each in line across web and flange

4 Machinery and systems

4.1 General

4.1.1 The survey items listed below are to be covered to the satisfaction of the Surveyor. However, other survey alternatives deemed equivalent by the Surveyor in relation to the characteristics and general condition of the ship concerned may also be accepted.

Note 1: Attention is drawn to the requirement Ch 2, Sec 2, [3.5.1] regarding safe execution of surveys, in particular as regards health hazards related to asbestos.

4.2 Main and auxiliary engines and turbines

4.2.1 General

Depending on the type of machinery, the following parts are to be opened up as necessary for inspection. Parts and components are to be pressure tested as appropriate or as deemed necessary by the Surveyor. A working test is also to be carried out, including testing of alarms and safety devices.

4.2.2 Internal combustion engines

a) Columns and entablature

b) Cylinders with their liners, cylinder covers (together with valves and valve gear), pistons with their rods, crossheads, slippers and guides (or gudgeon pins), connecting rods (with their top and bottom end bearings), control gear, driven scavenge pumps, driven air compressors, driven fuel pumps, supercharging blowers, fuel injection pumps, turning gear, etc.

c) Crankshafts (together with their main bearings)

d) Reverse gear, reduction gear and clutches, if fitted.

4.2.3 Steam turbines

a) Condensers and their cooling water and condensate extraction pumps

b) Casings and rotors (including their blading), impulse wheels (including guide blading and diaphragms), nozzles and nozzle boxes, journals and bearings, dummy pistons, labyrinths, external glands, etc.

c) Shafts, including their flexible couplings.

Where the propulsion steam turbines are of a well-known type, and fitted with rotor position indicators and vibration indicators of an approved type, as well as measuring equipment of steam pressure at proper locations along the steam flow, and the arrangements for change-over in the event of emergency operation of the plant are readily operable, the first class renewal survey may be limited to the examination of rotor bearings, thrust bearings and flexible couplings, provided the Surveyor is satisfied from operation service records and power trials subsequent to the survey, that the turbine plant is in good working condition.

4.2.4 Gas turbines

a) Casings, rotors and disks, impellers and blading of all turbines and compressors, combustion chambers, burners, heat exchangers, gas piping, compressed air piping with fittings, starting and reverse arrangements

b) Shafts and their flexible couplings.

4.2.5 Electric propulsion

Where the propulsion machinery consists of an electrical system, the propulsion motors, generators, cables and all ancillary electrical gear, exciters and ventilating plant (including coolers) associated therewith are to be examined and the insulation resistance to earth tested. Due attention is to be given to windings, commutations and sliprings. The operation of protective gear and alarm devices is to be checked, as far as practicable. Interlocks intended to prevent unsafe operations or unauthorised access are to be checked to verify that they are functioning correctly.

4.2.6 Thruster installations

When the ship is equipped with thruster installations, the class renewal survey is also to include:

- an examination of the machinery and electrical installation, as applicable
- an external examination of the propulsive part of the installation to be carried out at the dry dock survey due as part of the class renewal survey. During this examination other checks such as clearance readings, tightness of hub and blade sealing for controllable pitch propellers are to be verified. Locking arrangements for bolts, if fitted, are to be checked. Results of lubricating oil analysis to detect possible deterioration of internal gears and bearings or the presence of water are to be confirmed as acceptable. The Manufacturer's requirements may be taken into account. Dismantling of the assembly for the examination of internal parts may be required if the foregoing checks are not satisfactory
- a running test of the system under operating conditions.

4.3 Reduction gears, main thrust and intermediate shaft(s)

4.3.1 Reduction gears complete with all wheels, pinions, shafts, couplings, bearings and gear teeth, including incorporated clutch arrangements, are to be opened up, as deemed necessary by the Surveyor, for visual inspection. For complicated assemblies, gears and roller bearings may be inspected without dismantling.

4.3.2 All shafts, thrust blocks and bearings are to be examined.

4.4 Pumps and other machinery items

4.4.1 General

The items listed in [4.4.2] are to be opened up, as deemed necessary by the Surveyor, for visual inspection. Their parts and components are to be pressure tested as appropriate and considered necessary by the Surveyor. A working test is also to be carried out, including testing of alarms and safety devices if deemed necessary by the Surveyor.

4.4.2 Items to be surveyed

a) Air compressors with their intercoolers, filters and/or oil separators and safety devices

b) Heat exchangers, ventilation fans for boilers and other equipment used for essential services

c) Piston pumps and centrifugal pumps for sea water, bilge and salt water ballast

d) Screw pumps, gear pumps and centrifugal pumps other than those listed in item c) above (opening up is not required).

4.5 Systems in machinery spaces

4.5.1 Valves, cocks and strainers of the bilge and ballast systems are to be opened up, as deemed necessary by the Surveyor, for visual inspection, and, together with the piping and safety devices, examined and tested under working conditions.

4.5.2 The fuel oil, lubricating oil, hydraulic oil, thermal oil, and feed and cooling water systems, together with pressure filters, heaters and coolers used for essential services, are to be opened up and examined or tested, as considered necessary by the Surveyor. Safety devices for the foregoing items are to be examined.

4.5.3 The compressed air system together with its valves, fittings and safety devices is to be examined, as considered necessary by the Surveyor.

4.5.4 Compressed air receivers and other pressure vessels for essential services are to be cleaned internally and examined internally and externally. Their fittings, valves and safety devices are to be opened up, as deemed necessary by the Surveyor, for visual inspection and pressure tested as appropriate.

4.5.5 Steel pipes for superheated steam having a temperature of the steam at the superheater outlet exceeding 450°C are to be examined and tested in accordance with [4.5.7] to [4.5.8] at each class renewal survey.

4.5.6 Steel pipes for saturated steam or superheated steam having a temperature of the steam at the superheater outlet not exceeding 450°C are to be examined and tested in accordance with [4.5.7] to [4.5.8] at each class renewal survey for ships over 5 years of age. When the ship is 5 years of age or less, the inspection may be limited to a check of the satisfactory general condition of pipes.

4.5.7 The examination and hydrostatic test of steel pipes for main steam machinery, and steel pipes for auxiliary steam machinery having internal diameter 75 mm and over, are to be carried out on a number of pipes selected by the Surveyor after the lagging in way is removed.

4.5.8 Representative pipe lengths connected with bolted flanges are to be internally and externally examined, and hydrostatically tested to 1,1 times the working pressure at ambient temperature. Bolts and butt-welded joints between flanges and pipes are to be submitted to a non-destructive test for crack detection.

4.5.9 Non-structural tanks located in machinery spaces are to be externally examined; the relevant fittings, with particular regard to the remote control shut-off valves under hydrostatic head, are to be externally examined to check the efficiency of manoeuvres and the absence of cracks or leakage.

4.5.10 When the ship is equipped with a refrigerating plant (whether or not covered by an additional class notation), the class renewal survey is to include:

- examination and test at the design pressure of the parts of the plant under pressure
- for refrigerating machinery spaces using ammonia as refrigerant:
  - examination and test of the water-spraying fire-extinguishing system to the same extent as indicated in [4.8.3] item d)
  - examination of valves and pumps of the bilge system to the same extent as indicated in [4.4]
  - examination and test of the electrical equipment to the same extent as indicated in [4.6.11]
  - test of the gas detection system.

4.6 Electrical equipment and installations

4.6.1 An electrical insulation resistance test is to be performed on the electrical equipment and cables. If needed, for the purpose of this test, the installation may be subdivided or equipment which may be damaged disconnected.

4.6.2 The following minimum values, when performing the insulation test, are to be considered:

- for main and emergency switchboards, feeder circuit breakers being open, busbar circuit closed, measuring and monitoring instruments disconnected, the resistance of insulation measured across each insulated busbar and the hull, and across insulated busbars, should not be less than 1 megohm
- for generators, the equipment and circuits normally connected between the generator and the first circuit breaker being connected, the resistance of insulation (preferably at working temperature whenever possible), in ohms, is to be greater than 1 000 times the rated voltage, in volts. If appropriate, the Surveyor checks also that the insulation resistance of generators separate exciter gear is not less than 250 000 ohms
- the insulation resistance of the entire electrical system is to be checked with all circuit breakers and protective devices closed, except for generators; in general, the resistance should not be less than 100 000 ohms. However, the variation of the resistance with time is to be checked, comparing the current figure with previous readings. If the insulation resistance was to drop suddenly or be insufficient, the defective circuits are to be traced, disconnecting the circuits as much as necessary.

4.6.3 The prime movers of generators are to be surveyed in accordance with [4.2] and their governors tested. All generators are to be presented for inspection, clean and with covers opened and examined under working conditions.

4.6.4 Main and emergency switchboards, section boards and distribution boards are to be cleaned and doors or covers opened for examination of their fittings. The condition of overcurrent protective devices and fuses is to be checked. Circuit-breakers of generators are to be tested, as far as practicable, to verify that protective devices including preference tripping relays, if fitted, operate satisfactorily. The tightening of busbar connections is to be checked.

4.6.5 Electrical cables and cable runs are to be examined at random, in particular in places where deterioration is likely to occur; terminal boxes of essential services are also to be subjected to a random check.

4.6.6 The motors and starters concerning essential services together with associated control and switchgear are to be examined and, if considered necessary by the Surveyor, checked, as far as practicable, under working conditions.

4.6.7 Navigation light indicators are to be tested under working conditions, and correct operation on the failure of supply or failure of navigation lights verified.

4.6.8 The emergency sources of electrical power, their automatic arrangements and associated circuits are to be tested.

4.6.9 Emergency lighting, transitional emergency lighting, supplementary emergency lighting, general emergency alarm and public address systems are to be tested as far as practicable.

4.6.10 The visible condition of electrical equipment and installations is also to be checked as regards precautions against shock, fire and other hazards of electrical origin.

4.6.11 A general examination of the electrical equipment in areas where there may be flammable gas or vapour and/or combustible dust is to be carried out to ensure that the integrity of the electrical equipment of a safety type has not been impaired owing to corrosion, missing bolts, etc., and that there is not an excessive build-up of dust on or in dust-protected electrical equipment. Cable runs are to be examined for sheath and armouring defects, where practicable, and to ensure that the means of supporting the cables are in satisfactory condition. The proper condition of bonding straps for the control of static electricity is to be checked. Alarms and interlocks associated with pressurised equipment or spaces are to be tested for correct operation.

Note 1: Owners are reminded that maintenance, repairs or renewal of certified electrical equipment of a safe type remains their responsibility or that of their representatives.

4.6.12 The survey is also to cover the computerized systems. This survey includes checking that the revision of software mentioned in the records corresponds with the revision effectively used for all computerized systems.

4.6.13 For ships where the electrical distribution system includes harmonic filters, the survey is to include:

- annual measurement, as a minimum, of the harmonic distortion levels of main busbars under seagoing conditions as close to the periodical machinery survey as possible so as to give a clear representation of the condition of the entire plant to the surveyor. Harmonic distortion readings are to be carried out when the greatest amount of distortion is indicated by the measuring equipment. An entry showing which equipment was running and/or filters in service is to be recorded in the log so this can be replicated for the next periodical survey. Harmonic distortion levels are also to be measured following any modification to the ship's electrical distribution system or associated consumers by suitably trained ship's personnel or by a qualified outside source.
- verification that records of all above measurements are made available to the surveyor at each periodical survey.

Note 1: Those requirements apply at any scheduled machinery periodical survey having a due date on or after 1st July 2017 for ships contracted for construction before 1st July 2017.

- for ships contracted for construction on or after 1st July 2017, verification that the facilities used for continuous monitoring of the levels of harmonic distortion experienced on the main busbars as well as alerting the crew when the level of harmonic distortion exceeds the acceptable limits are working properly and review of corresponding records.

4.6.14 For Li-Ion batteries of a capacity above 20kWh or used as an emergency source or transitional source, the requirements given in Ch 3, Sec 1, [3.3.5] for annual survey are to be complied with.

In addition, the class renewal survey is to include:

- a comprehensive test of indicators and alarms
- checking of the traceability of cells replacement
- checking of the traceability of software modification
- witnessing of a battery capacity (State of Health - SOH) test when:
  - release of flammable or toxic gases during battery operation was identified since the last survey
  - loss of battery capacity might jeopardize the manoeuvrability of the ship.

4.6.15 For batteries used for electrical supply of pods, the requirements given in Ch 3, Sec 1, [3.3.6] for annual survey are to be complied with.

In addition, the class renewal survey is to include:

- verification of the quality of the power supply
- examination of the fire-extinguishing system as applicable in accordance with the relevant requirements given in [4.8].

4.6.16 For ships which are fitted with installations for the charging of electric, the requirements given in Ch 3, Sec 1, [3.3.7]] are to be complied with.

In addition, the class renewal survey is to include:

- a comprehensive test of indicators and alarms
- verification of the quality of the power supply intended for electric vehicle (EV) charging
- verification that the charging stations maintenance has been performed according to the manufacturer's recommendations
- examination of the fire-extinguishing system and fire detection system as applicable in accordance with the relevant requirements given in [4.8]
- operational testing and internal examination of the pumps feeding the water monitors covering recharging areas located on weather decks, if provided
- testing of the electrical installation to the same extent as required elsewhere in Article [4] for similar equipment for the class renewal survey of machinery
- testing of the cooling system of the charging station.

4.7 Controls, commands

4.7.1 Where remote and/or automatic controls-commands, not covered by an additional class notation related to automated installation, are fitted for essential machinery, they are to be tested to demonstrate that they are in satisfactory condition.

4.8 Fire protection, detection and extinction

4.8.1 The Owner or his representative is to declare to the attending Surveyor that no significant changes have been made to the arrangement of structural fire protection.

Note 1: Attention is drawn to the provisions of Ch 1, Sec 1, [3.1.1] regarding compliance with any additional and/or more stringent requirements issued by the Naval Authority.

4.8.2 The class renewal survey of fire prevention arrangements is to cover the following items.

a) Visible parts of items forming part of structural fire protection arrangements in accommodation spaces and in machinery spaces such as bulkheads, decks, doors, stairways, crew and service lift trunks, and light and air trunks are to be examined, due attention being given to their integrity and that of the insulating material.

b) The operation of manual/automatic fire doors, where fitted, is to be checked.

c) Remote controls for stopping fans and machinery and shutting off fuel supplies in machinery spaces and, where fitted, remote controls for stopping fans in accommodation spaces and means of cutting off power to the galley are to be tested.

d) Closing arrangements of ventilators, funnel annular spaces, skylights, doorways and tunnels, where applicable, are to be tested.

e) Fire and/or smoke detection and alarm systems are to be tested.

4.8.3 The survey requirements for all types of fire-fighting systems that are usually found on board ships related either to machinery spaces or to cargo areas and/or spaces or to accommodation spaces, irrespective of the service notation assigned, are the following:

a) water fire system
   - the associated pumps are to be opened up and examined at the Surveyor's discretion
   - the fire main is to be hydrostatically tested to the working pressure at the Surveyor's discretion

b) fixed gas fire-extinguishing system (CO_2 , Halon or other gas)

   Receivers of gas of the fixed fire-extinguishing systems are to be externally examined together with all stationary fittings and devices. In addition, the following applies:
   - the total loss of CO_2 is not to exceed 10% of the installed quantity, 5% for Halon
   - after being repaired or discharged, containers are to be subjected to a hydrostatic test
   - hydrostatic testing of high pressure CO_2 containers is to be carried out at intervals not exceeding 10 years; the number of the tested containers is to be not less than 10% of the total number
   - low pressure gas containers are to be internally inspected if the content has been released and the container is older than five years; depending upon the result of the internal examination, the Surveyor may require the container to be hydrostatically tested.

   It is to be checked that the distribution pipework is proved clear

c) sprinkler system
   - the associated pumps are to be opened up and examined at the Surveyor's discretion

d) water spraying system
   - the associated pumps are to be opened up and examined at the Surveyor's discretion
   - a working test is to be carried out as far as reasonable and appropriate

e) fixed foam systems (low or high expansion)
   - the associated pumps are to be opened up and examined at the Surveyor's discretion

f) dry powder system
   - it is to be verified that the propelling inert gas bottles have been hydrostatically tested. The same applies to bottles disembarked for refilling or embarked for replacement.

4.8.4 As far as other fire-fighting equipment is concerned, the following items are to be hydrostatically tested:

- any CO_2 bottles of extinguishers
- shells of foam extinguishers
- shells of powder extinguishers
- air or gas bottles associated with fire extinguishers whose shells are not kept under pressure (if internally examined, the test need not be performed).

4.8.5 Where a helideck is fitted, the following is to be checked, as far as appropriate:

- drainage arrangements around the landing area
- fire fighting appliances and arrangements (to be surveyed as per [4.8.3] and [4.8.4], according to the equipment installed)
- other arrangements for helicopter refuelling and hangar facilities (fuel system, ventilation, fire protection and detection).

4.8.6 For ships which are fitted with a storage space for electric vehicles with aggregated battery capacity equal to or higher than 20 kWh, the requirements given in Ch 3, Sec 1, [3.4.5] are to be complied with.

In addition, the class renewal survey is to include:

- operational testing and examination of the relevant pumps of the fixed water-based fire-fighting system.

Section 4 Bottom Survey

1 General

1.1 Conditions

1.1.1 The bottom survey may be carried out in dry condition, such as in dry dock or on a slipway, or through an in-water survey.

The conditions for acceptance of a bottom in-water survey in lieu of a bottom survey in dry condition are laid down in Ch 2, Sec 2, [6.5].

2 Bottom survey in dry condition

2.1 General requirements

2.1.1 When a ship is in dry condition, it is to be placed on blocks of sufficient height to permit the examination of the bottom of the ship.

2.1.2 The outer shell plating is to be visually examined for excessive corrosion, or deterioration due to chafing or contact with the ground or for any undue deformation or buckling. Due attention is to be given to the plating of end structures (stem and sternframe), and to the bilge keel connection to the shell plating.

2.1.3 Sea chests and their gratings, sea connections and overboard discharge valves and cocks and their fastenings to the hull or sea chests are to be examined.

2.1.4 Visible parts of the propeller(s), stern bush(es), propeller shaft boss, brackets and tightness system(s) are to be examined. The clearances of the propeller shaft(s) (or wear gauge) are to be checked and recorded. For controllable pitch propellers, the Surveyor is to be satisfied with the fastenings and tightness of hub and blade sealing.

Visible parts of other propulsion systems and propellers for steering purposes are also to be examined.

Dismantling is to be carried out, if considered necessary, notably where leakages are detected.

2.1.5 Visible parts of the rudder(s), rudder pintles, rudder stock and couplings as well as the sternframe are to be examined. If considered necessary by the Surveyor, the rudder(s) is (are) to be lifted or the inspection plates removed for the examination of pintles.

The clearances in the rudder bearings and the rudder lowering are to be checked and recorded.

2.2 Bottom survey held within the scope of class renewal survey

2.2.1 The examination and checks detailed in Ch 3, Sec 3, [3.1] are to be carried out as part of the class renewal survey. They are usually carried out during the bottom survey held concurrently with the class renewal survey.

3 Bottom in-water survey

3.1 General

3.1.1 An in-water survey may normally be carried out if the ship has been granted the additional class notation **INWATERSURVEY** as defined in Ch 1, Sec 2, [6.15.1]. Upon application by the Owner and in special circumstances, the Society may also authorise such bottom in-water survey for ships not assigned with the additional class notation **INWATERSURVEY**.

3.1.2 In principle, no outstanding recommendations are to exist requiring repair work to be carried out to the underwater part of the shell plating, the rudder, the propeller or the propeller shaft, unless the Society is satisfied that such repairs may be carried out while the ship is afloat.

3.1.3 The in-water survey is to be carried out with the ship at a suitable draught in sheltered water; the in-water visibility is to be good and the hull below the waterline is to be sufficiently clean to permit proper examination.

3.1.4 The in-water survey is to be carried out under the surveillance of a Surveyor by an in-water survey firm approved as a service supplier by the Society according to Ch 2, Sec 2, [3.4].

The Surveyor is to be satisfied with the methods of orientation of the diver(s) or remotely operated vehicle (ROV) on the plating, which should make use where necessary of permanent markings on the plating at selected points and with the method of pictorial representation. An efficient two-way communication between the Surveyor and the diver(s) is to be provided.

3.1.5 The bottom in-water survey is to provide the information normally obtained from a bottom survey carried out in dry condition, and the scope of the in-water survey is the same as detailed in [2.1], so far as practicable.

3.1.6 If the in-water survey reveals damage or deterioration that requires immediate attention, the Surveyor may require the ship to be drydocked in order for a detailed survey to be undertaken and the necessary repairs carried out.

Section 5 Tailshaft Survey

1 Survey of tailshafts

1.1 General

1.1.1 The different types of surveys to which tailshafts may be subjected and the intervals at which they are to be carried out are given in Ch 2, Sec 2, [6.6]. These surveys are:

- complete survey
- modified survey.

The requirements to be complied with at each survey are listed below.

1.2 Complete survey

1.2.1 The complete survey of tailshafts consists of the following, as applicable:

a) removal of propeller and key, where fitted, and their examination

b) complete withdrawal of shaft to permit the examination of sterntube bearings (outboard or inboard depending on the type of shaft)

c) examination by an appropriate crack detection method of the after end of the cylindrical part of the shaft and forward one third of shaft cone, or the fillet of the flange in the case of a flanged coupling

d) examination of shaft bearing surfaces, liners, joints, threaded end and nut

e) examination of oil sealing glands, if relevant, with the necessary dismantling

f) measurements of clearances and/or wear (prior to and after the survey) and their recording

g) opening-up of controllable pitch propellers and examination of their working parts and control gear.

1.2.2 Where the notation **MON-SHAFT** has been assigned as specified in Ch 2, Sec 2, [6.6.4], the tailshaft need not be withdrawn at the complete survey and items b) and d) of [1.2.1] need not be covered provided that all condition monitoring data (bearings temperature, consumption and analysis of lubricating oil or water flow, bearings wear, failure alarms) is found to be within permissible limits and the remaining requirements for the complete survey are complied with.

Where the Surveyor considers that the data presented is not entirely to his satisfaction, the shaft is to be withdrawn.

1.3 Modified survey

1.3.1 A modified survey may be carried out for those tailshafts which fulfil the conditions described in Ch 2, Sec 2, [6.6.3], where the periodicity of this type of survey is also shown.

1.3.2 The modified survey for all types of shafts consists of the following:

a) for oil lubricated tailshaft bearings
   - check of oil sealing glands in place
   - measurements of wear and their recording
   - examination of the results of sterntube lubricating oil analyses, if relevant, to confirm they have been regularly performed and the recorded parameters are within acceptable limits
   - check of the records of lubricating oil consumption, if relevant, to confirm it is within permissible limits.

b) For sea water lubricated tailshaft bearings:
   - measurements of bearings wear and clearance
   - external examination of the water pumping and filtering system and confirmation that such equipment operate satisfactorily
   - check of water flow measurements
   - verification of alarms (flow etc.) and interlock system.

1.3.3 In addition, for the different types of shafts, the following is required:

a) for shafts with keyed propeller coupling:
   - removal of propeller and key, and their examination in way of the connection area
   - examination by an appropriate crack detection method of the after end of the cylindrical part of shaft and forward one third of shaft cone

b) for shafts with keyless type propeller coupling:
- check of the tightness of the propeller hub (propeller hood, fore gland)

c) for shafts with a solid flange coupling at the aft end and variable pitch propeller:
- check of tightness in way of blade glands and distribution box
- check of analysis of hydraulic oil
- working test, as far as practicable, of the blade manoeuvring.

1.3.4 Where the Surveyor considers that the data presented is not entirely to his satisfaction, further dismantling may be required, including withdrawal of the tailshaft.

2 Periodical survey of other propulsion systems

2.1 Rotating and azimuth thrusters

2.1.1 The periodical survey of rotating and azimuth thrusters consists of:

a) removing the propeller(s) in order to examine the following items, as applicable:
- exposed parts
- cone and keyway to be checked by an appropriate crack detection method
- sealing glands
- threaded end and nut

b) examining the results of a lubricating oil analysis (water content and presence of material particles) to detect possible deterioration of internal gears and bearings

c) examining the orientation device.

If the foregoing checks are not satisfactory, dismantling of the internal parts may be required.

2.2 Vertical axis propellers

2.2.1 The periodical survey of vertical axis propeller systems consists of:

- checking the tightness of the oil glands and the backlash of the gears from outside by action on the blades
- checking the condition of gears and couplings from inside the ship
- examining the results of a lubricating oil analysis (water content and presence of material particles) to detect possible deterioration of internal gears and bearings.

If the foregoing checks are not satisfactory, dismantling of the internal parts may be required.

2.3 Ventilated propellers

2.3.1 When the ship is fitted with ventilated propellers, the survey includes, in addition with the requirements defined in [1.2] and [1.3], the following examinations:

- internal state of the air conducts with respect to free circulation of the air, corrosion and cracks
- air conducts tightness
- tightness of the mechanisms which may commit, in case of leakage, the safety of the tail shaft and of the propeller.

2.4 Pump jet systems

2.4.1 The periodical survey of pump jet systems consists of examining the following parts:

- impeller, shaft and clearances of bearings
- tightness of gland
- water duct
- steering nozzle
- reversing arrangements and control gear.

If the foregoing checks are not satisfactory, further dismantling may be required.

Section 6 Boiler Survey

1 Steam boilers

1.1

1.1.1 Steam boilers, superheaters and economisers are to be examined internally and externally with the periodicity given in Ch 2, Sec 2, [6.7]. To this end, boilers are to be emptied and suitably prepared for the examination, and the water-steam side and fire side are to be cleaned and cleared of soot. Where necessary, the external surfaces are to be made accessible for inspection by removal of insulation and lining.

1.1.2 Subject to the results of this visual examination, the Surveyor may require:

- non-destructive tests for detection of possible defects in critical areas of plating and shells, pipes and stays
- thickness measurements of plating and shells, furnaces, pipes and stays.

If appropriate, a new working pressure may be fixed by the Society.

When situated inside boiler combustion chambers, steam pipes of cylindrical boilers are to be examined at their ends, and if deemed necessary by the Surveyor, a sample pipe is to be removed for examination.

1.1.3 If the internal examination is not carried out for practicable reasons, the parts subject to pressure are to be submitted to a hydraulic test.

The testing pressure is fixed by the Surveyor versus the boiler working pressure and age.

1.1.4 Boiler supports and securing arrangements (fixed and sliding seating, chocks, rolling stays, if any, etc.) are to be examined.

Boiler accessories and mountings (such as valves and studs, water level indicators, safety valves) are to be externally and (as needed) internally examined.

Forced circulation pumps of fired steam generators are, wherever possible, to be opened up.

Fuel supply pipes between pumps and burners, fuel tank valves, pipes and deck control gear are to be examined.

1.1.5 Upon completion of the internal survey, the boiler is to be examined under steam and fuel oil burners and safety devices checked under working conditions.

Safety valves are to be checked for their setting. For auxiliary exhaust gas boilers, if steam cannot be raised at port, it is the Chief Engineer's responsibility to set the safety valves at sea and record the setting pressure in the log-book.

2 Thermal oil heaters

2.1

2.1.1 Thermal oil heaters are to be internally and externally examined. The heater tubes are to be visually examined, and the tightness of the installation (including flange connections, valves and pumps) is to be checked through a test at the working pressure.

2.1.2 Thermal oil heater supports and securing arrangements are to be examined.

Heater accessories and mountings are to be externally and (as needed) internally examined.

Forced circulation pumps are, wherever possible, to be opened up.

Fuel supply pipes between pumps and burners, fuel tank valves, pipes and deck control gear are to be examined.

2.1.3 The following safety devices and instrumentation are to be examined and tested:

- thermal fluid temperature safety device and control
- thermal fluid flow meter
- device for low thermal fluid level in the expansion tank
- other regulation and safety systems.

2.1.4 Where repairs and/or renewal of components exposed to pressure are performed, a pressure test is to be carried out to 1,5 times the working pressure.

2.1.5 Upon completion of the survey, the thermal oil heater is to be examined under working conditions, with particular attention to safety devices and controls of the plant.

Section 7 Survey of Watertight Cable Transits

1 General

1.1 Application

1.1.1 The requirements of this Section apply to all ships and are in addition to the requirements of Ch 2, Sec 2; Ch 3, Sec 1 Ch 3, Sec 2 Ch 3, Sec 3.

1.1.2 Watertight cable transits are to be installed and maintained in accordance with the manufacturer's requirements and in accordance with the requirements of the relevant Type Approval certification.

2 Cable Transit Seal Systems Register

2.1 New construction

2.1.1 A Cable Transit Seal Systems Register is to be provided by the Shipbuilder for all watertight cable transits fitted to the ship. The Cable Transit Seal Systems Register can be in either a hard copy or digitized media. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. It is to include sections to record any inspection, modification, repair and maintenance.

2.1.2 The Cable Transit Seal Systems Register is to be reviewed by the attending Surveyor to confirm it contains a list of the watertight cable transits, applicable cable transit information and sections to maintain in-service maintenance and survey records.

2.1.3 For manned ships, the Cable Transit Seal Systems Register is to be held onboard of the ship. For units assigned the service notation USV, if a suitable storage location does not exist onboard, the Register may be held ashore. The Cable Transit Seal Systems Register is to be readily available for the attending Surveyor.

2.2 Ship in service

2.2.1 The Owner is to maintain the Cable Transit Seal Systems Register to record any disruption (repair, modification or opening out and closing) to a cable transit or to record the installation of a new cable transit.

3 Installation and maintenance of Watertight Cable transits

3.1 General

3.1.1 At new construction and periodic surveys it is to be confirmed that:

- cable transits have been installed, and where disrupted have been reinstated, in accordance with the Manufacturer's requirements and in accordance with the requirements of Type Approval
- where specified, appropriate specialized tools have been used.

Appendix 1 Class Requirements and Surveys of Laid-up Ships

1 General

1.1

1.1.1 In order to maintain its class during a normal operation period, a ship is to be submitted to the surveys described in Ch 2, Sec 2 at their due dates and to the satisfaction of the Society, and is to be free of overdue surveys and conditions of class during the considered period.

1.1.2 When a ship stops trading and is put out of commission for a certain period, i.e. is laid-up, the normal survey requirements may no longer apply provided that the Owner notifies the Society of this fact. The Owner is also to submit a lay-up maintenance program to the Society for approval.

1.1.3 The lay-up maintenance program includes:

- the safety conditions to be kept throughout the lay-up period
- the measures taken to preserve the maintenance of the ship throughout the lay-up period
- the survey requirements to be complied with for lay-up, maintenance of class in lay-up and re-commissioning.

2 Safety conditions

2.1

2.1.1 Power supply

Adequate power supply is to be supplied, or readily available, all around the clock, either from independent means on board the ship or from shore.

The following safety conditions are to be kept throughout the lay-up period.

2.1.2 Manning

Watch personnel are to be provided. The number of the watch personnel will depend on the size of the ship, the lay-up site and mooring arrangements, the shore assistance available in case of fire, leakage or flooding, the maintenance required to provide adequate preservation. A permanent shore communication installation (radio, telephone) is also to be available.

2.1.3 Fire protection and fire fighting

The following is to be complied with:

- automatic fire alarm systems, where provided, are to be in working order and in operation
- fire-fighting installations are to be tested regularly and readily available
- the fire main is to be readily available and periodically tested under pressure
- ventilation trunks, air inlets and watertight doors are to be kept closed.

2.1.4 Protection against explosion

Cargo spaces and piping systems are to be cleaned and ventilated to prevent gas from forming any pockets.

An inert gas system in operation is recommended for the cargo spaces of oil and chemical tankers.

All flammable materials, sludge, etc. are to be removed from the ship's bilge, tank tops, double bottom tanks, engine room, pump rooms and similar spaces.

Hot work is not be carried out during lay-up, unless special precautionary measures are taken.

2.1.5 Safety equipment

All the equipment usually recommended for the safety of the watch personnel is to be provided, kept in working order and tested regularly.

The usual life-saving equipment such as liferafts, life-buoys, breathing apparatus, oxygen masks and distress signals is to be provided and made accessible.

The requirements of the flag Administration and of the local port authorities of the lay-up site are usually to be applied.

2.1.6 Emergency power

The emergency source of power, emergency generator and/or emergency air compressor are to be kept in working order and tested weekly.

3 Preservation measures for lay-up and maintenance

3.1 General

3.1.1 A lay-up log-book is to be kept on board, in which the maintenance work and tests carried out during the lay-up period are to be entered with the corresponding dates. The nature and frequency of the maintenance, inspections and tests are also to be defined in the lay-up log book.

3.1.2 The following measures for preservation and maintenance during the lay-up period are to be taken by Owners according to the type of ship, hull equipment, machinery installations and the specific cases of lay-up conditions.

3.2 Exposed parts of the hull

3.2.1 Underwater parts of the hull are to be protected against corrosion. It is advisable to provide an impressed current cathodic protection system where the quantity of corrosive waste discharge is particularly high. When such systems are provided they are to be serviced and checked at regular intervals. The condition of sacrificial anodes is to be evaluated at the annual lay-up condition surveys.

3.2.2 The coating of the hull above the waterline, exposed decks, access doors or covers on exposed decks, and hatch covers is to be maintained in satisfactory condition.

All accesses leading to internal spaces are to be kept closed.

All vent pipes and ventilation trunks are to be kept closed.

3.3 Internal spaces

3.3.1 Cargo tanks and cargo holds are to be emptied, cleaned and kept dry.

Ballast tanks are to be kept either full or empty. When ballast spaces are kept filled with sea water, special care is to be taken to keep such spaces topped up and protected against corrosion. When provided, sacrificial anodes are to be renewed when deemed necessary. The topping up is to be regularly verified.

3.3.2 Chain lockers are to be drained, cleaned and kept dry. Coating with bituminous paint is recommended.

3.3.3 Fuel oil and lubricating oil tanks are to be drained regularly.

Lubricating oil analysis is to be performed regularly and the oil renewed when the result is not satisfactory. Prior to being refilled, tanks are to be cleaned.

Empty lubricating oil tanks are to be cleaned and kept dry.

Fresh water or distilled water tanks are to be kept full or empty. Empty tanks are to be cleaned and kept dry. Where cement wash is used as a coating, this is to be examined and repaired prior to filling.

3.3.4 The bilge and tank top in engine rooms are to be cleaned and kept dry.

Hull sea inlet and outlet valves not in use are to be kept closed.

3.4 Deck fittings

3.4.1 The windlass, capstans and winches are to be regularly greased and turned once a week.

All wire cables are to be kept greased.

Visible parts of chains are to be coal-tarred and examined regularly.

Chocks and hawse pipes are to be coated with bituminous paint or equivalent if deemed necessary.

Cargo piping on deck is to be drained, blown through if deemed necessary and kept dry by opening up drains.

Electrical machinery and navigational equipment are to be protected by watertight covers.

3.5 Machinery

3.5.1 Machinery spaces

The air temperature inside the machinery spaces is normally to be kept above 0°C.

Humidity is to be kept as low as possible and within acceptable limits.

3.5.2 Machinery - General

Exposed mechanical parts of machinery are to be greased.

All rotating machinery such as diesel engines, reciprocating engines, pumps, turbines, electric motors and generators are to be turned at regular intervals with a limited number of revolutions (the lubricating oil system should be put in operation or proper priming applied). Units are not to be stopped in the same position as the previous one.

Bearing boxes are to be emptied, cleaned and refilled with new oil.

3.5.3 Main turbines

Turbines are to be kept dry.

All steam inlets are to be sealed.

Expansion arrangements (sliding feet) are to be suitably greased.

Electric heaters are to be put inside the turbines. Heat drying is to be made in open circuit, all valves shut and gland closing devices withdrawn.

Turbines are to be turned weekly, the lubricating oil system being put in service. The shaft line is to be stopped after turning an integer number of revolutions plus one quarter of a revolution.

3.5.4 Reduction gears

For large reduction gears, a fan activating the circulation of hot air in closed circuit with air hoses is to be fitted (intake at lower part of casing and discharge at upper part).

3.5.5 Auxiliary turbine-driven machinery

Stators are to be drained and kept dry.

Shaft sealing glands are to be lubricated.

Lubricating oil is to be analysed and renewed when deemed necessary. Prior to oil renewal, the oil casings are to be cleaned.

Exhaust steam pipes are to be kept dry.

Stuffing boxes are to be dismantled.

Turbines are to be turned weekly an integer number of revolutions plus one quarter of a revolution.

3.5.6 Condensers and heat exchangers

Condensers and heat exchangers are to be drained and kept dry.

Desiccant is to be placed in steam spaces.

Water sides are to be washed with fresh water.

The condition of the zinc anodes is to be periodically checked.

When tubes are fitted with plastic or fibre packing, water sides are to be filled with alkaline distilled water.

When tubes are expanded or fitted with metal packing, water sides are to be provided with desiccants and kept dry.

3.5.7 Auxiliary machinery

Air receivers are to be drained, opened up and cleaned. Pressure relief valves are to be cleaned and slightly lubricated.

Air compressor crankcases are to be drained, cleaned and refilled with clean oil. Cylinders and valves are to be lubricated. Coolers are to be drained and dried. Air drains are to be opened and the system dried.

Air start lines are to be drained and dried.

Hot-wells/return tanks are to be drained and dried.

De-aerators are to be drained and dried.

Feed pumps and extraction pumps are to be drained and dried.

Air ejectors are to be drained and dried.

Main circulation pumps are to be drained and dried.

Evaporators are to be drained, cleaned and dried.

3.5.8 Piping

Pipes not in use are to be drained and kept dry.

3.5.9 Diesel engines

Daily tank fuel oil outlet pipes and all injection equipment are to be filled with filtered gas oil.

Fresh water circuits are to be filled with water mixed with rust inhibitors. Fresh water pH is to be checked monthly.

Oil of hydraulic regulators is to be replaced.

Sea water cooling pipes are to be drained.

Crankcases are to be provided with desiccant.

Starting valves are to be lubricated (internally and externally).

Motor oil is to be sprayed in cylinders and on all external parts liable to corrosion.

Cams and cylinders are to be motor oil sprayed monthly.

Turbo-compressor/charger ball bearings are to be oil sprayed and rotated for an integer number of revolutions plus one quarter of a revolution.

Engine air inlets and exhaust gas pipes are to be sealed.

Scavenge spaces are to be cleaned.

Engines are to be turned weekly.

3.5.10 Shaft lines

Shaft lines are to be coated with grease.

Shaft bearing cooling pipes are to be drained.

For sea water lubricated propeller shafts, the packing gland of the engine room stuffing box is to be tightened.

For oil lubricated sterntubes, lubricating oil is to be analysed and renewed if not satisfactory. The oil level in the tank is to be verified regularly.

Propeller shaft lines are to be rotated an integer number of revolutions plus one quarter of a revolution.

3.6 Electrical installations

3.6.1 Main and secondary switchboards, sub-feeder panels, fuse panels and starters are to be made tight. Desiccant is to be provided.

Contacts of relays, breakers and switch-breakers are to be coated with neutral vaseline.

Bearings of generators are to be cleaned of old grease and protected with new oil or grease.

Carbon brushes are to be lifted off their commutations.

3.6.2 Electrical insulation of each item is to be kept at a minimum 200,000 Ohms and general insulation is to be not less than 50,000 Ohms. Local electric heating may be necessary to improve the level of insulation, particularly in the generators/alternators and large motors.

A insulation resistance test is to be performed regularly.

3.7 Steering gear

3.7.1 Exposed mechanical parts are to be greased or oil sprayed.

For electrical parts the same preservation measures given in [3.6] are to be taken.

It is recommended that the steering gear should be operated monthly.

3.8 Boilers

3.8.1 Smoke sides of boilers are to be swept, washed clean with basic hot water and hot air dried.

3.8.2 Water and steam sides should preferably be preserved using the dry method, keeping the moisture at the lowest possible level, the ideal level being between 30% and 35%. It is advisable to ensure that no residual water remains to cause rapid corrosion. Drum doors are to be kept closed.

In other cases, it is advisable to keep the boilers, superheaters and economisers filled with water having a pH around 10,5. Hydrazine hydrate treatment of the water is preferable to reduce risks of corrosion caused by dissolved oxygen. The water is to be regularly analysed.

3.8.3 Air heaters are to be cleaned and kept dry.

Uptake, shell and fan outlets are to be cleaned and kept closed with watertight hoods.

Burners are to be dismantled, and atomisers greased.

Desiccant is to be provided in furnaces where deemed necessary.

Expansion arrangements (sliding feet) are to be suitably greased.

The internal condition of boilers is to be checked every three months.

3.8.4 Boilers may also be preserved sealed with inert gas (nitrogen), provided that cocks and valves are tight and the installation allows an internal pressure of at least 0,05 bar to be maintained to prevent air penetration. Regular checks of the overpressure are to be carried out and results recorded in the log-book.

3.9 Automated installation

3.9.1 Recommendations for electronic components are the same as those given for electrical installations.

For pneumatic parts the manufacturers' recommendations are to be followed and the system is to be checked regularly.

Pressure, temperature or level sensors are generally not affected by damage when not used. However, when available, the manufacturers' recommendations are to be followed.

4 Lay-up site and mooring arrangements

4.1 General

4.1.1 The choice and suitability of the lay-up site, as well as the type of mooring conditions, the mooring arrangements and their efficiency during the lay-up period remain the responsibility of the Owner.

However, at the Owner's request, the mooring arrangement may be reviewed by the Society.

4.2 Recommendations for the lay-up site

4.2.1 The following recommendations are to be considered by Owners regarding the choice and suitability of the lay-up site.

The site should be:

- sheltered from open sea, strong currents and waves
- not exposed to whirling winds or turbulent tidal waves
- not exposed to moving ice
- clear of corrosive waste waters
- provided with adequate ship/shore communications.

4.3 Recommendations for the mooring arrangements

4.3.1 The following recommendations are to be considered by Owners with respect to the mooring arrangements:

- ground holding should be adequate
- vessels laid-up to buoys or anchored should be moored in such a way as to be prevented from swinging with normal wind and tidal changes
- chain cables should not be subject to cross-contact or twisting and stern anchorage should generally be provided
- laid-up ships should be in ballast condition in order to reduce the effects of wind. Due consideration should be given to the still water bending moment. For guidance, normal ballast draft should be roughly between 30% and 50% of the maximum draft.

4.3.2 Ships should normally be moored singly. However, when several ships are moored together, the following provisions are to be made:

- ships are to be moored bow to stern
- ships are to be of approximately the same size
- the number of ships moored together is, in principle, not to exceed six
- breast-lines are to be of similar elasticity
- fenders are to be provided.

4.4 Review of the mooring arrangements

4.4.1 As indicated in [4.1.1], at the Owners' request, the mooring arrangements may be reviewed by the Society.

4.4.2 The proposal for the mooring arrangements is in such case to be submitted by the Owner and is to include the following information.

a) Mooring site:
   - geographical area (to be specified on a map)
   - characteristics of the sea bottom
   - water depth
   - preferential angular sectors (effects of wind / tide / current) indicated according to statistical studies
   - wave characteristics (amplitude, periods)

b) Geometry of mooring arrangements:
   - ship's position and direction
   - shore anchorage
   - diagram showing mooring equipment (fore and aft)
   - angle between chain cables and ship's centreline

c) Characteristics of mooring equipment:
- maximum holding strength of each anchor
- type of mooring lines (chains, cables, sinkers, etc.)
- length of each section
- weight of each section
- mechanical characteristics of each section (breaking load)
- weight of sinkers.

4.4.3 On completion of the installation, the mooring arrangements are to be surveyed by the Society. When the ship is anchored, the underwater installation is to be inspected by a diver whose report is to be presented to the Society.

4.4.4 It is the responsibility of the Owners to ascertain the efficiency of the mooring arrangements during the lay-up period. The mooring arrangements are to be re-examined at regular intervals (at least each year when the ship is anchored) and when abnormal weather conditions occur at the lay-up site.

5 Surveys

5.1 Laying-up survey

5.1.1 At the beginning of the lay-up period a laying-up survey is to be carried out whose scope is to verify that the safety conditions, preservation measures, lay-up site and mooring arrangements are in accordance with the program agreed by the Society.

5.1.2 Upon satisfactory completion of this survey, an endorsement to confirm that the ship has been placed in lay-up is entered on the Certificate of Classification, which is subsequently to be kept on board.

5.2 Annual lay-up condition survey

5.2.1 As described in Ch 2, Sec 2, [9], an annual lay-up condition survey is to be performed in lieu of the normal annual class surveys. The purpose of this survey is to ascertain that the lay-up maintenance program implemented is continuously complied with.

5.2.2 It is to be checked that the arrangements made for the lay-up are unchanged and that the maintenance work and tests are carried out in accordance with the maintenance manual and recorded in the lay-up log-book.

5.2.3 Upon satisfactory completion of the survey, the Certificate of Classification is endorsed.

5.3 Re-commissioning survey

5.3.1 Owners are to make the necessary arrangements to remove the temporary lay-up installations provided for preservation measures and the protective materials and coatings (oil, grease, inhibitors, desiccants), before the survey is commenced.

It is the Owners' responsibility to verify that the ship parts that are not covered by class are reactivated in satisfactory operational condition.

5.3.2 The scope of the re-commissioning survey is to include:
- a general examination of the hull, deck fittings, safety systems, machinery installations (including boilers whose survey is not due) and steering gear
- all periodical surveys due at the date of re-commissioning or which became overdue during the lay-up period
- dealing with the recommendations due at the date of re-commissioning or which became due during the lay-up period.

5.3.3 For the hull the following is to be carried out:
- examination of shell plating above the waterline, deck plating, hatch covers and coamings
- examination of load line items
- overall survey of all cargo tanks/holds
- overall survey of representative ballast tanks when the lay-up period does not exceed two years
- overall survey of all ballast tanks when the lay-up period is two years and over
- function tests of bilge and ballast systems.

5.3.4 For the deck fittings the following is to be carried out:
- examination of the fire main under working pressure
- where possible, examination of deck piping under working pressure
- function tests of class items
- checking inert gas installation under working condition after inspection of water seal and function test of deck non-return valve and pressure/vacuum valves.

5.3.5 For machinery installations the following is to be checked:

- the analysis of lubricating oil of main engines, auxiliary engines, reduction gears, main thrust bearings and sterntube
- the general condition of crankcase, crankshaft, piston rods and connecting rods of diesel engines
- the crankshaft deflections of diesel engines. In addition when engines have been laid-up for more than two years, one piston is to be disconnected and one liner is to be removed for examination. Dismantling is to be extended if deemed necessary
- the condition of blades of turbines through the inspection doors
- the condition of the water side of condensers and heat exchangers
- the condition of expansion arrangements
- the condition of reduction gears through the inspection doors
- the condition after overhauling of pressure relief devices
- the test of bilge level alarms, when fitted.

5.3.6 The main and emergency electrical installations are to be tested. The parallel shedding of main generators and main switchboard safety devices are to be checked. An insulation resistance test of the electrical installation is to be performed.

5.3.7 For the fire prevention, detection and fire-fighting systems, the following is to be examined and/or tested:

- remote control for quick closing of fuel oil valves, stopping of fuel oil pumps and ventilation systems, closing of fire doors and watertight doors
- fire detectors and alarms
- fire-fighting equipment.

5.3.8 The automated installation is to be checked for proper operation.

5.3.9 When classed, the installations for refrigerated cargo are to be examined under working conditions. Where the lay-up period exceeds two years, representative components of the installation are to be dismantled.

5.3.10 For cargo installations on liquefied gas carriers, the following is to be carried out:

- inspection of the primary barrier in tanks
- for membrane tanks, a global gas test of tanks whose results are to be compared with those obtained at ship's delivery
- testing of gas piping at working pressure using inert gas.

A Surveyor of the Society is to attend the first cooling down and loading of the ship.

5.3.11 For other specific classed installations, the Owners are to submit a survey program to the Society.

5.3.12 On completion of the above surveys, sea trials are to be performed in the presence of a Surveyor of the Society.

The sea trials are to include:

- verification of the satisfactory performance of the deck installations, main propulsion system and essential auxiliaries, including a test of the safety devices
- an anchoring test
- complete tests of steering gear
- full head and full astern tests
- tests of automated machinery systems, where applicable.

5.3.13 Upon satisfactory completion of the surveys, an endorsement to confirm the carrying out of all relevant surveys and the re-commissioning of the ship is entered on the Certificate of Classification.

CHAPTER 4
SCOPE OF SURVEYS IN RESPECT OF THE DIFFERENT SERVICES OF SHIPS

Section 1 General

Section 2 Frigate, Corvette and Military OPV

Section 3 Aircraft Carrier

Section 4 Auxiliary Naval Vessel

Section 5 Amphibious Vessel

Section 1 General

1 Application

1.1

1.1.1 The purpose of this Chapter is to give details on the scope of surveys of certain ships which, due to the service notation assigned and related equipment, need specific requirements to be verified for the maintenance of their class.

1.1.2 These specific requirements either are additional to or supersede those stipulated in Part A, Chapter 3, which gives general requirements for surveys applicable to all types of ships: this is indicated in each Section of this Chapter. These surveys are to be carried out at intervals as described in Ch 2, Sec 2, concurrently with the surveys of the same type, i.e. annual, intermediate or class renewal surveys, detailed in Part A, Chapter 3.

1.1.3 Owners are reminded that a general examination of the ship having the same scope of an annual survey is to be carried out at the completion of the class renewal survey, see Ch 3, Sec 3, [1.1.5]. Where specific requirements are given in this Chapter for the class renewal survey, they are additional to the applicable requirements for the annual survey.

2 Service notations subject to additional surveys

2.1

2.1.1 The specific requirements detailed in this Chapter are linked to the service notation(s) assigned to the ship at the request of the Owner. Where a ship has more than one service notation, the specific requirements linked to each one are applicable, insofar as they are not contradictory (in such case, the most stringent requirement will be applied).

2.1.2 Tab 1 indicates which service notations are subject to specific requirements, and in which Section they are specified.

Table 1 : Service notations for which specific requirements are applicable

Service notation assigned	Section applicable	Type of surveys affected by these specific requirements
frigate **corvette** **military OPV**	Ch 4, Sec 2	annual survey class renewal survey
aircraft carrier	Ch 4, Sec 3	annual survey class renewal survey
auxiliary naval vessel	Ch 4, Sec 4	annual survey class renewal survey
amphibious vessel	Ch 4, Sec 5	annual survey class renewal survey

Section 2 Frigate, Corvette and Military OPV

1 General

1.1 Application

1.1.1 The requirements of this Section are applicable after construction to all self-propelled ships which have been assigned one of the following service notations:

- **frigate** as defined in Part D, Chapter 1
- **corvette** as defined in Part D, Chapter 3
- **military OPV** as defined in Part D, Chapter 6.

1.1.2 These requirements are additional to those laid down in Part A, Chapter 3, according to the relevant surveys.

2 Annual survey

2.1 Watertight bulkheads

2.1.1 The survey of watertight bulkheads and arrangements consists of:

- examination, as far as practicable, of collision and watertight bulkheads, and confirmation that their watertight integrity has not been impaired
- checking the diagram provided on the navigation bridge showing the location of the watertight doors and related indicators for their open/closed position
- testing operation of local and remote control (from the navigation bridge) of the watertight doors, and in particular, operation from each side of the bulkhead of audible alarms or visual signals and control handles, as required or fitted
- confirmation of operation of watertight doors in the event of failure of main and emergency sources of power
- confirmation that notices are affixed at appropriate locations.

2.2 Openings in shell plating

2.2.1 The survey consists of:

- examination of the arrangements for closing sidescuttles and their deadlights, as well as scuppers, sanitary discharges and similar openings and other inlets and discharges in the shell plating below the margin line
- confirmation that valves for closing the main and auxiliary sea inlets and discharges in the machinery spaces are readily accessible, and that indicators showing the status of the valves are provided, as required or fitted
- confirmation that gangway access and cargo ports fitted below the margin line may be effectively closed and that the inboard ends of any ash or rubbish chutes are fitted with an effective cover.

2.3 Shell and inner doors

2.3.1 The requirements of this item apply to all shell and inner doors fitted on these ships.

2.3.2 For the scope of survey of shell and inner doors, the following definitions are applicable:

- Securing device:

  a device used to keep the door closed by preventing it from rotating about its hinges
- Supporting device:

  a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure
- Locking device:

  a device that locks a securing device in the closed position.

2.3.3 It is to be checked that the operating procedures for closing the shell and inner doors are kept on board and posted at appropriate places.

When required, the Operating and Maintenance Manual is also to be checked for the verification of its approval and of any modification, reported repairs and proper endorsement by operating personnel.

2.3.4 The structural arrangements as well as welding are to be examined, including:

- plating, primary structure and secondary stiffeners
- hinging arms, hinges and bearings, thrust bearings
- hull and door side supports of securing, supporting and locking devices
- shell plating surrounding the openings and the securing, supporting and locking devices.

Hinge, bearing and thrust bearing clearances are to be measured when no dismantling is necessary for the measurement, or when the function tests detailed below are not satisfactory.

2.3.5 A close visual inspection of securing, supporting and locking devices, including their weld connections, is to be carried out and clearances are to be measured as required.

Non-destructive tests and/or thickness measurements may be required by the Surveyor after visual examination or in cases where cracks or deformations have been found.

2.3.6 A close visual inspection of sealing arrangements (packing material, rubber gaskets, packing retaining bars or channels) is to be carried out. For the tightness hose test, refer to [2.3.8].

2.3.7 The drainage arrangements including bilge wells, drain pipes and non-return valves are to be visually examined. A test of the bilge system between the inner and outer doors and that of the vehicle deck is to be carried out.

2.3.8 Function tests are to be carried out as follows, according to the required and/or existing equipment on board:

a) Doors are to be examined during a complete opening and closing operation; during this operation, the proper working of hinging arms and hinges, proper engagement of the thrust bearings and proper working of devices for locking the door in open position are to be checked

b) Securing, supporting and locking devices are to be examined during a complete opening and closing operation; the following items are to be checked:
   - opening/closing system and securing/locking devices are interlocked in such a way that they can only operate in proper sequence
   - mechanical lock of the securing devices
   - the securing devices remain locked in the event of loss of hydraulic fluid, if they are of hydraulic type

c) Indicators of open/closed position of doors and of securing/locking devices at remote control stations are to be checked; other safety devices such as isolation of securing/locking hydraulic system from other hydraulic systems, access to operating panels, notice plates and warning indicator lights are to be checked

d) A tightness hose test or equivalent of sealing arrangements is to be carried out

e) A working test of the indicator system is to be carried out, including checking of:
   - visual indicators and audible alarms on the navigation bridge and operating panel
   - lamp test function, fail safe performance, power supply for indicator system
   - proper condition of sensors and their protection from water, ice formation and mechanical damage

f) A working test of the water leakage detection system for inner doors and for the area between the bow door and the inner door (as applicable) is to be carried out and the proper function of audible alarms on the navigation bridge and the engine control room panel (as applicable) is to be ascertained

g) The television surveillance system is to be verified with proper indication on the navigation bridge and engine control room monitors

h) Electrical equipment for opening, closing and securing the doors is to be examined.

2.4 Fire protection, detection and extinction

2.4.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in Ch 3, Sec 1, [3.4], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)
- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge or on the central safety control room), and
- electrical equipment of a safe type.

2.5 Emergency escapes

2.5.1 It is to be verified that the emergency escape routes including related stairways and ladders, are kept clear.

2.6 Ballast equipment and installation

2.6.1 Piping

The visit includes:

- the examination of the state of the whole ballast piping system
- the examination of seals and space boundary penetrations with respect to cracks and leakages.

2.6.2 Control systems

The visit shall include the following points, as far as the elements exist:

- the examination of the filling measurement systems of the ballast capacities, upper level alarm and associated safety valves to control the overflows
- the confirmation that the pressure gauges installed on the ballast piping are correctly operational.

2.6.3 Ballasting system

The visit includes:

- the examination of all equipment of the ballasting system (pumps, valves and other components)
- the general examination of the ballast system equipment foundations and fixations
- the good working verification of the system, including the local manual means.

3 Class renewal survey

3.1 Stability

3.1.1 A lightweight survey is to be carried out to verify any changes in lightship displacement and in the longitudinal position of the centre of gravity. Where, in comparison with the approved stability information, a deviation exceeding 2% in the lightship displacement or 1% in the position of the longitudinal centre of gravity is found or anticipated, the ship is to be submitted to a new inclining test.

3.2 Lighting

3.2.1 The condition of the Low Location Lighting (LLL) system, where fitted, and its power source(s) is to be verified.

3.3 Shell and inner doors

3.3.1 A close visual inspection of structural arrangements is to be carried out, supplemented by non-destructive tests and/or thickness measurements, as deemed necessary by the Surveyor.

3.3.2 The close visual inspection of securing, supporting and locking devices, as required for the annual survey, is to be supplemented by non-destructive tests and/or thickness measurements.

3.3.3 Clearances of hinges, bearings and thrust bearings are to be measured. Dismantling may be required as deemed necessary by the Surveyor.

3.3.4 Non-return valves of drainage arrangements are to be checked after dismantling.

3.4 Fire protection, detection and extinction

3.4.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in Ch 3, Sec 3, [4.8], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as those indicated in [2.4.1].

Section 3 Aircraft Carrier

1 General

1.1 Application

1.1.1 The requirements of this Section are applicable after construction to all self-propelled ships which have been assigned the service notation **aircraft carrier**, as defined in Part D, Chapter 2.

1.1.2 These requirements are additional to those laid down in Part A, Chapter 3, according to the relevant surveys.

2 Annual survey

2.1 Inner doors

2.1.1 The requirements of this sub-article apply to all inner doors fitted on these ships.

In particular, they apply to hangar doors and aircraft lift doors.

2.1.2 For the scope of survey of inner doors, the following definitions are applicable:

- Securing device:

  a device used to keep the door closed by preventing it from rotating about its hinges

- Supporting device:

  a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure

- Locking device:

  a device that locks a securing device in the closed position.

2.1.3 It is to be checked that the operating procedures for closing the inner doors are kept on board and posted at appropriate places.

When required, the Operating and Maintenance Manual is also to be checked for the verification of its approval and of any modification, reported repairs and proper endorsement by operating personnel.

2.1.4 The structural arrangements as well as welding are to be examined, including:

- plating, primary structure and secondary stiffeners
- hinging arms, hinges and bearings, thrust bearings
- hull and door side supports of securing, supporting and locking devices.

Hinge, bearing and thrust bearing clearances are to be measured when no dismantling is necessary for the measurement, or when the function tests detailed below are not satisfactory.

2.1.5 A close visual inspection of securing, supporting and locking devices, including their weld connections, is to be carried out and clearances are to be measured as required.

Non-destructive tests and/or thickness measurements may be required by the Surveyor after visual examination or in cases where cracks or deformations have been found.

2.1.6 A close visual inspection of sealing arrangements (packing material, rubber gaskets, packing retaining bars or channels) is to be carried out. For the tightness hose test, refer to [2.1.8].

2.1.7 The drainage arrangements including bilge wells, drain pipes and non-return valves are to be visually examined. A test of the bilge system between the inner and outer doors and that of the garage deck is to be carried out.

2.1.8 Function tests are to be carried out as follows, according to the required and/or existing equipment on board:

a) Doors are to be examined during a complete opening and closing operation; during this operation, the proper working of hinging arms and hinges, proper engagement of the thrust bearings and proper working of devices for locking the door in open position are to be checked

b) Securing, supporting and locking devices are to be examined during a complete opening and closing operation; the following items are to be checked:
   - opening/closing system and securing/locking devices are interlocked in such a way that they can only operate in proper sequence
   - mechanical lock of the securing devices
   - the securing devices remain locked in the event of loss of hydraulic fluid, if they are of hydraulic type

c) Indicators of open/closed position of doors and of securing/locking devices at remote control stations are to be checked; other safety devices such as isolation of securing/locking hydraulic system from other hydraulic systems, access to operating panels, notice plates and warning indicator lights are to be checked

d) A tightness hose test or equivalent of sealing arrangements is to be carried out

e) A working test of the indicator system is to be carried out, including checking of:
   - visual indicators and audible alarms on the navigation bridge and operating panel
   - lamp test function, fail safe performance, power supply for indicator system
   - proper condition of sensors and their protection from water, ice formation and mechanical damage

f) A working test of the water leakage detection system for inner doors and for the area between the bow door and the inner door (as applicable) is to be carried out and the proper function of audible alarms on the navigation bridge and the engine control room panel (as applicable) is to be ascertained

g) The television surveillance system is to be verified with proper indication on the navigation bridge and engine control room monitors

h) Electrical equipment for opening, closing and securing the doors is to be examined.

2.2 Internal platforms and ramps

2.2.1 The annual survey of internal movable platforms and ramps (excluding those considered as inner doors and covered in [2.1]) and related equipment consists of:

- a general examination of the installation, particular attention being paid to the condition of steel cables
- confirmation of the proper operation of platforms/ramps and of mechanical stops and locks
- checking, as far as practicable, of the alarms and safety devices.

2.3 Fire protection, detection and extinction

2.3.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in Ch 3, Sec 1, [3.4], attention is to be given to the particular arrangements related to landing and garage spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)
- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge or on the central safety control room), and
- electrical equipment of a safe type.

2.4 Emergency escapes

2.4.1 It is to be verified that the emergency escape routes from passenger and crew spaces, including related stairways and ladders, are kept clear.

3 Class renewal survey

3.1 Stability

3.1.1 A lightweight survey is to be carried out to verify any changes in lightship displacement and in the longitudinal position of the centre of gravity. Where, in comparison with the approved stability information, a deviation exceeding 2% in the lightship displacement or 1% in the position of the longitudinal centre of gravity is found or anticipated, the ship is to be submitted to a new inclining test.

3.2 Lighting

3.2.1 The condition of the Low Location Lighting (LLL) system, where fitted, and its power source(s) is to be verified.

3.3 Inner doors

3.3.1 A close visual inspection of structural arrangements is to be carried out, supplemented by non-destructive tests and/or thickness measurements, as deemed necessary by the Surveyor.

3.3.2 The close visual inspection of securing, supporting and locking devices, as required for the annual survey, is to be supplemented by non-destructive tests and/or thickness measurements.

3.3.3 Clearances of hinges, bearings and thrust bearings are to be measured. Dismantling may be required as deemed necessary by the Surveyor.

3.3.4 Non-return valves of drainage arrangements are to be checked after dismantling.

3.4 Internal platforms and ramps

3.4.1 The condition of pulleys, axles, cables and structure of the platforms and ramps is to be checked.

Electric motors and/or hydraulically operated equipment are to be surveyed according to the scope detailed in Ch 3, Sec 3, [4] for the class renewal survey of machinery installations.

3.5 Fire protection, detection and extinction

3.5.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in Ch 3, Sec 3, [4.8], attention is to be given to the particular arrangements related to landing and garage spaces, such as those indicated in [2.3.1].

Section 4 Auxiliary Naval Vessel

1 General

1.1 Application

1.1.1 The requirements of this Section apply to self-propelled ships which have been assigned the service notation **auxiliary naval vessel**, as defined in Part D, Chapter 4.

1.1.2 The requirements for hull surveys apply to the surveys of the hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels and void spaces within the cargo area and all ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Part A, Chapter 3 according to the relevant surveys.

1.1.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [3.2.7], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.4 In all cases the extent of thickness measurements is to be sufficient as to represent the actual average condition.

1.1.5 When, in any survey, thickness measurements are required:

- the procedure detailed in Ch 2, Sec 2, [3.3] is to be applied
- the thickness measurement operator is to attend the survey planning meeting held prior to commencing the survey.

1.1.6 The requirements for machinery surveys apply to surveys of the machinery and equipment in the cargo area or dedicated to cargo service systems and are additional to those given in Part A, Chapter 3 for all ships.

1.2 Documentation on board

1.2.1 The Owner is to obtain, supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor. The documentation is to be kept on board for the lifetime of the ship.

1.2.2 A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 The following additional supporting documentation is to be available on board:

- main structural plans of cargo tanks and ballast tanks
- previous repair history
- cargo and ballast history
- extent of use of inert gas system and tank cleaning procedures
- ship’s personnel reports on:
  - structural deterioration/defects in general
  - leakage in bulkheads and piping systems
  - condition of coatings or corrosion prevention systems, if any
- any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

1.2.4 Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

1.3 Reporting and evaluation of surveys

1.3.1 The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 When a survey is split between different survey stations, a report is to be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements etc.) and an indication of whether the item has been credited, are to be made available to the next attending Surveyor(s), prior to continuing or completing the survey.

1.3.3 A hull condition evaluation report (summarizing the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for reference at future surveys. The hull condition evaluation report is endorsed by the Society.

1.4 Conditions for survey

1.4.1 In order to enable the attending Surveyor(s) to carry out the survey, provisions for proper and safe access are to be agreed between the Owner and the Society.

Details of the means of access are to be provided in the survey planning questionnaire.

In cases where the provisions of safety and required access are judged by the attending Surveyor(s) not to be adequate, the survey of the spaces involved is not to proceed.

1.4.2 The Surveyor(s) are to always be accompanied by at least one responsible person, assigned by the Owner, experienced in tank and enclosed spaces inspection. In addition a back-up team of at least two experienced persons is to be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team is to continuously observe the work in the tank or space and is to keep lifesaving and evacuation equipment ready for use.

1.5 Access to structures

1.5.1 For overall survey, means are to be provided to enable the Surveyor(s) to examine the hull structure in a safe and practical way.

2 Annual survey - Hull items - Liquid cargo area

2.1 Weather decks

2.1.1 The survey is to include:

- examination of cargo tank openings, including gaskets, covers, coamings and screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker, oily-ballast and oily slop tanks and void spaces
- examination of cargo, crude oil washing, bunker, ballast and vent piping systems, including remote control valves, safety valves and various safety devices, as well as vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deckhouse ends facing the cargo area are in satisfactory condition.

2.2 Cargo pump rooms and pipe tunnels

2.2.1 The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of oil leakage or fractures and, in particular, the sealing arrangements of penetrations in these bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements.

2.3 Ballast tanks

2.3.1 Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey or the intermediate survey.

2.3.2 When considered necessary by the Surveyor, or when extensive corrosion exists, thickness measurements are to be carried out and if the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 2 or Tab 3. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

2.4 Safe access to tanker bows

2.4.1 The access to bow arrangement is to be examined, as applicable.

3 Annual survey - Hull items - Dry cargo area

3.1 Watertight bulkheads

3.1.1 The survey of watertight bulkheads and arrangements consists of:

- examination, as far as practicable, of collision and watertight bulkheads, and confirmation that their watertight integrity has not been impaired
- checking the diagram provided on the navigation bridge showing the location of the watertight doors and related indicators for their open/closed position
- testing operation of local and remote control (from the navigation bridge) of the watertight doors, and in particular, operation from each side of the bulkhead of audible alarms or visual signals and control handles, as required or fitted
- confirmation of operation of watertight doors in the event of failure of main and emergency sources of power
- confirmation that notices are affixed at appropriate locations.

3.2 Openings in shell plating

3.2.1 The survey consists of:

- examination of the arrangements for closing sidescuttles and their deadlights, as well as scuppers, sanitary discharges and similar openings and other inlets and discharges in the shell plating below the margin line
- confirmation that valves for closing the main and auxiliary sea inlets and discharges in the machinery spaces are readily accessible, and that indicators showing the status of the valves are provided, as required or fitted
- confirmation that gangway access and cargo ports fitted below the margin line may be effectively closed and that the inboard ends of any ash or rubbish chutes are fitted with an effective cover.

3.3 Shell and inner doors

3.3.1 The requirements of this sub-article apply to all shell and inner doors fitted on these ships.

3.3.2 For the scope of survey of shell and inner doors, the following definitions are applicable:

- Securing device:

  a device used to keep the door closed by preventing it from rotating about its hinges
- Supporting device:

  a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure
- Locking device:

  a device that locks a securing device in the closed position.

3.3.3 It is to be checked that the operating procedures for closing the shell and inner doors are kept on board and posted at appropriate places.

When required, the Operating and Maintenance Manual is also to be checked for the verification of its approval and of any modification, reported repairs and proper endorsement by operating personnel.

3.3.4 The structural arrangements as well as welding are to be examined, including:

- plating, primary structure and secondary stiffeners
- hinging arms, hinges and bearings, thrust bearings
- hull and door side supports of securing, supporting and locking devices
- shell plating surrounding the openings and the securing, supporting and locking devices.

Hinge, bearing and thrust bearing clearances are to be measured when no dismantling is necessary for the measurement, or when the function tests detailed below are not satisfactory.

3.3.5 A close visual inspection of securing, supporting and locking devices, including their weld connections, is to be carried out and clearances are to be measured as required.

Non-destructive tests and/or thickness measurements may be required by the Surveyor after visual examination or in cases where cracks or deformations have been found.

3.3.6 A close visual inspection of sealing arrangements (packing material, rubber gaskets, packing retaining bars or channels) is to be carried out. For the tightness hose test, refer to Ch 4, Sec 2, [2.3.8].

3.3.7 The drainage arrangements including bilge wells, drain pipes and non-return valves are to be visually examined. A test of the bilge system between the inner and outer doors and that of the vehicle deck is to be carried out.

3.3.8 Function tests are to be carried out as follows, according to the required and/or existing equipment on board:

a) Doors are to be examined during a complete opening and closing operation; during this operation, the proper working of hinging arms and hinges, proper engagement of the thrust bearings and proper working of devices for locking the door in open position are to be checked

b) Securing, supporting and locking devices are to be examined during a complete opening and closing operation; the following items are to be checked:
   - opening/closing system and securing/locking devices are interlocked in such a way that they can only operate in proper sequence
   - mechanical lock of the securing devices
   - the securing devices remain locked in the event of loss of hydraulic fluid, if they are of hydraulic type

c) Indicators of open/closed position of doors and of securing/locking devices at remote control stations are to be checked; other safety devices such as isolation of securing/locking hydraulic system from other hydraulic systems, access to operating panels, notice plates and warning indicator lights are to be checked

d) A tightness hose test or equivalent of sealing arrangements is to be carried out

e) A working test of the indicator system is to be carried out, including checking of:
   - visual indicators and audible alarms on the navigation bridge and operating panel
   - lamp test function, fail safe performance, power supply for indicator system
   - proper condition of sensors and their protection from water, ice formation and mechanical damage

f) A working test of the water leakage detection system for inner doors and for the area between the bow door and the inner door (as applicable) is to be carried out and the proper function of audible alarms on the navigation bridge and the engine control room panel (as applicable) is to be ascertained

g) The television surveillance system is to be verified with proper indication on the navigation bridge and engine control room monitors

h) Electrical equipment for opening, closing and securing the doors is to be examined.

4 Annual survey - Machinery items - Liquid cargo area

4.1 Cargo area and cargo pump rooms

4.1.1 The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- check of the protection of cargo pump room, as applicable, and in particular, check of:
  - temperature sensing devices for bulkheads glands and alarms
  - interlock between lighting and ventilation
  - gas detection system
  - bilge level monitoring devices and alarms
- examination of the emergency lighting in cargo pump rooms
- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, etc., are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of the pump room bilge system, and checking that pump foundations are intact
- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump rooms) is operational, ducting is intact, dampers are operational and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- examination of the cargo heating system, as appropriate
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition and test of the means of communication and remote shutdown of the cargo pumps.

4.2 Instrumentation and safety devices

4.2.1 The survey is to include:

- examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- verification that installed pressure gauges on cargo discharge lines are properly operational
- confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- confirmation that devices provided for measuring the temperature of the cargo, if any, operate satisfactorily.

4.3 Fire-fighting systems in cargo area

4.3.1 The survey is to include:

- external examination of piping and cut-out valves of fixed fire-fighting systems related to cargo tanks and cargo pump rooms
- confirmation, as far as practicable and when appropriate, that the remote means for closing the various openings are operable
- examination of the appropriate portable fire-extinguishing equipment for the cargoes to be carried in accordance with the relevant requirements given in Ch 3, Sec 1, [3.4.3]
- examination of fire-fighting systems of any type fitted on board such as deck foam, water-spraying, etc., as applicable in accordance with the relevant requirements given in Ch 3, Sec 1, [3.4].

4.4 Inert gas system

4.4.1 The survey is to include:

- external examination of the whole system, to check the condition of all piping, including vent piping above the upper deck in the cargo tank area and overboard discharges through the shell so far as practicable, and associated components to verify, in particular, the absence of signs of corrosion and leakage of gas, water or other liquid from inert gas and water piping systems or from the pressure/vacuum breaking device
- check of proper operation of both inert gas blowers
- check of proper operation of ventilation system required for scrubber room (if any)
- check of deck water seal for automatic water filling and draining
- check of absence of water carry over in the inert gas from the deck water seal and check of the condition of the non-return valve
- check of proper operation of all remotely operated or automatically controlled valves and, in particular, of the flue gas isolating valve located on the inert gas supply main after the blowers
- check of proper operation of the interlocking feature fitted to prevent soot blowers from operating when the inert gas system is working
- check that the gas pressure regulating valve automatically closes when gas blowers are stopped
- check, as far as practicable and using simulated conditions where necessary, of the following alarms and safety devices of the inert gas system:
  - high oxygen content of gas in the inert gas main
  - low gas pressure in the inert gas main
  - low pressure in the supply to the deck water seal
  - high temperature of gas in the inert gas main, including automatic shutdown devices
  - low water pressure to the scrubber, including automatic shutdown devices
  - accuracy of portable and fixed oxygen measuring equipment by means of calibration gases
  - high water level in the scrubber, including automatic shutdown devices
  - failure of the inert gas blowers
  - failure of the power supply to the automatic control system for the gas regulating valve and to the instrumentation for continuous indication and permanent recording of pressure and oxygen content in the inert gas main
  - high pressure of gas in the inert gas main
- check, when practicable, of the proper operation of the inert gas system on completion of the checks listed above.

5 Annual survey - Machinery items - Dry cargo area

5.1 Fire protection, detection and extinction

5.1.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in Ch 3, Sec 1, [3.4], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)
- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge or on the central safety control room), and
- electrical equipment of a safe type.

5.2 Emergency escapes

5.2.1 It is to be verified that the emergency escape routes including related stairways and ladders, are kept clear.

5.3 Ballast equipment and installation

5.3.1 Piping

The visit includes:

- the examination of the state of the whole ballast piping system
- the examination of seals and space boundary penetrations with respect to cracks and leakages.

5.3.2 Control systems

The visit shall include the following points, as far as the elements exist:

- the examination of the filling measurement systems of the ballast capacities, upper level alarm and associated safety valves to control the overflows
- the confirmation that the pressure gauges installed on the ballast piping are correctly operational.

5.3.3 Ballasting system

The visit includes:

- the examination of all equipment of the ballasting system (pumps, valves and other components)
- the general examination of the ballast system equipment foundations and fixations
- the good working verification of the system, including the local manual means.

6 Intermediate survey - Hull items

6.1 General

6.1.1 The survey of weather decks is to include:

- examination, as far as applicable, of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, the piping may be required to be pressure tested, thickness measured or both
- confirmation, if applicable, that cargo pipes are electrically bonded to the hull
- examination of vent line drainage arrangements.

6.2 Ships between 5 and 10 years of age

6.2.1 For single hull oil tankers, all ballast tanks are to be examined.

When considered necessary by the Surveyor, thickness measurements and testing are to be carried out to ensure that the structural integrity remains effective.

6.2.2 For double hull oil tankers, an overall survey of representative salt water ballast tanks selected by the Surveyor is to be carried out.

If such overall survey reveals no visible structural defects, the examination may be limited to a verification that the hard protective coating remains in good condition.

6.2.3 A ballast tank is to be examined at subsequent annual surveys where:

- a hard protective coating has not been applied from the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurement is to be carried out as deemed necessary by the Surveyor.

6.2.4 In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

6.3 Ships between 10 and 15 years of age

6.3.1 The scope of intermediate survey of ships between 10 and 15 years of age is the scope of the preceding class renewal survey of hull, as detailed in [8] with bottom survey in dry condition or bottom in water survey as applicable. However, pressure testing of all cargo and ballast tanks and the requirements for longitudinal strength evaluation of hull girder as required in [8.4.5] are not required unless deemed necessary by the attending Surveyor.

6.4 Ships over 15 years of age

6.4.1 The scope of intermediate survey of ships over 15 years of age is the scope of the preceding class renewal survey of hull, as detailed in [8] with bottom survey in dry condition, except that pressure testing of ballast and cargo tanks and the requirements for longitudinal strength evaluation of hull girder as required in [8.4.5] is not required unless deemed necessary by the Surveyor.

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and water ballast tanks are to be carried out during the bottom survey in accordance with the applicable requirements for intermediate surveys, if not already performed.

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast waterline.

7 Intermediate survey - Machinery items - Liquid cargo area

7.1 Cargo area and cargo pump rooms

7.1.1 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

7.1.2 The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship’s personnel.

7.1.3 The satisfactory condition of the cargo heating system is to be verified.

7.2 Inert gas system

7.2.1 The following is to be carried out:

- main parts such as the scrubber, washing machines, blowers, deck water seal and non-return valve are to be opened out as considered necessary and examined
- gas distribution lines and shut-off valves, including soot blower interlocking devices, are to be examined as deemed necessary
- all automatic shutdown devices and alarms are to be examined and tested.

8 Class renewal survey - Hull items - Liquid cargo area

8.1 Survey planning meeting

8.1.1 The establishment of proper preparation and the close co-operation between the attending Surveyor(s) and the Owner's representatives onboard prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board, safety meetings are to be held regularly.

8.1.2 Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement company representative, where involved, and the master of the ship or an appropriately qualified representative appointed by the master or Company for the purpose to ascertain that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out. See also [1.1.5].

8.1.3 The following is an indicative list of items that are to be addressed in the meeting:

a) schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.)

b) provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety)

c) extent of the thickness measurements

d) acceptance criteria (refer to the list of minimum thicknesses)

e) thickness measurements considering the coating condition and suspect areas/areas of substantial corrosion

f) execution of thickness measurements

g) taking representative readings in general and where uneven corrosion/pitting is found

h) mapping of areas of substantial corrosion, and

i) communication between the attending Surveyor(s), the thickness measurement company operator(s) and the Owner's representative(s) concerning findings.

8.2 Scope of survey

8.2.1 In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping are in satisfactory condition for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

8.2.2 All cargo tanks, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in [8.4] and [8.5], to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

8.2.3 As indicated in Ch 3, Sec 3, [2.1.1], a bottom survey in dry condition is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks are to be carried out during this bottom survey in accordance with the applicable requirements for class renewal surveys, if not already performed.

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast waterline.

8.2.4 Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A ballast tank is to be examined at subsequent annual surveys where:

- a hard protective coating has not been applied from the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurement is to be carried out as deemed necessary by the Surveyor.

8.3 Overall surveys

8.3.1 Each class renewal survey is to include an overall survey of all tanks and spaces.

8.4 Thickness measurements

8.4.1 The minimum requirements for thickness measurements at class renewal survey are given in Tab 1.

8.4.2 Provisions for extended measurements for areas with substantial corrosion are given in Tab 2 for single hull oil tankers and combination carriers or Tab 3 for double hull oil tankers and as may be additionally specified in the survey program as required in [8.1]. These extended thickness measurements are to be carried out before the survey is credited as completed.

Suspect areas identified at previous surveys are to be examined.

Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

The Surveyor may further extend the thickness measurements as deemed necessary.

8.4.3 When pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

8.4.4 For areas in tanks where hard protective coatings are found to be in good condition as defined in Ch 2, Sec 2, [3.2.9], the extent of thickness measurements according to Tab 1 may be specially considered.

8.4.5 On oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force) and more than 10 years of age, the longitudinal strength of the ship's hull girder is to be evaluated in compliance with the requirements of NR467, Pt A, Ch 4, App 1 on the basis of the thickness of the structures measured, renewed or reinforced, as appropriate, during the class renewal survey.

Table 1 : Thickness measurements at class renewal survey - Auxiliary naval vessels

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	Within the cargo area: • each deck plat • 1 transverse section**(1)**	Within the cargo area: • each deck plate • 2 transverse sections**(1)(2)** • all wind and water strakes	Within the cargo area: • each deck plate • 3 transverse sections**(1)(2)** • each bottom plate
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey**(3)**	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey**(3)**	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey**(3)**	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey**(3)**
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	All wind and water strakes, full length

(1) Transverse sections are to be chosen where the largest reductions are likely to occur or as revealed by deck plating measurements.

(2) At least one section is to be within 0,5 L amidships and, where applicable, in way of a ballast tank.

(3) A close-up survey is a survey where the details of structural components are within the close visual inspection range of the Surveyor, i.e. normally within reach of hand.

Table 2 : Extended thickness measurements at those areas of substantial corrosion - Auxiliary naval vessels

BOTTOM STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom plating	Minimum of 3 bays across tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and webs
Bottom longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on vertical web
Bottom girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across face flat. 5-point pattern on girder/bulkhead brackets.
Bottom transverse webs	3 webs in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over 2 square metre area. Single measurements on face flat.
Panel stiffening	Where provided	Single measurements

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	2 bands across tank	Minimum of 3 measurements per plate per band
Deck longitudinals	Minimum of 3 longitudinals in each of 2 bays	3 measurements in line vertically on webs and 2 measurements on flange (if fitted)
Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across face flat. 5-point pattern on girder/bulkhead brackets.
Deck transverse webs	Minimum of 2 webs, with measurements at both ends and middle of span	5-point pattern over 2 square metre area. Single measurements on face flat.
Panel stiffening	Where provided	Single measurements

SIDE SHELL AND LONGITUDINAL BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes and strakes in way of stringer platforms	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same 3 bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
All other longitudinals	Every third longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
Longitudinal brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5-point pattern over area of bracket
Web frames and cross ties	3 webs with minimum of 3 locations on each web, including in way of cross tie connections	5-point pattern over approximately 2 square metre area, plus single measurements on web frame and cross tie face flats

TRANSVERSE BULKHEADS AND SWASH BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between pair of stiffeners at 3 locations: approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over 1 metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about 1 square metre of plating
Stiffeners	Minimum of 3 typical stiffeners	For web, 5-point pattern over span between bracket connections (2 measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of 3 at top, middle and bottom of tank	5-point pattern over area of bracket
Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, 5-point pattern over about 1 square metre. 3 measurements across face flat.
Stringer platforms	All stringers with measurements at both ends and middle	5-point pattern over 1 square metre of area plus single measurements near bracket toes and on face flats

Table 3 : Extended thickness measurements at those areas of substantial corrosion - Auxiliary naval vessel with double hull

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of 3 bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on vertical web
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of 3 measurements
Bottom floors, including the watertight ones	3 floors in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over 2 square metre area
Hopper structure web frame ring	3 floors in bays where bottom plating measured	5-point pattern over about 1 square metre of plating. Single measurements on flange.

Hopper structure transverse watertight bulkhead or swash bulkhead	• lower 1/3 of bulkhead	5-point pattern over about 1 square metre of plating
	• upper 2/3 of bulkhead	5-point pattern over 2 square metre of plating
	• stiffeners (minimum of 3)	For web, 5-point pattern over span (2 measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span.
Panel stiffening	Where provided	Single measurements

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	2 transverse bands across tank	Minimum of 3 measurements per plate per band
Deck longitudinals	Every third longitudinal in each of 2 bands with a minimum of one longitudinal	3 measurements in line vertically on webs and 2 measurements on flange (if fitted)
Deck girders and brackets (usually in cargo tanks only)	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across flange. 5-point pattern on girder/bulkhead brackets.
Deck transverse webs	Minimum of 2 webs, with measurements at both ends and middle of span	5-point pattern over 1 square metre area. Single measurements on flange.
Vertical web and transverse bulkhead in wing ballast tank (2 metres from deck)	Minimum of 2 webs, and both transverse bulkheads	5-point pattern over 1 square metre area
Panel stiffening	Where provided	Single measurements

STRUCTURE IN WING BALLAST TANKS		
Structural member	Extent of measurement	Pattern of measurement
Side shell and longitudinal bulkhead plating:		
• upper strake and strakes in way of horizontal girders	Plating between each pair of longitudinals in a minimum of 3 bays (along the tank)	Single measurement
• all other strakes	Plating between every third pair of longitudinals in same 3 bays	Single measurement
Side shell and longitudinal bulkhead longitudinals on:		
• upper strake	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
• all other strakes	Every third longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
Longitudinal brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5-point pattern over area of bracket
Vertical web and transverse bulkheads (excluding deckhead area):		
• strakes in way of horizontal girders	Minimum of 2 webs and both transverse bulkheads	5-point pattern over 2 square metre area
• other strakes	Minimum of 2 webs and both transverse bulkheads	2 measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of 3 bays	2 measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where provided	Single measurements

LONGITUDINAL BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes and strakes in way of the horizontal stringers of transverse bulkheads	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same 3 bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
All other longitudinals	Every third longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
Longitudinal brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5-point pattern over area of bracket
Web frames and cross ties	3 webs with minimum of 3 locations on each web, including in way of cross tie connections	5-point pattern over approximately 2 square metre area of webs, plus single measurements on flanges of web frame and cross ties
Lower end brackets (opposite side of web frame)	Minimum of 3 brackets	5-point pattern over approximately 2 square metre area of brackets, plus single measurements on bracket flanges

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Upper and lower stool, where fitted	• Transverse band within 25mm of welded connection to inner bottom/deck plating • Transverse band within 25mm of welded connection to shelf plate	5-point pattern between stiffeners over 1 metre length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at 3 locations: approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over 1 metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about 1 square metre of plating
Stiffeners	Minimum of 3 typical stiffeners	For web, 5-point pattern over span between bracket connections (2 measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span.
Brackets	Minimum of 3 at top, middle and bottom of tank	5-point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	5-point pattern over 1 square metre of area plus single measurements near bracket toes and on flange

8.5 Tank testing

8.5.1 The requirements for tank testing at class renewal survey are given in Tab 4.

8.5.2 The Surveyor may extend the tank testing as deemed necessary.

8.5.3 Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

Boundaries of cargo tanks are to be tested to the highest point that liquid will rise under service conditions

For double hull oil tankers, the testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out.

Table 4 : Tank testing at class renewal survey - Auxiliary naval vessels

Age of ship (in years at time of class renewal survey)	
age ≤ 6	age > 6
All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All cargo tank bulkheads

8.6 Cargo piping, area and pump rooms

8.6.1 Cargo piping on deck and cargo and ballast piping systems within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when this piping, including valves and fittings, is opened during repair periods and can be examined internally.

The Surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out in the event of repair or dismantling or cargo, crude oil washing, or ballast piping, or where doubts arise.

8.6.2 All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

8.6.3 All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

9 Class renewal survey - Hull items - Dry cargo area

9.1 Stability

9.1.1 A lightweight survey is to be carried out to verify any changes in lightship displacement and in the longitudinal position of the centre of gravity. Where, in comparison with the approved stability information, a deviation exceeding 2% in the lightship displacement or 1% in the position of the longitudinal centre of gravity is found or anticipated, the ship is to be submitted to a new inclining test.

9.2 Shell and inner doors

9.2.1 A close visual inspection of structural arrangements is to be carried out, supplemented by non-destructive tests and/or thickness measurements, as deemed necessary by the Surveyor.

9.2.2 The close visual inspection of securing, supporting and locking devices, as required for the annual survey, is to be supplemented by non-destructive tests and/or thickness measurements.

9.2.3 Clearances of hinges, bearings and thrust bearings are to be measured. Dismantling may be required as deemed necessary by the Surveyor.

9.2.4 Non-return valves of drainage arrangements are to be checked after dismantling.

10 Class renewal survey - Machinery items - Liquid cargo area

10.1 Cargo area and cargo pump rooms

10.1.1 Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out, as far as practicable.

Maintenance records of cargo pumps are to be made available to the Surveyor.

10.1.2 The satisfactory condition of the cargo heating system is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

10.1.3 An operating test of the remote control of pumps and valves and of automatic closing valves is to be carried out.

10.1.4 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

10.2 Fire-fighting systems in cargo area

10.2.1 The survey is to include the examination of fire-fighting systems of any type fitted on board for the protection of the cargo area, cargo pump room and other dangerous spaces, such as deck foam, water-spraying systems, etc., as applicable in accordance with the relevant requirements given in Ch 3, Sec 3, [4.8].

10.3 Inert gas system

10.3.1 In addition to the inspections required at the intermediate survey, the following is to be carried out:

a) An internal examination of:
- the inert gas generator, where fitted
- the scrubber
- the deck water seal including the non-return valve
- the pressure/vacuum breaking device
- the cooling water systems including overboard discharge from the scrubber
- all valves

b) A test to verify the proper operation of the system upon completion of all survey checks.

11 Class renewal survey - Machinery items - Dry cargo area

11.1 Lighting

11.1.1 The condition of the Low Location Lighting (LLL) system, where fitted, and its power source(s) is to be verified.

11.2 Fire protection, detection and extinction

11.2.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in Ch 3, Sec 3, [4.8], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as those indicated in [5.1.1].

Section 5 Amphibious Vessel

1 General

1.1 Application

1.1.1 The requirements of this Section are applicable after construction to all self-propelled ships which have been assigned the service notation **amphibious vessel** as defined in Part D, Chapter 5.

1.1.2 These requirements are additional to those laid down in Part A, Chapter 3, according to the relevant surveys.

2 Annual survey

2.1 Shell and inner doors

2.1.1 The requirements of this sub-article apply to all shell and inner doors fitted on these ships.

2.1.2 For the scope of survey of shell and inner doors, the following definitions are applicable:

- Securing device:

  a device used to keep the door closed by preventing it from rotating about its hinges
- Supporting device:

  a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure
- Locking device:

  a device that locks a securing device in the closed position.

2.1.3 It is to be checked that the operating procedures for closing the shell and inner doors are kept on board and posted at appropriate places.

When required, the Operating and Maintenance Manual is also to be checked for the verification of its approval and of any modification, reported repairs and proper endorsement by operating personnel.

Confirmation is to be obtained that no unapproved changes have been made to the bow, inner, side shell and stern doors since the last survey.

2.1.4 The structural arrangements as well as welding are to be examined, including:

- plating, primary structure and secondary stiffeners
- hinging arms, hinges and bearings, thrust bearings
- hull and door side supports of securing, supporting and locking devices
- shell plating surrounding the openings and the securing, supporting and locking devices.

Clearances of hinges, bearings and thrust bearings are to be taken, where no dismantling is required. Where the function test is not satisfactory, dismantling may be required to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out. Clearances of securing, supporting and locking devices are to be measured, where indicated in the Operation and Maintenance Manual (OMM).

2.1.5 A close-up survey of securing, supporting and locking devices as listed below, including welding, is to be carried out:

- cylinder securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections
- hinge pins, supporting brackets, back-up brackets (where fitted) and their welded connections
- locking hooks, securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections
- locking pins, supporting brackets, back-up brackets (where fitted) and their welded connections
- locating and stopper devices and their welded connections.

2.1.6 A close visual inspection of sealing arrangements (packing material, rubber gaskets, packing retaining bars or channels) is to be carried out. For the tightness hose test, refer to [2.1.8].

2.1.7 The drainage arrangements including bilge wells, drain pipes and non-return valves are to be visually examined. A test of the bilge system between the inner and outer doors and that of the vehicle deck is to be carried out.

2.1.8 Function tests are to be carried out as follows, according to the required and/or existing equipment on board:

a) Doors are to be examined during a complete opening and closing operation; during this operation, the proper working of hinging arms and hinges, proper engagement of the thrust bearings and proper working of devices for locking the door in open position are to be checked

b) Securing, supporting and locking devices are to be examined during a complete opening and closing operation; the following items are to be checked:
   - opening/closing system and securing/locking devices are interlocked in such a way that they can only operate in proper sequence
   - mechanical lock of the securing devices
   - the securing devices remain locked in the event of loss of hydraulic fluid, if they are of hydraulic type

c) Indicators of open/closed position of doors and of securing/locking devices at navigation bridge and other remote control stations are to be checked; other safety devices such as isolation of securing/locking hydraulic system from other hydraulic systems, access to operating panels, notice plates and warning indicator lights are to be checked

d) A tightness hose test or equivalent of sealing arrangements is to be carried out

e) A working test of the indicator system is to be carried out, including checking of:
   - visual indicators and audible alarms on the navigation bridge and operating panel
   - lamp test function, fail safe performance, power supply for indicator system
   - proper condition of sensors and their protection from water, ice formation and mechanical damage
   - confirmation that power supply for indicator system is supplied by the emergency source or other secure power supply and is independent of the power supply for operating the doors

f) A working test of the water leakage detection system for inner doors and for the area between the bow door and the inner door (as applicable) is to be carried out and the proper function of audible alarms on the navigation bridge and the engine control room panel (as applicable) is to be ascertained

g) The television surveillance system is to be verified with proper indication on the navigation bridge and engine control room monitors

h) Electrical equipment for opening, closing and securing the doors is to be examined.

2.1.9 Non-destructive tests and/or thickness measurements may be required by the Surveyor after visual examination and function test or in cases where cracks or deformations have been found.

2.2 Internal platforms and ramps

2.2.1 The annual survey of internal movable platforms and ramps (excluding those considered as inner doors and covered in [2.1]) and related equipment consists of:

- a general examination of the installation, particular attention being paid to the condition of steel cables
- confirmation of the proper operation of platforms/ramps and of mechanical stops and locks
- checking, as far as practicable, of the alarms and safety devices.

2.3 Watertight bulkheads

2.3.1 The survey of watertight bulkheads and arrangements consists of:

- examination, as far as practicable, of collision and watertight bulkheads, and confirmation that their watertight integrity has not been impaired
- checking the diagram provided on the navigation bridge showing the location of the watertight doors and related indicators for their open/closed position
- testing operation of local and remote control (from the navigation bridge) of the watertight doors, and in particular, operation from each side of the bulkhead of audible alarms or visual signals and control handles, as required or fitted
- confirmation of operation of watertight doors in the event of failure of main and emergency sources of power
- confirmation that notices are affixed at appropriate locations.

2.4 Openings in shell plating

2.4.1 The survey consists of:

- examination of the arrangements for closing sidescuttles and their deadlights, as well as scuppers, sanitary discharges and similar openings and other inlets and discharges in the shell plating below the margin line
- confirmation that valves for closing the main and auxiliary sea inlets and discharges in the machinery spaces are readily accessible, and that indicators showing the status of the valves are provided, as required or fitted
- confirmation that gangway access and cargo ports fitted below the margin line may be effectively closed and that the inboard ends of any ash or rubbish chutes are fitted with an effective cover.

2.5 Fire protection, detection and extinction

2.5.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in Ch 3, Sec 1, [3.4], attention is to be given to the particular arrangements related to amphibious vessel spaces, such as:

- fire detection systems and alarms
- fixed fire-extinguishing arrangements (gas, water-spraying or foam systems)
- portable fire extinguishers in spaces and at entrances
- ventilation and related safety devices (including remote control on the bridge), and
- electrical equipment of a safe type.

2.6 Means of escape

2.6.1 The condition of means of escape as well as of fire protection, detection and extinction in special category spaces is to be checked.

2.6.2 It is to be verified that the emergency escape routes from passenger and crew spaces, including related stairways and ladders, are kept clear.

3 Class renewal survey

3.1 Lightweight survey

3.1.1 A lightweight survey is to be carried out to verify any changes in lightship displacement and in the longitudinal position of the centre of gravity. Where, in comparison with the approved stability information, a deviation exceeding 2% in the lightship displacement or a deviation of the longitudinal centre of gravity exceeding 1% of the length between perpendiculars is found or anticipated, the ship is to be submitted to a new inclining test.

3.2 Shell and inner doors

3.2.1 The class renewal survey is to include, in addition to the requirements of the annual survey as required in [2], examination, tests and checks of sufficient extent to verify that the bow, inner, side shell and stern doors are in satisfactory condition and considered able to remain in compliance with the applicable requirements, subject to proper maintenance and operation in accordance with the OMM or the manufacturer's recommendations and the periodical surveys being carried out at the due dates for the five-year period until the next class renewal survey.

3.2.2 The examinations of the doors are to be supplemented by thickness measurements and testing to verify compliance with the applicable requirements so that the structural and weathertight integrity remains effective. The aim of the examination is to identify corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

3.2.3 A close visual inspection of structural arrangements is to be carried out, supplemented by non-destructive tests and/or thickness measurements, as deemed necessary by the Surveyor.

3.2.4 A survey of the items listed in [2.1.4] and [2.1.5], including close-up survey of securing, supporting and locking devices, together with welding, is to be carried out.

Non-destructive testing and thickness measurements are to be carried out on securing, supporting and locking devices, including welding, to the extent considered necessary by the Surveyor. Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items, as considered necessary by the Surveyor.

3.2.5 Clearances of hinges, bearings and thrust bearings are to be taken. Unless otherwise specified in the OMM or by the manufacturer's recommendation, the measurement of clearances on amphibious vessels may be limited to representative bearings where dismantling is needed in order to measure the clearances.

If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pins are to be carried out.

3.2.6 Non-return valves of drainage arrangements are to be checked after dismantling.

3.2.7 The maximum thickness diminution of hinging arms, securing, supporting and locking devices is to be treated according to the normal procedure for primary structures, but is not to be more than 15% of the as-built thickness or the maximum corrosion allowance of the Society, whichever is less. Certain designs may be subject to the Society's special consideration.

3.2.8 Checking the effectiveness of sealing arrangements by hose testing or equivalent is to be carried out.

3.3 Internal platforms and ramps

3.3.1 The condition of pulleys, axles, cables and structure of the platforms and ramps is to be checked.

Electric motors and/or hydraulically operated equipment are to be surveyed according to the scope detailed in Ch 3, Sec 3, [4] for the class renewal survey of machinery installations.

3.4 Fire protection, detection and extinction

3.4.1 Within the scope of survey of fire protection, detection and extinction arrangements as required for the class renewal survey of all ships in Ch 3, Sec 3, [4.8], attention is to be given to the particular arrangements related to amphibious vessel spaces, such as those indicated in [2.5.1].

3.5 Means of escape

3.5.1 The condition of means of escape as well as of fire protection, detection and extinction in special category spaces is to be checked.

3.5.2 The condition of the Low Location Lighting (LLL) system, where fitted, and its power source(s) is to be verified.

CHAPTER 5
SCOPE OF SURVEYS RELATED TO ADDITIONAL CLASS NOTATIONS

Section 1 General
Section 2 Military environment
Section 3 VeriSTAR System
Section 4 Availability of Machinery
Section 5 Automated Machinery Systems
Section 6 Integrated Ship Systems
Section 7 Monitoring Equipment
Section 8 Refrigerating Installations
Section 9 Environmental Protection
Section 10 CBRN Protection
Section 11 Manoeuvrability
Section 12 Towing
Section 13 Helideck
Section 14 Compartment Air Testing

Section 1 General

1 Application

1.1

1.1.1 The purpose of this Chapter is to give details on the scope of surveys of specific equipment and systems fitted on board the ship, which are covered by an additional class notation. Unless otherwise specified in Ch 1, Sec 2, [6], the scope of these surveys provides the requirements to be complied with for the maintenance of the relevant additional class notation.

1.1.2 These specific requirements are additional to those laid down in Part A, Chapter 3 and Part A, Chapter 4. These surveys are to be carried out at intervals as described in Ch 2, Sec 2, as far as possible concurrently with the surveys of the same type, i.e. annual, intermediate or class renewal survey.

1.1.3 The equipment and systems are also to be submitted to occasional survey whenever one of the cases indicated in Ch 2, Sec 2, [7] occurs.

1.1.4 Where specific requirements are given for the class renewal survey, they are additional to the requirements for the annual survey, which, in accordance with Ch 3, Sec 3, [1.1.5], is to be carried out at the completion of the class renewal survey.

1.1.5 For the assignment of the additional class notations, ships are to be submitted to an admission to class survey as described in Ch 2, Sec 1, [2] and Ch 2, Sec 1, [3] for new and existing installations, respectively, as applicable.

2 Additional class notations subject to additional surveys

2.1

2.1.1 The specific requirements detailed in this Chapter are linked to the additional class notation(s) assigned to the ship. Where a ship has more than one additional class notation, the specific requirements linked to each additional class notation are applicable as long as they are not contradictory.

2.1.2 Tab 1 indicates which additional class notations are subject to specific requirements, and in which Section they are specified.

Table 1 : Additional class notations for which specific survey requirements are applicable

Additional class notation	Section applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
Military environment: **ARMOUR** **FFS**	Ch 5, Sec 2	See Remarks	As applicable in accordance with the related Articles in Ch 5, Sec 2
VeriSTAR system: **STAR-HULL** **STAR-MACH**	Ch 5, Sec 3	See Remarks	The scope and periodicity of surveys are stipulated by specific requirements given in Part E, Chapter 2
Availability of machinery: **AVM-APM**, **AVM-DPS**, **AVM-IPSx-(V)**	Ch 5, Sec 4	annual survey class renewal survey	
Automated machinery systems: **AUT-QAS**, **AUT-PORT**, **AUT-IAS**	Ch 5, Sec 5	annual survey class renewal survey	
Integrated ship systems: **SYS-NEQ**, **SYS-NEQ1**	Ch 5, Sec 6	annual survey class renewal survey	
Monitoring equipment: **MON-HULL**, **MON-SHAFT**	Ch 5, Sec 7	annual survey class renewal survey tailshaft survey	
Refrigerating installations: **REF-STORE**	Ch 5, Sec 8	annual survey class renewal survey	
Environmental Protection: **CLEANSHIP**, **CLEANSHIP SUPER** **AWT**, **BWE**, **BWT**, **GWT** **NDO-x days**, **NOX-x%** **OWS-x ppm**, **SOX-x%**	Ch 5, Sec 9	annual survey class renewal survey	

Additional class notation	Section applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
CBRN protection: **CBRN** **CBRN-AIR BLAST RESISTANCE**	Ch 5, Sec 10	annual surveys class renewal surveys	
Manoeuvrability: **MANOVR**	Ch 5, Sec 11	class renewal surveys	
Towing: **TOW**	Ch 5, Sec 12	annual surveys class renewal surveys	
Helideck: **HELICOPTER**	Ch 5, Sec 13	annual surveys class renewal surveys	
Compartment air testing: **AIRTEST**	Ch 5, Sec 14	annual surveys class renewal surveys	

Section 2 Military environment

1 General

1.1 Application

1.1.1 The requirements of this Section apply to self-propelled ships assigned one or more of the following additional class notations:

ARMOUR

FFS

1.1.2 These requirements apply in addition to the requirements given in Part A, Chapter 3 and Part A, Chapter 4 versus the type of surveys.

2 ARMOUR

2.1 Class renewal surveys

2.1.1 Surveys

The survey shall include:

- an examination of the armour components as described in the armouring table
- the confirmation that the armour components are still in place, without external deficiency that can be detected by visual examination.

3 FFS

3.1 Annual survey

3.1.1 The annual survey is to include the following items:

- examination, as far as practicable, of the FFS pumping systems and suctions
- general examination of FFS piping, valves, indicators and remote controls.

3.2 Class renewal survey

3.2.1 The requirements given in [3.1] for annual survey are to be complied with.

3.2.2 In addition, the class renewal survey is to include a functional test of the flooding fighting system. If impractical to conduct, an exemption may be granted for actual pumping if agreed upon by the Naval Authority.

Section 3 VeriSTAR System

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to the **VeriSTAR** system, as described in Ch 1, Sec 2, [6.3]:

STAR-HULL

STAR-MACH

2 STAR-HULL

2.1 Survey scope and periodicity

2.1.1 The scope and periodicity of surveys for the maintenance of the **STAR-HULL** notation are given in Pt E, Ch 2, Sec 1.

3 STAR-MACH

3.1 Survey scope and periodicity

3.1.1 The procedures for the maintenance of the **STAR-MACH** notation are given in Pt E, Ch 2, Sec 2.

Section 4 Availability of Machinery

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to availability of machinery, as described in Ch 1, Sec 2, [6.4]:

AVM-APM

AVM-DPS

AVM-IPSx-(V)

1.2 Annual survey

1.2.1 At each annual survey the Owner or his representative is to declare to the attending Surveyor that no modifications have been made to the systems affecting the notations without prior approval by the Society.

1.3 Class renewal survey

1.3.1 At each class renewal survey a test is to be conducted in order to ascertain that the systems affecting the notations operate satisfactorily. This test is usually to be carried out at sea.

Section 5 Automated Machinery Systems

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to automated machinery systems, as described in Ch 1, Sec 2, [6.5]:

AUT-QAS

AUT-PORT

AUT-IAS

1.2 Annual survey

1.2.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made without prior approval by the Society.

1.2.2 The annual survey is to include:

- an examination of the engineers' log-book to verify the proper operation of automation systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions or failures which have occurred during the same period
- a general examination of the control systems covered by the notation, including a random check of the proper operation and calibration of main measuring, monitoring, alarm, and automatic shut-off devices
- a check of the fire detectors
- a check of the bilge flooding alarms
- a running test which may be also performed by a spot check method.

1.3 Class renewal survey

1.3.1 The requirements given in [1.2] for annual survey are to be complied with. An additional program of examinations, checks and tests is to be devised in agreement with the Owner and based on the operational data and experience of previous surveys. This program is to include verification of the calibration of instruments and testing of control and safety functions of the machinery. The Owner is to produce evidence that all these checks and tests have been carried out and this will be verified by the Surveyor at random. In addition, the proper operation of the control system of propulsion machinery is to be checked at sea.

Section 6 Integrated Ship Systems

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to integrated ship systems, as described in Ch 1, Sec 2, [6.6.1]:

SYS-NEQ

SYS-NEQ-1

1.2 Annual survey

1.2.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made to the relevant installations without the prior approval by the Society.

An examination of the log-books is to be carried out to verify the proper operation of systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions or failures which have occurred during the same period

1.2.2 The annual survey is to include:

a) General:

- general examination of the bridge layout, with regard to the field of vision, window wipe and wash system, wheelhouse lighting and heating/cooling systems, and arrangements for the safety of navigators

b) Propulsion and steering controls:

- operational test of the steering gear to confirm the proper operation of the various remote controls from the wheelhouse
- operational test, as far as practicable, of the propulsion control, including propeller pitch control, where fitted
- check of the relevant indicators such as rudder angle, ahead/astern position, propeller rpm or pitch

c) Navigation aids:

- operational test of the satisfactory operating condition of radars
- operational test of the functions available at quay side of the ARPA and collision avoidance system
- operational test of the position fixing system
- operational test of the gyro compass system
- operational test of the echo sounding device, using appropriate scale of depth
- operational test of other available alarms (sounding equipment, self-checking device, etc.), as far as practicable

d) Communications:

- operational test of the whistle control device from the relevant workstation
- check of the different communication systems (internal communication, VHF radiotelephone installation, receiver capable of receiving MSI and search and rescue related information (e.g. NAVTEX))

e) Bridge safety and alarm system (notation **SYS-NEQ-1**)

- operational test, as far as practicable, of the vigilance system and related alarm/warning transfer system.

1.3 Class renewal survey

1.3.1 The requirements given in [1.2] for annual survey are to be complied with. An additional program of examinations, checks and operational tests is to be devised in agreement with the Owner and based on the operational data and experience of previous surveys. This program is to include verification of the calibration of instruments and testing of control and safety functions of the installation. An additional program of random tests of the systems is to be performed during sea trials.

The Owner is to confirm that any modification to the hardware and software is fully documented and properly recorded.

Section 7 Monitoring Equipment

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to hull and tailshaft monitoring equipment, as described in Ch 1, Sec 2, [6.7]:

MON-HULL

MON-SHAFT

2 MON-HULL

2.1 Annual and class renewal survey

2.1.1 The Owner or his representative is to declare to the attending Surveyor that the hull monitoring equipment has been recently calibrated using a reference loading case.

3 MON-SHAFT

3.1 Tailshaft survey

3.1.1 When the records of the tailshaft bearing temperature readings are checked and doubts arise, the Surveyor may require the verification of the accuracy of the gauging devices.

Section 8 Refrigerating Installations

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned the additional class notation **REF-STORE** related to refrigerating installations, as described in Ch 1, Sec 2, [6.9].

2 Annual survey

2.1 General

2.1.1 The annual survey of refrigerating installations (plants and spaces) is to be carried out with the installation in running condition and, whenever possible, during unloading operations or without supplies in refrigerated spaces.

2.1.2 The refrigeration installation log-book (or other similar record) is to be made available to the Surveyor for examination of the records since the last survey, and checking any unusual consumption of refrigerant, breakdown or defective items.

2.1.3 Decks, bulkheads or ship sides adjacent to refrigerated spaces are to be checked as far as practicable in order to verify the absence of cold spots.

2.1.4 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made to the installations that could affect the class notations without the prior approval by the Society.

2.2 Refrigerating plant

2.2.1 Refrigerating machines and related accessories, including compressors, condensers, pumps and piping are to be examined externally and in running condition. Insulation of insulated parts is to be checked for possible signs of humidity or wear. The tightness of the system is to be ascertained.

2.2.2 The electrical installation is to be generally examined, and the insulation resistance of the installation is to be checked as deemed necessary by the Surveyor.

2.2.3 If independent from the electrical installation of the ship, the generators supplying electrical power to the refrigerating installation are to be examined to the same extent as described in Ch 3, Sec 1, [3.3].

2.3 Refrigerated spaces

2.3.1 Refrigerated spaces are to be generally examined to ascertain the condition of:

- insulation lining; removable panels or covers may be dismantled for examination of insulation, as deemed necessary by the Surveyor
- hatch covers, doors, access panels (including gaskets and securing devices) and dampers of ventilation ducts
- air coils, coolers, fans, air ducts, coolant piping systems and associated equipment; cleanliness of grids
- bilge wells
- protection of fans and other rotating machinery, battens for air circulation within the space.

2.4 Instrumentation and safety devices

2.4.1 Thermometers used for measurement of temperature in refrigerated spaces, air ducts and other elements of the installation are to be examined and checked for their accuracy. The Surveyor may require the calibration of one or more thermometers and one or more automation devices to be checked in his presence or, failing this, a certificate of calibration is to be presented to him.

2.4.2 The following alarm and safety devices are also to be checked, as required or fitted:

- alarm and emergency shutdown devices
- CO_2 detectors, if any
- refrigerant leakage detectors
- access to spaces, with regard to possibilities of escape and prevention of personnel being trapped within spaces.

3 Class renewal survey

3.1 General

3.1.1 The installation is to be surveyed out of operation in order to enable examinations in opened condition of certain items.

3.1.2 After completion of these examinations, the installation is to be checked while cooling down from the ambient temperature to the lowest design temperature for the refrigerated spaces. The plant is to be examined for ability to maintain stable air temperatures and defrosting operation is to be checked.

3.2 Refrigerating plant

3.2.1 The equipment is to be dismantled to a sufficient extent to enable the following examinations:

- reciprocating compressors: examination of cylinders, valves, crankshaft, connecting rods, pistons, bearings and safety devices
- screw compressors, turbo compressors and pumps: parts subject to wear and tear; the equipment may not need to be opened up if log-book records and a running test show proper functioning.

3.2.2 Prime movers of pumps, compressors and fans are to be examined to the same extent as required in Ch 3, Sec 3, [4] for similar equipment for the class renewal survey of machinery.

3.2.3 Condensers and coolers are to be opened up for examination of tube plates, tubes and end covers.

Condensers are to be pressure tested to 1,2 times the rated working pressure.

3.2.4 Insulation of insulated parts (such as piping and pressure vessels) may need to be removed at random, to ascertain the condition of such parts and of the insulation itself.

3.2.5 The electrical installation of the plant is to be examined and insulation tests checked.

3.2.6 If independent from the electrical installation of the ship, the generators supplying electrical power to the refrigerating installation are to be examined to the same extent as described in Ch 3, Sec 3, [4.6].

3.2.7 Sea connections to condenser circulating pumps are to be opened up and piping examined.

3.2.8 Other equipment, such as oil separators on refrigerant systems, filters and dehydrators, are to be examined to the satisfaction of the Surveyor.

3.3 Refrigerated spaces

3.3.1 The lining and insulation in the refrigerated spaces may need to be partly removed for examination of its condition. The condition of the hull part under the insulation is then ascertained, as well as that of girders, meat rails, hooks and coil/cooler supports.

3.3.2 Air coolers and coils are to be examined and pressure tested at the rated working pressure and at 1,2 times such pressure in the case of hydraulic test after repairs.

3.3.3 Air cooler fans are to be examined and their prime movers are to be checked to the same extent as stated in [3.2.2].

3.3.4 The electrical installation in the refrigerated spaces is to be examined and insulation tests checked.

3.3.5 Defrosting and heating systems are to be examined to the satisfaction of the Surveyor.

3.4 Instrumentation and safety devices

3.4.1 Pressure relief valves and safety disks are to be checked. Discharge piping is to be examined with regard to integrity and non-obstructed flow.

Section 9 Environmental Protection

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to pollution prevention systems, as described in Ch 1, Sec 2, [6.10]:

CLEANSHIP

CLEANSHIP SUPER

AWT

BWE

BWT

GWT

NDO-x days

NOX-x%

OWS-x ppm

SOX-x%

2 Prevention of sea pollution

2.1 First annual survey

2.1.1 Confirmation of no discharge period

During the first annual survey, the Surveyor collects the results of tests and measurements undertaken by the Shipowner according to Pt E, Ch 7, Sec 3. These results are used to confirm or modify the no discharge numeral appended to the notations **NDO-x days**.

2.1.2 Audit

An on-board audit of the procedures, as required in Part E, Chapter 7, is done by the Surveyor in order to ascertain that the Master and crew are familiar with the ship's on-board procedures for preventing pollution and in order to check that the discharge records mentioned in Part E, Chapter 7 are properly completed.

2.2 Annual survey

2.2.1 General

The survey is to include, as far as practicable:

- confirmation of the installation being in accordance with the plans. If modifications have been made, checking that these modifications are in accordance with approved documentation (for all additional class notations related to pollution prevention systems)
- confirmation that the IOPP certificate is valid (for **CLEANSHIP**, **CLEANSHIP SUPER** and **OWS-x ppm**)
- general examination of the most important components of the sewage treatment plant, the garbage treatment plant, the oil filtering equipment, the incinerators if fitted, the comminuters and grinders, the hazardous wastes recovery unit if fitted (for **CLEANSHIP** and **CLEANSHIP SUPER**)
- general examination of the holding tanks, including examination of a possible corrosion protection of the inside surfaces of the tanks which are to be in good condition (for **CLEANSHIP** and **CLEANSHIP SUPER**)
- verification of the satisfactory condition of the standard discharge connections for oil and wastewater (for **CLEANSHIP**, **CLEANSHIP SUPER**, **AWT** and **NDO-x days**)
- external examination and operating tests of the equipment and systems as required in Pt E, Ch 7, Sec 2 and Pt E, Ch 7, Sec 3 (for all additional class notations related to pollution prevention systems).
- confirmation that the hazardous wastes are properly stowed as specified in the garbage management plan (for **CLEANSHIP**, **CLEANSHIP SUPER** and **NDO-x days**).

For some pollution prevention system of [1.1.1], the survey is also to include, as far as practicable:

- ascertainment of the correct concentration of the disinfectant in the effluent (for **CLEANSHIP**, **CLEANSHIP SUPER**, **AWT** and **GWT**)
- ascertainment of possible concentration of other chemicals in the effluent (for **CLEANSHIP**, **CLEANSHIP SUPER**, **AWT** and **GWT**).

2.2.2 Review of records

The following records for the preceding 12 months are to be reviewed as necessary:

- oil record book (for **CLEANSHIP**, **CLEANSHIP SUPER** and **OWS-x ppm**)
- garbage record book (for **CLEANSHIP**, **CLEANSHIP SUPER** and **OWS-x ppm**)
- records of ballast exchanges after international voyages (for **BWE** and **BWT**)
- ballast water record book (for **BWE** and **BWT**)
- sewage and grey water discharge book (for **CLEANSHIP**, **CLEANSHIP SUPER**, **GWT** and **AWT**)
- emissions record (for **CLEANSHIP SUPER**, **NOX-x%** and **SOX-x%**)
- results of the tests on effluents done by the Shipowner according to Pt E, Ch 7, Sec 2, [4.2.3] for any pollution prevention system of [1.1.1] (for **AWT**).

2.3 Class renewal survey

2.3.1 The requirements given in [2.2] for annual surveys are to be complied with. In addition, for all additional class notations related to pollution prevention systems, the following is to be carried out:

- demonstration, under working conditions, of the correct functions of the most important components of the sewage treatment plant or AWT plant if fitted, the garbage treatment plant, the oil filtering equipment, the incinerators if fitted, the comminuters and grinders, the hazardous waste recovery unit if fitted
- ascertainment of the correct function of the alarms.

3 Prevention of air pollution

3.1 Annual survey

3.1.1 Ozone depleting substances (CLEANSHIP, CLEANSHIP SUPER)

a) A procedure for annual verification of the system and equipment condition by an authorised organisation is to be settled. The interval of this verification may be extended in case of predictive maintenance scheme approved by the Society.

b) A procedure for weekly verification and maintenance is to be settled enabling to:
   - check the tightness of the circuits by satisfactory means (such as weighing or vessel pressure monitoring)
   - identify the location of possible leakage
   - carry out necessary corrective actions.

   Record books tracing all the operations carried out on board the ship according to the procedures mentioned in the NOx Technical Code are to be kept on-board and updated after each intervention. They are to include in particular the following records:
   - presence of leak and corrective action
   - volume of substance recovered and indication of the storage location
   - volume of substance recharged
   - volume of substance consumed
   - volume of substance disposed.

   The survey is to include the following items:
   - verification that the above procedures for annual and weekly checking of systems with ozone depleting substances are available on-board
   - confirmation that appropriate entries are being made in the record book for ozone depleting substances
   - test of the proper operation of the leak detectors and related audible and visual alarms.

c) Review of ozone - depleting substance record book.

3.1.2 NOx emission (CLEANSHIP SUPER, NOX-x%)

- The procedures for demonstrating compliance with NOx emission limits on board are given in the NOx Technical Code.
- During the annual survey, it is to be confirmed that the NOx emission control procedure is available on-board.
- NOx emission records.

3.1.3 SOx emission (CLEANSHIP, CLEANSHIP SUPER, SOX-x%)

Procedures are to be established to detail the maximum sulphur content in the fuel oil purchase orders, and to check the actual content of sulphur at the delivery of bunker.

In the case the actual sulphur content is checked by sampling testing and analysis, procedures are to be carried out in accordance with a recognised standard acceptable to the Society.

The fuel management procedures are to be established and followed as part of the certified ship management system of the ship.

Records on purchase orders and on type of checking carried out, including results, are to be kept on-board.

The survey is to include the following items:

- verification that the above procedures for defining, ordering and checking fuel oils for control of SOx emission are available on-board
- confirmation that fuel oil sulphur content records are available on-board
- emission record (when exhaust gas cleaning is provided (EGC)).

3.1.4 Shipboard incineration (CLEANSHIP, CLEANSHIP SUPER)

The annual survey is to include the following items, when fitted:

- external examination of the incinerators and confirmation that such equipment operates satisfactorily
- test of the alarms, exhaust monitoring devices and emergency stop located outside the compartment.

3.2 Class renewal survey

3.2.1 The requirements given in [3.1] for annual surveys are to be complied with. In addition, the following is to be carried out:

- confirmation of the operation and calibration of the emissions analysers if fitted (for **CLEANSHIP SUPER**, **NOX-x%** and **SOX-x%**)
- external examination and operating tests of the equipment and systems, as required in Pt E, Ch 7, Sec 2 and Pt E, Ch 7, Sec 3 (for all additional class notations related to pollution prevention systems).

Section 10 CBRN Protection

1 General

1.1 Application

1.1.1 The requirements of this Article apply to ships which have been assigned the **CBRN** or **CBRN-AIR BLAST RESISTANCE** additional class notation as described in Ch 1, Sec 2, [6.11].

1.2 Significant modifications

1.2.1 At each survey, the Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made to the installations that could affect the class notations without prior approval by the Society.

2 Annual survey

2.1 General

2.1.1 The CBRN operation manual is to be made available to the Surveyor and may be used as a basis for survey.

An examination of the log-books is to be carried out to verify the proper operation of the systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions and failures which have occurred during the same period.

2.1.2 The annual survey is to include:

- examination and testing, as feasible, of airlocks, cleansing station(s) and CBRN protection plant(s)
- examination of CBRN detection system, including checking of number and location of each detector
- verification that each opening in the citadel and shelter boundaries is provided with a closing appliance in working order and suitably marked
- verification of remote indication, alarm and control functions at the damage control station
- verification of ventilation non-return devices and dampers
- verification of water traps or equivalent devices against air entrance
- examination of CBRN ventilation system, including ducts, filters and dampers
- examination of pre-wetting and washdown system, including piping, valves and nozzles.

2.2 Air blast resistance

2.2.1 In addition, for ships assigned the additional class notation **CBRN-AIR BLAST RESISTANCE**, the annual survey is to include:

- examination of the air blast protective device
- checking that the remotely controlled means of closing ventilation openings are in working order.

3 Class renewal survey

3.1 General

3.1.1 The CBRN operation manual is to be made available to the Surveyor and may be used as a basis for survey.

An examination of the log-books is to be carried out to verify the proper operation of the systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions and failures which have occurred during the same period.

3.1.2 The class renewal survey is to include:

- Check of overpressure levels in the citadel with the collective protection ventilation system working. The required overpressure is to be held for at least 30 min. The test may be carried out with dummy filters in lieu of CBRN filters.

- Verification of gastightness of engine enclosure and associated supply and exhaust ducts, for engines with dedicated air supply.
- Verification of air conditioning capability under CBRN condition.
- Functioning test of the CBRN detection system. Each line is to be tested from the level of the detector, with means defined by the system supplier.
- Functioning test of the pre-wetting and washdown system, including verification that all external surfaces are properly covered, verification of water drainage and verification of section valve remote operation.
- Checking that the environmental conditions related to temperature remain inside the limits as defined in Pt C, Ch 1, Sec 1 with the propulsion machinery at maximum power setting during CBRN operations.
- Verification of gastightness of engine enclosure and associated supply and exhaust ducts, for engines with dedicated air supply.
- Verification of air conditioning capability under CBRN condition.
- Functioning test of the CBRN detection system. Each line is to be tested from the level of the detector, with means defined by the system supplier.
- Functioning test of the pre-wetting and washdown system, including verification that all external surfaces are properly covered, verification of water drainage and verification of section valve remote operation.
- Checking that the environmental conditions related to temperature remain inside the limits as defined in Pt C, Ch 1, Sec 1 with the propulsion machinery at maximum power setting during CBRN operations.

Section 11 Manoeuvrability

1 General

1.1 Application

1.1.1 The requirements of this Section apply to self-propelled ships assigned the additional class notation **MANOVR**.

1.1.2 These requirements apply in addition to the requirements given in Part A, Chapter 3 and Part A, Chapter 4 versus the type of surveys.

1.2 Annual survey

1.2.1 At each annual survey the Owner or his representative is to declare to the attending Surveyor that no repairs, alterations or modifications have been made, which may influence the vessel's manoeuvrability characteristics.

In the event of repairs, alterations or modifications, which, in the opinion of the Society, may influence the vessel's manoeuvrability characteristics, the continued compliance with the criteria as described in Pt E, Ch 9, Sec 1 is to be verified to the satisfaction of the Society.

1.3 Class renewal survey

1.3.1 The requirements given in Sub-article [1.2] for annual survey are to be complied with.

Section 12 Towing

1 General

1.1 Application

1.1.1 The requirements of this Section apply to self-propelled ships assigned the additional class notation **TOW**.

1.1.2 These requirements apply in addition to the requirements given in Part A, Chapter 3 and Part A, Chapter 4 versus the type of surveys.

1.2 Annual survey

1.2.1 The additional items and equipment to be surveyed together with the scope of the survey shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.2.2 The type and number of additional tests to be performed shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.2.3 The survey shall include:.

- an examination of the emergency towing installation
- the confirmation that the installation is instantaneously available including a pre-rigged aft towing arrangements and a forward chafing gear secured to the strong-point
- an examination of the pick-up gear, towing pennant and chafing gear over the full length for detection of possible deterioration. Where the pennant line is stored in a watertight condition and can be confirmed as being maintained, consideration may be given to waiving the requirement to examine the pennant line over the full length
- an examination of the strong-points, fairleads and pedestal roller together with their attachments to the hull structure.

1.3 Class renewal survey

1.3.1 The additional items and equipment to be surveyed together with the scope of the survey shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.3.2 The type and number of additional tests to be performed shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

Section 13 Helideck

1 General

1.1 Application

1.1.1 The requirements of this Section apply to self-propelled ships assigned the additional class notation **HELICOPTER**.

1.1.2 These requirements apply in addition to the requirements given in Part A, Chapter 3 and Part A, Chapter 4 versus the type of surveys.

1.2 Annual survey

1.2.1 The additional items and equipment to be surveyed together with the scope of the survey shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.2.2 The type and number of additional tests to be performed shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.3 Class renewal survey

1.3.1 The additional items and equipment to be surveyed together with the scope of the survey shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

1.3.2 The type and number of additional tests to be performed shall be defined, on a case by case basis, by an agreement between the Surveyor and the Owner representative.

Section 14 Compartment Air Testing

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned the additional class notation **AIRTEST** related to leak testing of watertight boundaries, as described in Ch 1, Sec 2, [6.15.5].

1.1.2 These requirements apply in addition to the requirements given in Part A, Chapter 3 and Part A, Chapter 4.

1.2 Annual survey

1.2.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications or repairs have been made to structure or other elements affecting the notation without prior approval by the Society.

1.2.2 If boundaries covered by the additional class notation have been subjected to modifications or repair work that may affect watertightness after previous leak tests, their tightness is to be verified by leak test according to Pt E, Ch 11, Sec 5, [5.1.2] and Pt E, Ch 11, Sec 5, [5.1.3].

1.2.3 New watertight boundaries resulting from design modifications may be added to the list of boundaries covered by the additional class notation if subjected to compartment air test in accordance with the requirements of Pt E, Ch 11, Sec 5, [5].

1.2.4 The compartment air test register is to be updated with the results and observations of any verifications conducted, as per Pt E, Ch 11, Sec 5.

1.2.5 The result of general examinations of the hull and review of the Cable Transit Seal Systems Register may be used by the attending Surveyor for determining further survey requirements.

1.3 Class renewal survey

1.3.1 The requirements given in [1.2] for annual survey are to be complied with.



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