

TÜRK LOYDU



RULES FOR THE CLASSIFICATION OF NAVAL SHIPS

Chapter 101 - Classification and Surveys

January 2022

This latest edition incorporates all rule changes. The latest revisions are shown with a vertical line. The section title is framed if the section is revised completely. Changes after the publication of the rule are written in red colour.

Unless otherwise specified, these Rules apply to ships for which the date of contract for construction as defined in TL- PR 29 is on or after 1st of January 2022. New rules or amendments entering into force after the date of contract for construction are to be applied if required by those rules. See Rule Change Notices on TL website for details.

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CLASSIFICATION

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A. Scope, Application

1. Scope, Prerequisites

1.1 The Rules for Classification and Surveys of Naval Ships cover the Classification of naval surface ships as defined in 2. and in Section 2, C.

"Classification" essentially means the

- Examination of design documents, construction plans and material specifications in comparison with the applicable Rules, Guidelines and Regulations according to B.
- Supervision of construction/fabrication of new buildings or conversions.
- Supervision of ships in service by regular surveys in order to ascertain that a condition is maintained, which complies with Class requirements. See also E. and Section 3.

1.2 Classification covers the ship's hull and machinery including electrical installations as well as special equipment and installations as far as agreed in the building specification between the Naval Authority and the Shipyard. Classification aims primarily at ensuring reliability of the hull structure and machinery systems on board resulting in an adequate level of safety of personnel and environmental protection. However, Classification is not intended to ensure the effectiveness of the intended missions.

1.3 Structures, machinery and equipment determining the type of ship are subject to examination within the scope of Classification, in accordance with the Character of Classification and affixed Notations.

Other systems and components may be included in the Classification and/or certification procedure upon request of the Naval Authority.

For alternative certification scheme see TL Rules, Classification and Surveys, Section 2,F.

1.4 Particular systems and components for military use (especially weapons and their sensors) are normally exempted from Classification, depending on the

indication of the Naval Authority and on legal or contractual restrictions. However, influences from such systems possibly affecting safety, e.g. static and dynamic loads, explosion or fire hazards, shall be taken into account in the design appraisal for Classification.

1.5 Design appraisal within the Classification procedure will normally include the review or recalculation of stability investigations. This requires the relevant information, on (e.g. combat-related) damages to be taken into account, to be submitted by the Naval Authority.

1.6 It is assumed that all parties involved in the planning and design, materials and components production and installation have the professional qualifications required and/or suitable facilities/equipment for fabrication. This will normally be established or confirmed by means of a certified quality assurance management system in accordance with ISO 9000, AQAP or equivalent.

2. Application

2.1 These Rules apply to seagoing surface ships and craft intended for naval activities.

2.2 Classification according to these Rules applies primarily to new buildings constructed under surveillance of TL. Classification may also be applied to existing ships by a survey for Admission to Class, if sufficient documentation is available, see E.2.

3. Confidentiality

3.1 TL maintains confidentiality with respect to all documents and other kinds of information received in connection with the orders entrusted to TL.

3.2 TL shall comply with the security procedures agreed upon with the Naval Authority.

3.3 TL will instruct its personnel engaged in a naval project to follow the security procedures, including the necessary safe handling and storage of confidential information and documentation as agreed upon with the Naval Authority.

B. Rules, Guidelines and Regulations

1. TL Rules

1.1 The **TL** - Naval Ship Rules, (see Table 1.1) will be applied for structural elements and for components of the machinery and electrical installation of naval ships, subject to agreement between the Naval Authority and the Shipyard for the Classification order to **TL**.

Table 1.1 Rules for Classification and Construction of Naval Ships

Naval Ship Rules	
Chapter	Title
102	Hull Structures and Ship Equipment
103	Special materials for Naval Ships
104	Propulsion Plants
105	Electrical Installations
106	Automation
107	Ship Operation Installations and Auxiliary Systems

Regarding weapons and sensors normally only their recoil forces must be considered when dimensioning the relevant foundations.

1.2 Additional **TL** Rules and Guidelines which may be used for naval ships, without pretension for completeness, are listed in Table 1.2.

1.3 Ships, not in compliance with 1.1 and 1.2 may be classed, provided that their structural elements or any installations are found to be equivalent for the respective Character of Classification including Notations regarding design, function and safety.

1.4 If the Class Notation **NSC** shall be assigned, detailed compliance with the different Chapters of the Naval Ship Code can be certified by **TL**.

2. Other Construction Rules and Maritime Regulations

2.1 The review and appraisal of design and

construction particulars by **TL** will be exclusively based on rules and guidelines, agreed upon in the specification of the Classification contract between the Naval Authority or the Shipyard and **TL**.

2.2 In addition, national construction rules for naval ships may be applied upon agreement with the relevant Authority and if defined in the specification of the Classification contract between the Naval Authority or the Shipyard and **TL**.

2.3 The application of national regulations of the respective Flag State to the naval ship under consideration shall be checked by the Naval Authority and the Shipyard and agreed upon in the particular case.

2.4 IMO Conventions, Resolutions, Codes, etc., may be applicable in certain cases and/or for certain aspects, e. g. pollution prevention. Details shall be clarified and laid down in the Classification specification in the particular case.

3. Industry Codes, Standards, etc.

Internationally recognized Standards and Codes published by military organizations, national industry organizations or standardization institutions may be used upon agreement in particular cases as a design and fabrication basis.

Examples: STANAG, MIL-STD, DEF, DIN, IEC, ISO.

C. Definitions

1. Classification

The term "Classification" is used as defined under A.1.1. Classification is documented by a valid Certificate to be carried on board of the ship.

TL reserves the right to enter special condition in the class certificate stating assumptions for the assignment of the class and restrictions regarding the use of the ship and service areas.

For validity see D.2.2.

2. Class Designation

The Class designation consists in:

- The **Character of Classification**, i.e. a sequence of abbreviations indicating the extent of compliance with the applicable Rules and the duration of the Class period.
- **Notations**, affixed to the Character of Classification, indicating particular features capability, service restrictions or special equipment and installations included in the Classification.

For details see Section 2.

Table 1.2 Relevant Chapters of TL Rules and Guidelines

Part	Chapter	Rule
A	2	Materials
A	3	Welding of Hull Structures
C	7	High Speed Craft
C	21	Bridge Design
C	22	Dynamic Positioning Systems
C	23	Redundant Propulsion and Steering Systems
C	25	Guidelines for Machinery Condition Monitoring

3. Period of Class

Period of Class **p** is the nominal interval [years] between two Class Renewal Surveys, see Section 2, B.2. and Section 3, B.1.4.

4. Naval Authority

Naval Authority is the State Authority respectively an authorized institution responsible for the definition, purchase and operation of the naval ship. In some cases the above mentioned responsibilities are split up between different Authorities or Institutions.

5. Naval Ship

A naval ship is a vessel designed and operated for naval and related activities commanded by a Navy or Coast Guard.

6. Auxiliary Naval Ship

Auxiliary naval ship is a vessel used for the support of

civil and naval operations. They may have a variety of roles including the movement of military and other personnel, ammunition, vehicles, stores and fuels and the transfer of such to other naval ships. They do not have a defined military role but may have a limited self-defence capability.

7. Shipyard

The Shipyard is the contractual partner of the Naval Authority, entrusted with managing the design, construction and equipment of the naval ship, generally together with a series of subcontractors and manufacturers.

8. Building Specification

The building specification is part of the building contract between the Naval Authority and the Shipyard and specifies the technical parameters and all other details for the construction of the naval ship.

9. TL

TL means Head Office of Türk Loydu in İstanbul/ Turkey.

10. Classification Specification

The Classification specification is part of the Classification contract between the Shipyard and **TL** during construction and between the Naval Authority and **TL** after delivery. It specifies the Rules, guidelines and regulations forming the technical basis of the Classification as well as scope and necessary details of the Classification and survey procedures and refers to the building specifications as far as necessary.

11. Client's Responsibility

11.1 It is the responsibility of the Ship Owner/operator, designer, builder and the installer to familiarize themselves and to abide by the appropriate sections of the Rules.

D. Validity of Class

1. Period of Class

1.1 The hull, the machinery as well as special equipment and installations classed have the same period of Class; see also Section 2, B.2. The class continues to be valid, provided that hull and machinery are subject to all surveys stipulated and any repairs

required are carried out to the satisfaction of **TL**.

1.2 For reassignment of Class after conversions see 3.4.

2. Prerequisites for Validity of Class

2.1 The Class assigned by **TL** is only valid under the provision that the operating conditions are complied with as stated in the Class Certificate. Class assignment is conditional upon the ship, including her machinery, being loaded and operated such as to comply with the design concept, and applicable rules and regulations.

This also applies to the distribution of loads and ballast, if necessary to the securing of supplies etc., as well as to the operation of the ship in heavy weather.

2.2 If the hull and/or machinery are not subjected to the prescribed surveys on their due dates, ship's Class will be suspended or withdrawn for both hull and machinery.

If some special equipment classed is not subjected to the prescribed surveys on their due dates or is no longer intended to be carried on board, the Notation for that equipment only will be suspended or withdrawn.

2.3 **TL** Head Office or one of the **TL** representations are to be immediately informed about any aver-age, damage or deficiency to the hull, machinery or equipment classed, where these may be of relevance to the ship's Class and safety. A survey will have to be arranged for a date not later than that of the ship's arrival at the next port.

If the survey reveals that the ship's Class has been affected, it will be maintained only on condition that the repairs or modifications demanded by **TL** are carried out within the period and under the operating conditions specified by the Surveyor. Until full settlement of these demands the Class will be restricted.

2.4 Any damage or excessive wastage beyond allowable limits to side shell frames, their end attachments and/or adjacent shell plating, the deck structure and deck plating, the bottom structure and bottom plating, the watertight or oiltight bulkheads and

the hatch covers or coamings that affect a ship's Class, is to be permanently repaired immediately after the survey.

For locations where adequate repair facilities are not available, consideration may be given to allow a ship to proceed directly to a repair yard. This may require temporary repairs for the intended voyage.

Damages or excessive wastage at the areas noted above and not immediately affecting the vessel's structural or watertight / weathertight integrity may be temporarily repaired for a period to be defined.

2.5 Adequate spare parts together with the necessary tools for maintenance and repair shall be readily available for use.

2.6 In exceptional cases, following inspection of hull and machinery, performance of the repairs required for maintenance of the original Class may be dispensed with, if the Naval Authority agrees to the Class and/or the range of service being restricted, or possibly a higher freeboard being assigned

2.7 Apart from the Class Certificate, any other documentation of significance for classification, such as:

- Reports on surveys previously performed,
- Approved drawings and other documentation handed out to the Naval Authority and containing particulars or instructions of significance in respect of the Classification requirements, e.g. use of special steel grades, list of spare parts,

is to be kept on board and made available to the Surveyor on request.

2.8 Weapons and other systems for military use may be exempted from Classification, see A. 1.4. However, any changes in such systems that may affect the safety of operations and hence validity of the ship's Class, including its classified installations, shall be notified to **TL** in due course. This applies particularly to cases, where system changes lead to structural conversions or important changes in the machinery and electrical installation.

2.9 **TL** provide a notification system to remind the Naval Authority of surveys becoming due, or of any other matters of interest or urgency in connection with the Classification of the ship. However, in principle it remains the responsibility of the Naval Authority to comply with the Class conditions and to observe the dates for the prescribed surveys.

3. Repairs, Conversions

3.1 Where parts are damaged or worn to such an extent that they no longer comply with the Class requirements, they are to be repaired or replaced.

3.2 Maintenance work, repairs and conversions of classed ships and special equipment have to be carried out under the supervision of **TL** to ensure maintenance or reassignment of Class.

3.3 The areas affected by repairs or conversion shall be treated in the same way as for new buildings, irrespective of whether the hull, the machinery including the electrical installation, automated systems or other classed equipment are concerned,

3.4 If following major conversions a new Character of Classification and/or new Notations are assigned so that the Class Certificate has to be reissued, commencement of a new period of Class may be agreed upon.

4. Class Expiry

4.1 Where hull and/or machinery are not longer complying with the requirements on which Class assignment had been based, or where the Naval Authority refuses to have repairs or modifications required by **TL** carried out within a period to be determined from case to case, ship's Class will be suspended or withdrawn. The same applies to the Class of special equipment.

4.2 If the Naval Authority is not interested in maintenance of, or re-admission to Class of the ship or any of its classed equipment, **TL** will have to be informed accordingly. The Class Certificates will have to be returned to **TL**.

4.3 If for some reason the Class has expired or has been withdrawn or suspended by **TL**, this will be indicated in the Register.

4.4 Where following suspension or withdrawal of ship's Class the repairs required by **TL** have been carried out and the ship has been subjected to a survey for readmission to Class, the original Class may be reassigned with a new period of Class. Such surveys are to be carried out in accordance with the requirements for a Class Renewal Survey.

5. Laid-Up Ships

5.1 The period of Class of hull and machinery will not be interrupted throughout the laying-up period. This means that periodical surveys will have to be carried out as before; surveys due, for which drydocking is required, may be postponed until recommissioning. Apart from this, the requirements of the preceding paragraphs are to be applied.

5.2 Upon expiry of the Class, a survey substituting the Class Renewal Survey will have to be performed. An entry on the Class Renewal will be made in the Class Certificate, with the Notation LAID-UP SHIP, and indicated in the Register.

5.3 At the time of recommissioning a thorough survey of the entire machinery will have to be performed in addition to the outstanding periodical surveys. Depending on the duration of the laying-up period, a sea trial and/or recommissioning trials of specific installations and/or components will have to be carried out.

6. Re-Admission to Class

6.1 Where, after suspension or withdrawal of Class, the repairs required by **TL** have been carried out and the ship has been subjected to a survey for Re-admission to Class, the original Class may be reassigned starting with a new period of Class. Such surveys are generally to be carried out in accordance with the requirements for a Class Renewal Survey, see Section 3.

6.2 Depending on the duration of the interruption period, parts of the machinery installation may have to be dismantled and sea trials or function tests have to be carried out in excess of the requirements mentioned above. For parts and installations replaced or added in the meantime, the scope of examinations and tests to be carried out for Admission to Class shall be as for newbuildings.

E. Classification Procedures

1. Classification of newbuildings

1.1 Order for Classification

1.1.1 The written order for Classification is to be submitted to **TL** by the Shipyard or by the Naval Authority,. It should be clearly agreed between the parties concerned, e.g. in the building contract, which party will be responsible for compliance with the **TL** Rules and Guidelines and other rules and regulations to be applied.

1.1.2 Where orders for the production of components are placed with subcontractors, **TL** will have to be advised accordingly indicating the scope of the subcontract. The Shipyard is responsible for observance of the rules, guidelines and regulations by subcontractors.

1.1.3 When particulars already approved by **TL** for previous ships built under **TL** supervision are incorporated in the design of the newbuilding, this should be specifically stated in the order for Classification. Amendments to the Construction Rules having been introduced meanwhile shall be taken into account.

1.2 Examination of design and construction particulars

1.2.1 Particulars/documents for examination such as construction plans, calculations, details on materials, etc. are to be submitted in triplicate in Turkish or English language to **TL** in due time prior to commencement of construction/manufacturing, see also Section 4, E.

The particulars submitted shall contain all details required to verify compliance with the Construction

Rules. **TL** reserve the right to request additional information and particulars to be submitted.

1.2.2 After examination by **TL**, the documents subject to approval will be returned in one copy (in case of triplicate submission) with a mark of approval..

1.2.3 Any deviations from the approved documents e.g. due to requirements of the Naval Authority or alterations suggested by the Shipyard and/or Manufacturer, require to be approved by **TL** prior to being realized.

1.3 Supervision of Construction and Trials

1.3.1 General

1.3.1.1 **TL** will assess the production facilities and Procedures of the Shipyard, subcontractors and other manufacturers, to determine whether they meet the requirements of the **TL** Rules and any additional requirements of the Naval Authority as agreed in the building specification. This assessment may be connected with Health and Safety assessment and a quality assurance certification.

1.3.1.2 Materials, components, appliances and installations subject to inspection are to comply with the relevant rule requirements and are to be presented for inspection by **TL** Surveyors, unless otherwise provided as a result of special arrangements agreed upon with **TL**.

1.3.1.3 It is the obligation of the Shipyard, subcontractors and other manufacturers to inform the **TL** inspection office in due time about particular surveys to be carried out.

1.3.1.4 In order to enable the Surveyor to fulfill his duties, he is to be given free access to the workshops and to the ship. For performance of the tests required, the Shipyard, subcontractors and other manufacturers are to give the Surveyor any assistance necessary by providing the staff and the equipment needed for such tests.

1.3.2 Supervision of construction

During the phase of construction of the ship or

installation, **TL** will satisfy themselves by surveys and inspections that:

- Parts for hull, machinery and electrical installations or special equipment subject to approval have been constructed in compliance with the approved drawing/documents;
- All tests and trials stipulated by the Rules for Classification and Construction are performed satisfactorily;
- Workmanship is in compliance with current engineering standards and/or **TL** Rule requirements;
- Welded parts are produced by qualified welders having undergone the required regular tests;
- For hull sections or components requiring approval **TL** Certificates have been presented. The Shipyard, subcontractors or other manufacturers will have to ensure that any parts and materials requiring approval will only be delivered and installed, if the appropriate certificates have been issued;
- Type-tested appliances and equipment are used, in accordance with the Rule requirements, where individual certificates are not required.

1.3.3 Tests at the manufacturer's works

As far as practicable, the machinery including electrical installations as well as special equipment and installations classed will be subjected to operational trials at the manufacturer's premises to the scope specified in the Construction Rules. This applies also to engines produced in series.

Where the machinery, electrical installation or special equipment and installations are of novel design or have not yet sufficiently proved their efficiency and reliability under actual service conditions on board, **TL** may require performance of trials under specified severe conditions.

1.3.4 Shipboard trials

Upon completion of the ship, all hull, machinery including electrical installations as well as special equipment and installations classed will be subjected to operational trials in the presence of the **TL** Surveyor prior to and during the sea trials. This will include, e.g.:

- Tightness, operational and load tests of tanks, anchoring equipment, hatches and hatch covers shell ports, ramps, etc.
- Operational and/or load tests of the machinery, installations and equipment of importance for safety of the crew and the operational safety of the ship.

During a final survey, checks will be made to ensure that any deficiencies found, for instance during the sea trials, have been eliminated.

1.4 Reports, certificates, documentation

1.4.1 Testing of materials, components, machinery, etc. at subcontractor's works will be certified by the Surveyor and/or the local **TL** representation.

1.4.2 Upon completion of the ship and the ship board trials, the Surveyors will prepare construction and survey reports, on the basis of which **TL** Head Office will issue the Class Certificate.

1.4.3 The Classification data of each ship will be included in the **TL** data file and treated as strictly confidential. An extract of these ship data will be entered in the Register Book published by **TL** if the Naval Authority agrees.

1.4.4 Where **TL** has been entrusted in addition and beyond the scope of the Rules mentioned under B. with supervision of construction in accordance with the building specification a Certificate of Conformity (CoC) will be issued and a corresponding Notation added to the Class designation, see Section 2, C.1.4.

2. Admission to Class of Existing Ships

2.1 Admission to Class

2.1.1 Naval ships not originally built under supervision of **TL** may be classed subsequently following the procedures described below, see also A.2.2.

The Naval Authority should contact **TL** for the necessary arrangements. The written order for Admission to Class of existing ships or special equipment including the required documents shall be formally addressed to **TL** Head Office in triplicate, using the form provided by **TL**.

2.1.2 The following documents updated to present status shall be submitted for examination where applicable. Information shall be provided about any additional regulations to be observed.

Hull and machinery:

- Particulars of the type and main dimensions of the ship, building year, building yard, major conversions, if any, freeboard, stability documentation and details of the anchor equipment;
- Particulars of the type, output and main data, building year and manufacturer of the main engine(s) and of the auxiliary machinery essential for operational safety, the electrical installations, the automatic/remote-control system, the safety arrangements, the steering gear and the windlasses;
- General arrangement, capacity plan, hydrostatic and cross curves, loading manual, where required, midship section, longitudinal and transverse sections, transverse bulkheads, decks, shell expansion, engine and boiler foundations, stem and stern frame, rudder and rudder stock, hatch covers;
- Machinery arrangement and layout, thrust, intermediate and screw shafts, propellers, main engines, propulsion gears and clutch systems, starting-air receivers, auxiliary boilers, gas turbines and related systems, cooling water and lubricating oil systems, bilge and ballast systems,

fuel oil and starting-air systems, air and sounding pipe systems, electrical arrangements and wiring diagrams;

- Steering gear arrangement and piping system and steering gear manufacturer make and model information;
- Torsional vibration calculations of the main shafting system including its branches for ships less than two years old;
- Drawings for flexible couplings and/or torque limiting shafting devices in the propulsion line or manufacturer, make, model and rating information for ships with ice class Notation B; Instrument and alarm list, fire alarm system, list of automatic safety functions, e.g. slowdowns, etc., function testing plan for ships with Notation AUT-N.

For ship type-related equipment and installations the documentation is to be determined from case to case, depending on the scope of Classification agreed and on possible conversions planned at the same time.

TL reserve the right to request additional information depending of ship's type and/or according to Naval Authority requirements.

2.2 Performance of admission to class

2.2.1 The drawings and other particulars of relevance to Classification are checked for compliance with the applicable **TL** Construction Rules and/or equivalent other rules.

2.2.2 For Admission to Class the extent of the Classification survey for the hull and machinery installation respectively the special equipment will be especially determined by **TL** depending on the ship's age and type. If the result of the survey is satisfactory, **TL** Class will be effective as of the date of performance of the concluded survey.

2.2.3 If the ship and/or her special equipment hold the valid Class of another recognized Classification Society and if sufficient proof has been furnished regarding the Class status, **TL** may dispense with the examination of drawings and computations.

In such cases, the period of Class will remain as assigned by the previous Classification Society.

2.2.4 A ship will not be admitted to Class if the relevant drawings and computations are not submitted.

2.2.5 If the ship complies with the requirements of **TL**, a Class Certificate will be issued in accordance with the Surveyor's report on the condition of the ship. Once a ship and/or her equipment have been classed with **TL**, the Rules in force as well as procedures applicable to ships and/or special equipment constructed under supervision by **TL** will apply.

2.2.6 If a sufficient proof of the losing Society regarding the ship's previous Class status is not as yet available the survey status information provided by the Naval Administration may be used. An "Interim Class Certificate" may be issued after completion of the surveys requested for Admission to Class with a statement that Conditions of Class (recommendations) which are overdue, if received after issuance of the Interim Class Certificate are to be dealt with at the next port of call.

F. Documents to be Carried on Board

To allow quick action in case of surveys, special operation and especially in case of damage, the following documentation must be kept on board and shall be made available to the **TL** Surveyor on request:

- Class Certificate all Survey Statements and reports;
- Stability Handbook and Loading Manual, if required;
- Description of corrosion protection system;
- "As built" drawings and other documentation containing particulars or instructions of significance as far as **TL** is concerned, e.g. use of special steel etc;
- List of important testing/monitoring procedures to be followed in connection with validity of Class.

SECTION 2**CLASS DESIGNATION**

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A. General, Definitions

1. General

The Class of a naval ship complying with the **TL** Rules is expressed by the "Character of Classification", assigned for hull and machinery including electrical installations see B.

Details about hull, machinery including electrical installations as well as special equipment and installations included in the Classification procedure are indicated by "Notations" affixed to the Character of Classification, see C.

2. Class Designation

The following example shows a Class designation for hull and machinery of a naval ship:

	Character of Classification	Notations
Hull	+ 1 N 5	FRIGATE RSD SFP
Machinery	+ M	CM NBC DEG

B. Characters of Classification

1. Survey, Construction Supervision

1.1 + heading the Class designation indicates that hull, machinery as well as special equipment and installations included in the Classification have been constructed:

- Under the supervision of and in accordance with the Rules of **TL** at the Shipyard and/or at subcontractors supplying construction components / hull sections, as applicable.
- With certification by **TL** of components and materials requiring inspection subject to the **TL** Rules.

1.2 [+] This sign will be part of the Character of Classification if the ship has been designed and constructed in accordance with the rules and under

supervision of another recognized Classification Society and is subsequently - or at a later date classed with **TL**, see Section 1, E.2.

In the event of admission to Class (change of Class) from a Society or institution which is not recognized, prior examination of drawings and existing certificates of the hull structure, the machinery and electrical installations is conditional.

2. Compliance with Rule Requirements, Class Period

2.1 Hull

If the ship's hull fully complies with the Rules of **TL** or another recognized Classification Society or other rules considered to be equivalent, the Character of Classification will be

1Np

The figure 1 indicates full compliance with the Construction Rule requirements.

N indicates a ship for naval service

p figure, indicating the duration of the nominal Class period [years]. Normally, **p** = 5

The nominal Class period may be increased to 6 years, if after examination of the internal inspection and maintenance scheme of the Naval Authority, **TL** is convinced that compliance with the Rule requirements can be assured for this extended period.

The nominal Class period can be reduced in exceptional cases and for a limited time, if the ship does not fully comply with the Rules but has been allowed to operate under restrictions, e.g. regarding the service range and/or weather conditions.

2.2 Machinery

M The machinery and all installations covered by Classification comply with the requirements of the Rules of **TL** or other rules considered being equivalent.

[M] The machinery does not fully comply with the requirements of the Rules of **TL**, but functional safety and sea worthness are ensured for the envisaged service.

3. Subdivision, Damage Stability

If requested by the Naval Authority the following designations may be affixed to the Character of Classification.

FS For the hull, proof of subdivision and damage stability has been furnished and verified by **TL**.

This symbol may be supplemented by a Notation indicating the degree of subdivision, kind of stability assessment and regulations applied, see C.3.5.

4. Use of Alternative/Additional Standards

(NS) is appended to the Character of Classification in agreement with **TL** and the Naval Authority when alternative or additional standards which represent significant changes to **TL** Rules or additional requirements to the **TL** Rule Requirements are applied. Alternative or additional standards are normally raised by the designer or builder.

Alternative or additional standards are to be documented or stated in advance of design appraisal and they are to be clearly defined and referenced in the Classification Certificates and any other required registers such as lifting appliances.

The following can be example uses of **(NS)**:

N (NS), M (NS), SFP (NS), LA (NS).

C. Notations

1. General Indications

1.1 There are different kinds of Notations, describing particular features, capabilities, service restrictions or special equipment and installations included in the Classification, as defined in the following.

1.2 The Notations to be affixed to the Character of Classification are optional and may be elected by the Naval Authority. The chosen scope of Notations has to be defined in the Classification specification as well as in the building specification.

1.3 It will be the Naval Authority's decision to have the Notations, together with the whole Class designation, included in the published Register of **TL** or not, see Section 1, E. 1.4.3.

1.4 Certificate of Conformity (CoC)

This notation will be assigned and the certificate issued if, in addition to the investigations and surveys usually associated with classification of the hull / machinery, **TL** has been entrusted with supervising construction, outfitting and trials of the ship regarding conformity with the building specification agreed in the contract between the Naval Authority and the Shipyard, see Section 1, E. 1.4.4.

This Notation can only be assigned if the requirements of the building specification are not contrary to or of a lower level than **TL** Rules in force.

Note

*If **TL** is only entrusted with supervising construction, outfitting and trials of the ship regarding conformity with the building specification agreed upon in the contract between the Naval Authority and the Shipyard, a Certificate of Conformity can be issued without **TL** Classification.*

2. Notations for Hull and Machinery

2.1 Restricted service area for seagoing naval ships

Naval ships complying with the Construction Rule requirements for a restricted service area only will have the Notations specified in Table 2.1 affixed to their Character of Classification.

2.2 Ice strengthening

2.2.1 Ships, which comply with the requirements of the Construction Rules relating to strengthening for navigation in ice, will have one of the "Ice Class"

Notations specified below affixed to the Character of Classification. Except for Class Notation ICE-B, which on request may be assigned to the hull or the machinery installation only, hull and machinery shall always be assigned the same ice class. If the hull is constructed such as to comply with a higher ice class, this will be indicated in the Technical File.

2.2.2 Notations ICE-B, ICE-B1, ICE-B2, ICE-B3, ICE-B4

Hull and machinery have been designed such as to comply with the requirements for navigation in ice, with index 4 representing the highest Notation. Notations ICE-B1 to B4 correspond to ice classes IC to IA Super of the Finnish- Swedish Ice Class Rules, as amended.

2.2.3 Notations PC7, PC6, PC5, PC4, PC3, PC2, PC1

Hull and machinery have been designed such as to comply with the requirements for navigation in ice, with index 1 representing the highest Notation. Notations PC7 to PC1 are based on the TL Rules, Chapter 33, Construction of Polar Class Ships.

2.2.4 ICEOPS

Class Notation ICEOPS is defined in Table 2.2.

2.3 Ambient conditions and environmental standards

2.3.1 Ambient conditions

Where more severe ambient conditions are expected by the Naval Administration, one of the two Notations defined in Table 2.3 may be affixed to the Character of Classification.

2.3.2 Environmental standards

EP (Environmental Passport Notation) additional class notation is assigned to the ships fulfilling the requirements of the TL Chapter 107 - Naval Ship Technology, Ship Operation Installations and Auxiliary

Systems. When all requirements of **EP** Notation cannot be complied with, following characters of notations can be assigned individually or in combination eg. **EP (A), EP (N, S)**.

A Anti-fouling coatings, (see TL Chapter 107 - Section 10 item B.6)

B Ballast water management, (see TL Chapter 107 - Section 10 item B.5)

G Grey water, (see TL Chapter 107, Section 10 item B.4)

N Oxides of nitrogen in exhaust emissions, (see TL Chapter 107, Section 10 item C.1)

R Refrigeration systems, (see TL Chapter 107, Section 10 item C.5)

S Oxides of sulphur in exhaust emissions, (see TL Chapter 107, Section 10 item C.2)

O Oily bilge water, (see TL Chapter 107, Section 10 item B.1 and 2)

EE Energy efficiency, (see TL Chapter 107, Section 10 item C.7)

SR Ship recycling, (see TL Chapter 107, Section 10 item D).

Class Notation BWM is defined in Table 2.3.

2.3.3 Stabilization in the Seaway SEAKEEP

If the naval surface ship is designed and equipped with the aim to reduce the movement (heel, trim and roll) in the seaway the Notation SEAKEEP may be affixed to the Character of Classification. The requirements to be met are specified in the TL Rules for Ship Operation Installations and Auxiliary Systems Section 2, C. to J.

2.4 Naval Ship Code

Class Notation NSC is defined in Table 2.4. The text of the NSC is not directly included in the TL Rules.

2.5 Laid-up ships LAID-UP SHIP

If a naval ship is not in operation for a certain time the period of Class will not be interrupted. Upon expiry of Class a survey will be performed and the entry LAID-UP SHIP will be made in the Class Certificate and also indicated in the Register. Refer to TL Guidelines for Laid-up Vessels, see also Classification and Surveys, Section 2, C.7.1)

2.6 CSR

Examples for such Notations are:

CSR Additional class notation is assigned to bulk carriers and double hull oil tankers compliant with the TL Common Structural Rules for Bulk Carriers and Oil Tankers

PATROL BOAT
OFFSHORE PATROL VESSEL
SUPPLY VESSEL
RESEARCH VESSEL
CADET TRAINING SHIP
AMPHIBIOUS WARFARE SHIP (LPD, LHD)
LPD Landing Platform Dock
LHD Landing Helicopter Dock
LCVP Landing Craft, Vehicle and Personnel
ACİL MÜDAHALE VE DALIŞ EĞİTİM BOTU
MOSHIP Submarine Rescue Mother Ship
RATSHIP Rescue and Towing Ship
LCT Landing Craft Tank
LCM Landing Craft Mechanized
LST Landing Ship Tank
PRODUCT TANKER
TUG
ESCORT TUG (p,V)

3. Notations for hull and equipment**3.1 Ship type Notations**

3.1.1 Generally, the type Notation will be assigned according to the indications or suggestions of the Naval Authority.

A relevant descriptive Notation indicating the ship type will be added to the Class designation, such as defined as examples in Table 2.5.

3.1.2 Where the intended duties of the ship include support functions which may be described by Notations also used for commercial and/or state operated non-military craft, such Notations may be assigned instead of or in addition to the notations referred to under 3.1, see **TL** Rules – Classification and Surveys, Section 2,D.

Note

This is applicable also in the case that the ship is armed, e.g. for defence purposes; regarding inclusion of weapons/military systems in the Classification procedure, see Section 1, A.1.3 and A. 1.4.

Table 2.1 Notations for restricted service area

Notation	Service area restriction
Y (Restricted International Service)	This range of service is limited, in general, to operate along the coast, provided that the distance to the nearest port of refuge and the offshore distance do not exceed 200 nautical miles. This applies also to operation in the North Sea and within enclosed seas, such as the Mediterranean Sea, the Black Sea, the Caspian Sea and waters with similar seaway conditions
K50/K20 (Coastal Service)	This range of service is limited, in general, to operate along the coasts, provided that the distance to the nearest port of refuge and the offshore distance do not exceed 50/20 nautical miles. This applies also to operation within enclosed seas, such as the Baltic Sea, Marmara Sea and gulfs with similar seaway conditions
K6 (Sheltered Waters)	This range of service is limited to operate along the coasts, provided that the distance to the nearest port of refuge and the offshore distance do not exceed 6 nautical miles. This area of service is restricted to operate in shoals, bays, haffs and firths or similar waters, where heavy seas do not occur.
<p>The Notations may possibly be assigned on the basis of the seaway conditions prevailing in the respective service area (e. g. official seaway statistics).</p> <p>Observance of the range of service boundaries is a prerequisite for validity of the Class.</p> <p>TL may, on request, agree to the range of service being extended for a limited period and/or with certain reservations. This will have to be documented.</p>	

Table 2.2 Class notation ICEOPS

Notation	Characteristics	Underlying rules
ICEOPS	Ship and machinery equipment is designed for operation in very low temperatures and for minimization of accretion of ice and other relevant problems.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 19

Table 2.3 Class notations for severe ambient conditions and environmental standards

Notation	Characteristics	Underlying rules
AC1 (Ambient Conditions 1)	The parameter for ship inclination, for ship movement and the limit conditions are increased against the standard requirements.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 1, A.4. Tables 1.1 and 1.2, TL Rules, Chapter 107 Ship Operation Installations and Auxiliary Systems, Section 1.
ACS (Ambient Conditions Special)	The special requirements for unusual types and/or tasks of naval ships are agreed upon case by case.	TL Rules, Chapter 102, Hull Structures and Ship Equipment Section 1, A.4. TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 1.
BWM (Ballast Water Management)	Ballast water discharges from ships are prominently responsible for transferring organisms between geographically separated water bodies. BMW serves the purpose of speeding up and simplifying the process of producing a ballast water management plan to optimize the safe operation of the naval ship.	

Table 2.4 Class notation NSC

Notation	Characteristics	Underlying rules
NSC	The overall aim of the Naval Ship Code (NSC) as NATO standard ANEP 77 is to provide a frame-work for a naval surface ship safety management system. If the requirements of certain Chapters of the NSC are fulfilled, TL may issue the Class Notation for the relevant Chapter(s).	NSC Chapter I NSC Chapter II NSC Chapter III NSC Chapter IV NSC Chapter VI NSC Chapter VII

Table 2.5 Ship type notations

Notation	Characteristics	Underlying rules
AIRCRAFT CARRIER	Large naval ship with a displacement greater than 10.000 tons which is capable of operate with a flight deck, hangar, etc. a greater number of different types of naval aircraft at the same time.	TL Naval Ship Rules Especially; Aircraft carriers
CRUISER	Large naval ship with a displacement greater than 5.000 tons which is capable to develop control commanding tasks and mainly sea and air in a mission theatre at the same time.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 23
AMPHIBIOUS WARFARE SHIP	Large naval ship with a displacement above 5.000 tons which is capable to operate mainly helicopter and landing craft at the same time, the latter often via stern dock.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems Section 22
DESTROYER	Larger naval ship with a displacement above 4.000 tons which is capable to develop at least two control tasks at the same time.	
FRIGATE	Medium sized naval ship with a displacement above 1.500 tons which is capable to develop sea or air or submarine control alternatively	
CORVETTE	Small naval ship with a displacement less than 1.500 tons which is capable to undertake limited missions.	
MINE WARFARE VESSEL	This type includes mine countermeasure vessels, mine hunters and mine laying ships	
PATROL	This type of naval ship is a patrol ship/vessel/boat/unit with a length $L \geq 24$ m. If the length L would reach about 80 m special agreement with TL will become necessary for some design aspects. The tasks are similar to patrol boats, but may include a wider range of the possible activities.	
PATROL BOAT	Small naval, coast guard or police vessel, smaller in size than a corvette, commonly engaged in military patrol and reconnaissance missions, border protection roles, including anti-smuggling, anti-terrorist, anti-piracy, fishery patrols and law enforcement. It is also often used rescue operations and can be diversified in smaller Inshore Patrol Vessels and larger Offshore Patrol Vessels. It is assumed that the length L of a patrol boat/vessel/unit is < 24 m.	

3.1.3 A Notation may be added if the ship corresponds to a special type regarding the hull configuration and/or kind of propulsion, e.g.:

HYDROFOIL
CATAMARAN
WATER JET
AIR CUSHION

3.1.4 High speed craft

HSC-N

Special ship types such as catamarans, SWATH, hydrofoil craft, surface effect ships and air cushion vehicles are designed in accordance with the **TL** Rules, Chapter 7, High Speed Craft.

HSDE

Notation for craft which have been constructed by using elements of **TL** Rules, Chapter 7, High Speed Craft and which are not subject to the IMO HSC Code. Details regarding rule application are specified in the Class Certificate.

3.2 Special considerations for hull structures

3.2.1 The Notations defined in Table 2.6 may be applied to the hull of naval surface ships.

3.2.2 Rational ship design

Complex hull structures subjected to a variety of static and dynamic loads often require an increased scope of strength investigations, particularly if a weight optimization is necessary. For such cases, **TL** offers special analysis procedures, which may be indicated in the Class designation by a special Notation, see also, Chapter 102 - Hull Structures and Ship Equipment, Section 4.

Rational Ship Design Notation for ships which are subject to special analysis procedures. The analysis procedures required for the ship's hull comprise inter alia the following:

- First principle design procedures by means of e. g. finite element analysis techniques
- Additional fatigue strength calculations
- Calculation of usage factors and assessment of highly stressed structures
- Determination of explicit corrosion margins of structural members

The analysis results will be stored in a data base.

For details see Table 2.6.

3.3 Bridge design

Where ships are to be operated by one person only, or a very limited number of personnel, the workplaces on the bridge shall be arranged according to ergonomic principles.

Ships which designed in compliance with the rules for and Chapter 21 - Navigation Bridge Visibility, Bridge Arrangement and Equipment Rules are to be given notation:

NAV Designed in compliance with Chapter 21 and equipped with Chapter 21, Section 4, B.1.

NAV-INS Integrated Navigation Systems, Designed in compliance with Chapter 21 and equipped with Chapter 21, Section 4, B.2, and C.

3.4 Novel design

EXP

Ships and equipment have been constructed in accordance with a design, for which sufficient experience is not available. **TL** will decide at what intervals the required periodical surveys will have to be carried out. Where experience over a prolonged period of time has proved the efficiency of the design, the Notation EXP may be cancelled.

3.5 Subdivision, damage stability

3.5.1 The proof of damage stability is specified by a Notation consisting of a 5-digit marking. The first two digits represent the ship type, i.e.

Z1 Naval Surface Ship

The letter following in the third place indicates that the deterministic (D) damage stability assessment method has been applied.

The fourth and the fifth digits, i.e. one digit each, specify the procedure applied, i.e. the subdivision status assumed in the damage stability calculation, see Table 2.7.

3.5.2 Procedures as developed by IMO such as SOLAS 74/78, LLC 66/68, and MARPOL 73/78, as amended, for commercial ships may be adopted, as far as practicable, if no other adequate regulations are available.

3.5.3 Damage assumptions shall normally be specified by the Naval Authority in the building specification.

3.6 Auxiliary ship - navy hull

AUX-NH The hull of the ship is partly built according to the **TL** Rules, Chapter 102 - Hull Structures and Ship Equipment as agreed upon with the Naval Authority case by case.

3.7 Loading Instrument

LI Loading Instrument - This notation will be assigned where an approved loading instrument has been installed either as a Class or Owner's requirement. As a supplement to the approved documentation for intact and damage stability and longitudinal strength (both for

intact and damage condition) and torsional moments and lateral loads, where applicable; a loading instrument, approved by **TL**, is to be provided to facilitate calculations for the intact and damage stability and longitudinal strength (both for intact and damage condition) and torsional moments and lateral loads, where applicable.

General Provisions are settled in A Chapter 1, Hull, Section 6 H. Loading Guidance Information and Section 26 F. Onboard Stability Instruments

4. Machinery Notations

4.1 Automation

4.1.1 Machinery installations which comply with the Rules of **TL** for automated and/or remote-controlled systems, will have the Notations specified in Table 2.8 affixed to the Character of Classification (not applicable if Class Notations for high-speed craft have been assigned).

4.1.2 For ships equipped with arrangements such that the control and supervision of the ship operational functions are computer based, **ICC** Notation is assigned. For this purpose Chapter 105 - Naval Ship Technology - Electrical Installations - Section 10, ISO IEC 60182 FMEA and applicable provisions of Chapter 106 - Naval Ship Technology - Automation - Annex shall be complied with.

4.2 Redundant propulsion and steering systems

Naval ships with propulsion and steering systems which meet the redundancy requirements of **TL** obtain one of the Notations specified in Table 2.9 affixed to the Character of Classification.

Table 2.6 Special notation for hull structures

Notation	Characteristics	Underlying rules
HIGHER STRENGTH HULL STRUCTURAL STEEL ALUMINIUM FRP	The use of normal strength hull structural steel will not be specially indicated. If other materials are employed for the hull, this has to be indicated in the Class Certificate. Material selection, design, dimensioning and manufacturing of hull structures made of FRP are to be agreed upon case by case with TL Head Office	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 3.
RSD (F25) (Rational Ship Design)	Fatigue assessment based on $6.25 \cdot 10^7$ load cycles of North Atlantic Spectrum carried out by TL .	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 4.
RSD (F30) (Rational Ship Design)	Fatigue assessment based on $7.5 \cdot 10^7$ load cycles of North Atlantic Spectrum carried out by TL .	
RSD (ACM) (Rational Ship Design)	Additional corrosion margin according to detailed listings in the technical file. Analysis carried out by TL .	
RSM (Residual Strength)	The construction of the hull fulfils the requirements for residual strength following a defined extent of structural damage due to military effects.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 21.
ERS (Emergency Response Service)	The geometry and structural data of the ship are made available in a data base to provide the assistance necessary for limiting damages and/or taking the adequate measures in case of average, with the aid of special computer programs.	TL Rules, Chapter 102, Hull Structures and Ship Equipment
SFP (Structural Fire Protection)	Additional requirements concerning fire-resisting divisions, combustible materials, ventilation, etc. are to be applied.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 20.
IWS (In Water Surveys)	The ship's hull is specially equipped for in-water surveys, i.e. surveys of the underwater part carried out in floating condition instead of dry docking. Fixed markings and inscriptions are not required, but means for the diver to determine his respective position shall be in place.	For technical requirements, see TL Rules, Chapter 1, Hull, Section 25

Table 2.7 Subdivision status

...D33	3-Compartment-Status, throughout the entire ship's length
...D22	2-Comp.-Status, throughout the entire ship's length
...D21	2-Comp.-Status, partial 1-Comp.-Status for specified compartments, e.g. engine room
...D20	2-Comp.-Status, without damage to specified compartments, e.g. engine room
...D11	1-Comp.-Status, throughout the entire ship's length
...D10	1-Comp.-Status, without damage to specified compartments, e.g. engine room

4.3 Dynamic positioning systems

Notations specified in Table 2.10 for ships designed to maintain a desired position within the normal excursions of the control system under defined environmental conditions. The Class Notation required for a particular operation, and the desired system reliability should be agreed between the Naval Authority and TL on an analysis of a consequence of a loss of position.

4.4 Condition monitoring of propeller shaft at stern tube

CM-PS

Where the propeller shaft runs within the stern tube in oil, the possibility exists, to prolong the intervals between shaft withdrawals, if the requirement according to the TL Rules, Chapter 4, Machinery, Section 5, C.6.6 are fulfilled.

4.5 Fuel cell systems

FC-xxx

Notation for ships and boats with fuel cell systems the nominal power of which is equal or exceeds 10 % of the total nominal power of the machinery installation (excluding the emergency supply power) and complying with the TL Guidelines, Chapter 26, Use of Fuel Cell Systems on Board Ships.

"xxx" means the percentage of the fuel cell system related to the nominal power of the machinery installation.

with FC

Notation for fuel cell systems the nominal power of which is below 10 % of the nominal power of the machinery installation.

Li-BATTERY

For ships, Lithium batteries used for propulsion and/or electric power supply purpose during ship operation.

4.6 Carriage of dangerous goods

DG

Notation for naval ships equipped for the carriage of dangerous goods in packaged form according with the TL Rules for Ship Operation Installations and Auxiliary Systems, Section 9, N.

4.7 Fire Fighting

Following notations are assigned to ships which are complying with Part C, Chapter 11, Fire Fighting Ships..

FF0 For ships when the characteristics of the fire-fighting system are not those required for the assignment of the additional service features FF1, FF2 or FF3, and when the system is specially considered by TL.

FF1 For ships provided with equipment for fighting fires in the initial stage and performing rescue operations in the immediate vicinity of the installation on fire.

FF2 For ships provided with equipment for sustained fighting of large fires and for cooling parts of the installation on fire.

FF3 For ships provided with equipment corresponding to FF2, but with greater fire-extinguishing capacity and more comprehensive fire-extinguishing equipment.

FF1/2 For ships provided with equipment corresponding to FF2 and additionally suited for rescue operations as per FF1.

FF1/3 For ships provided with equipment corresponding to FF3 and additionally suited for rescue operations as per FF1.

4.8 Novel designs

EXP

The machinery installations or essential parts have been constructed in accordance with a design, for which sufficient experience is not available. **TL** will decide at what intervals the required periodical surveys will have to be carried out. Where experience over a prolonged period of time has proved the efficiency of the design, the Notation EXP may be cancelled.

4.9 Towing Arrangements

TA1 (TA2, TA3) Towing Arrangements - This notation will be assigned when an appraisal has been made of the towing arrangements and strength performance of the supporting structures in accordance with Chapter 102, Hull Structures and Ship Equipment, Section 18, G.2.3.6 ÷ G.2.3.14.10. This notation recognises the least severe weather conditions, see Chapter 102, Hull Structures and Ship Equipment Section 18, Table 18.3.

4.10 Protective Coating

PCWBT Protective Coating in Water Ballast Tanks- This notation will be assigned to indicate that the ship's seawater ballast tanks are provided with a corrosion protection system using by coatings according to **TL** Chapter 1, Hull, Section 22, A.7.1.

4.11 Notations for Electrical Installations

ELS Quality of Electrical Power Supplies – This notation will be assigned to indicate that the mains quality of the electrical power supply are complied with the requirements of NATO Standardization Agreement (STANAG) 1008 as referenced in **TL** Rules, Chapter 105, Electric, Section 1, F.2.1. It also shows that the installation has been arranged, installed and tested in accordance with **TL** Rules.

4.12 Auxiliary ship - navy machinery

AUX-NM The machinery installations of the ship are partly built according to the **TL** Rules Chapter 104 – Propulsion Plants, Chapter 105 – Electrical Installations as agreed upon with the Naval Authority case by case.

5. Notations for special military requirements

5.1 Dynamic loads

The Notations for abilities of the naval ship to limit the effects created by dynamic loads are specified in Table 2.11.

5.2 Flight operations

The Notations for the different abilities to execute flight operations are specified in Table 2.12.

5.3 Special Notations for military requirements

Additional Notations for military requirements are specified in Table 2.13.

6. Submarine

SUBMARINE

Additional notation for submarines complying with related Türk Loydu rules.

7. Overview of possible Notations for naval surface ships

Table 2.14 gives an overview for the various Notations which may be assigned to naval surface ships. Additional information is given in the respective Chapters.

Table 2.8 Notation for machinery with automated or remote controlled systems

Notation	Characteristics	Underlying rules
AUT-N	The machinery installation is fitted with equipment for unattended machinery spaces, so that it does not require to be operated and/or maintained for periods of at least 24 hours.	TL Rules, Chapter 106, Automation, Section 2, A.
AUT-Nnh	The period during which attendance to and maintenance of equipment is not required, is less than 24 hours, with nh indicating that the machinery space may remain unattended for n hours.	TL Rules, Chapter 106, Automation, Section 2, B.
AUT-N-C	Automation-Centralized Control Station- This notation may be assigned when the automated equipment can be controlled and monitored from a central control station	TL Rules, Chapter 106, Automation Section 2, B.2.
RC	Small naval vessels with a length $L \leq 48$ m are provided with a system for remote control of the main propulsion plant from the navigation bridge.	TL Rules, Chapter 106, Automation, Section 2, C.

Table 2.9 Notations for redundant propulsion and steering systems

Notation	Characteristics	Underlying rules
RP1x%	The ship has at least two propulsion machines, which are independent or can be disconnected from each other. This also applies to the auxiliary systems which are needed to operate the propulsion machines. No redundancy of propeller, shaft line, gearbox and steering system is required.	TL Rules, Chapter 23, Redundant Propulsion and Steering Systems
RP2x%	This ship has at least two propulsion systems and two steering systems, each of which is independent or can be disconnected from each other. This also applies to each of the auxiliary systems which are needed to operate the propulsion and/or steering systems.	
RP3x%	This ship has at least two propulsion systems and two steering systems, each of which is independent or can be disconnected from each other and is installed in separate compartments. This also applies to each of the auxiliary systems which are needed to operate the propulsion and/or steering systems.	
The additional index x% denotes what percentage of the main propulsion power of the ship is provided by redundant ship's propulsion system.		

Table 2.10 Notation for dynamic positioning systems

Notation	Characteristics	Underlying rules
DK 1	Loss of position may occur, meets IMO Class 1 (non-redundant)	TL Rules, Chapter 104, Propulsion Plants, Section 7, I. TL Rules; Chapter 22, Dynamic Positioning Systems
DK 2	No loss of position in the event of a single fault in an active component, meets IMO Class 2 (redundant)	
DK 3	No loss of position in the event of a single fault in an active or static components, meets IMO Class 3 (redundant installation in separate components)	
<p><i>Note</i> For DK 2 and DK 3 a redundancy concept document (FMEA of basic design) with worst case failure design intent is to be submitted in due time.</p>		

Table 2.11 Notation to limit the effect of dynamic loads

Notation	Characteristics	Underlying rules
SHOCK	Designed to withstand shock loads from weapon effects above or below the water surface of a size to be specified by the Naval Authority.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 16, D.
NOISE	Designed to operate with a defined noise level to be specified by the Naval Authority.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 16, B.
VIBR	Designed to operate create only a limited influence or vibrations on the fatigue of the hull structures, the mast mounted electronic equipment, etc. and the habitability of the crew.	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 16, C.

Table 2.12 Notation for flight operations

Notation	Characteristics	Underlying rules
FO (Flight Operations)	The naval ship is arranged for starts and landing of a greater number of different types of aircraft, for which complete service, like refuelling and maintenance, etc. can be performed in a protected hangar	TL Rules, Chapter 102, Hull Structures and Ship Equipment, Section 23 and Ship Operation Installations and Auxiliary Systems, Section 13
FO (HELIW)	Equipped for helicopter winching operations, landing is not possible.	
FO (HELIL)	Equipped with helicopter landing deck.	
FO (HELILF)	Equipped with helicopter landing deck and refuelling capabilities.	
FO (DRONE)	Equipped with drone (UAV) handling capabilities	

Table 2.13 Notations for special military requirements

Notation	Characteristics	Underlying rules
LA	The ship is equipped with lifting appliances, other than those needed in connection with the equipment described under RAS, such as cranes or lifts which have been included in the Classification procedure. The class notation LA will, in general, be assigned for a classed ship as a mandatory class notation where the lifting appliance is considered to be an essential feature.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 3, A.
LA (CRANE)	The ship is equipped with classified lifting appliances like cranes, gantry cranes, A-frames, etc. which are able to work up to a certain sea state to be defined by the Naval Authority.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 3,A.
LA (CL)	Cargo Lift – This notation is assigned in compliance with Chapter 107 - Naval Ship Technology, Ship Operation Installations and Auxiliary Systems- Section 3 E.2.2 to ships having lifts to be used for transporting military supplies	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 3, E.2.2
LA (CR)	Cargo Ramp - This notation is assigned in compliance with Chapter 107- Naval Ship Technology, Ship Operation Installations and Auxiliary Systems- Section 3 G to ships having movable ship borne vehicle ramps moved and/or used for loading/unloading in calm water	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 3, G.
LA (PL)	Passenger Lift - This notation is assigned in compliance with Chapter 107- Naval Ship Technology, Ship Operation Installations and Auxiliary Systems- Section 3 E.2.1 to ships having passenger lifts that are designated to transport crew members or embarked troops.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems, Section 3, E.2.1.
RAS (Replenishment at Sea)	Equipped with installations for the transfer of liquids, such as fuel, oil, water, stores and persons while operating at sea. This Notation may be assigned to the supplying ship as well as to the receiving ship.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems Section 4.
NBC (Nuclear, Biological and Chemical Warfare)	Designed and equipped to meet the requirements for protection within a citadel against the fall-out of nuclear, as well as biological and chemical weapons.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems Section 11.
DEG (Degaussing)	Equipped with an active system for degaussing (magnetic self-protection) by means of amplified cable windings in the ship which reduce the magnetic signature.	TL Rules, Chapter 105, Electrical Installations, Section 12,F.
DI (Diving Installations)	Equipped with diving installations for production, bottling and storage of breathing gases	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems Section 18.
ARM PLT (Armour)	Equipped with special (light weight) armour to protect sensible elements.	
EMC (Electromagnetic Compatibility)	Special measures are provided for the laying of cables to optimize electromagnetic compatibility	TL Rules, Chapter 105, Electrical Installations, Section 12.
SAM (Storage of Ammunition)	Equipped with special measures to store safely ammunition, missiles, torpedos, etc. with minimized risk for the naval ship.	TL Rules, Chapter 107, Ship Operation Installations and Auxiliary Systems Section 3,F and Section 9,O.

Table 2.14 Summary of notations for naval surface ships

Chapter 101 Classification and Surveys	Chapter 102 Hull Structures and Ship Equipment	Chapter 104 Propulsion Plants	Chapter 105/106 Electrical Installations / Automation	Chapter 107 Ship Operation, Installations and Auxiliary Systems
<p>Ship type: CORVETTE FRIGATE DESTROYER CRUISER MINE WARFARE VESSEL AMPHIBIOUS WARFARE SHIP AIRCRAFT CARRIER PATROL PATROL BOAT OFFSHORE PATROL VESSEL SUPPLY VESSEL RESEARCH VESSEL CADET TRAINING SHIP ACİL MÜDAHALE VE DALIŞ EĞİTİM BOTU MOSHIP Submarine Rescue Mother Ship RATSHIP Rescue and Towing Ship LCT Landing Craft Tank LCM Landing Craft Mechanized LST Landing Ship Tank LPD Landing Platform Dock LHD Landing Helicopter Dock LCVP Landing Craft, Vehicle and Personnel PRODUCT TANKER TUG ESCORT TUG (p,V) SUBMARINE Special types, e.g.: HYDROFOIL CATAMARAN WATER JET AIR CUSHION</p> <p>High speed craft: HSC-N HSDE</p> <p>Certificate of Conformity: CoC</p> <p>Naval Ship Code: NSC</p> <p>Laid-up ships: LAID-UP SHIP</p> <p>Auxiliary ship-Navy: AUX-NH AUX-NM</p> <p>TL Common Structural Rules: CSR</p>	<p>Ambient conditions: AC1 ACS</p> <p>Material: (HIGHER STRENGTH HULL STRUCTURAL STEEL) ALUMINIUM FRP</p> <p>Residual strength after military effects: RSM</p> <p>Rational ship design: RSD (F25) RSD (F30) RSD (ACM)</p> <p>In-water survey: IWS</p> <p>Structural fire protection: SFP</p> <p>Navigation in ice: ICE-B, ICE-B1, ICE-B2, ICE-B3, ICE-B4, PC7, PC6, PC5, PC4, PC3, PC2, PC1</p> <p>Bridge design: NAV NAV-INS</p> <p>Novel design: EXP</p> <p>Emergency response service: ERS</p> <p>Service range: Y K50/K20 K6</p> <p>Dynamic loads: SHOCK NOISE VIBR</p> <p>Towing arrangement: TA1 (TA2, TA3)</p> <p>Corrosion Protection: PCWBT</p> <p>Loading Instrument: LI</p>	<p>Redundant propulsion: RP1 x % RP2 x % RP3 x %</p> <p>Dynamic positioning: DK1 DK2 DK3</p> <p>Fuel Cell Systems: FC-xxx with FC</p> <p>Novel design: EXP</p>	<p>Automation: AUT-N AUT-Nnh AUT-N-C</p> <p>Remote control: RC</p> <p>Degaussing: DEG</p> <p>Electromagnetic Compatibility: EMC</p> <p>Dangerous goods: DG</p> <p>Quality of Electrical Power Supplies: ELS</p> <p>Integrated Computer Control: ICC</p>	<p>Flight operation: FO FO (HELIW) FO (HELIL) FO (HELILF) FO (DRONE)</p> <p>Lifting appliances: LA LA (CRANE) LA (CL) LA (CR) LA (PL)</p> <p>Replenishment at sea: RAS</p> <p>NBC protection: NBC</p> <p>Diving systems: DI</p> <p>Environmental Passport: EP</p> <p>Operation in ice: ICEOPS</p> <p>Ballast water management: BMW</p> <p>Stabilization in seaway: SEAKEEP</p> <p>Condition monitoring stern tube: CM-PS</p> <p>Ammunition storage: SAM</p> <p>Fire Fighting : FF0 FF1 FF2 FF3 FF1/2 FF1/3</p>

SECTION 3**SURVEYS**

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A. General Indications

1. Surveys for Maintenance of Class

1.1 For maintenance of Class, the regular periodical and non-periodical surveys of hull and machinery, including electrical installations as well as special equipment and installations agreed to be in the scope of Classification have to be performed as detailed in the following, see also Section 1, D.2.2.

For other surveys performed by TL see 4.

1.2 Surveys required for maintenance of Class, e.g. in the case of repairs of, or modifications to any parts subject to Classification, are to be agreed with TL Head Office or the local TL representations in due time, so that the measures envisaged may be assessed and supervised as required.

1.3 The Surveyors are to be given access at any time to the ship and/or to the workshops, so that they may perform their duties. See also Section 1, E.1.3.3. In this connection all areas to be surveyed have to be cleared, cleaned and are to be made gas-free, as deemed necessary by the Surveyor.

The Class Certificate and other documents related to Classification and carried on board are to be made available to the Surveyor on request.

1.4 Surveys conducted during a voyage may be agreed and credited to periodical surveys due. The prerequisites, procedure and specific conditions to be met, e.g. weather, will be fixed case by case. The decision as to feasibility of the survey may only be taken in agreement with the Surveyor.

1.5 TL will inform the Naval Authority about the status of Class, indicating the last recognized surveys and the next due dates. However, even if not provided with such information, the Naval Authority is obliged to have the surveys stipulated by the present Rules performed.

1.6 Upon request TL may agree to testing, monitoring and analysis procedures as a supplement to or equivalent substitute for conventional survey and inspection such as by uncovering/opening up of components,, see B.1.5.6.

1.7 TL reserves the right for given reasons, e. g. in the light of special experience gained during operation, to extend the scope of survey and/or inspection or to carry that out with two Surveyors, if needed.

1.8 TL reserves the right to demand surveys to be held between the due dates of regular surveys, if this is necessary, see B.2.

1.9 If a ship has to be surveyed in a port beyond the reach of a TL Surveyor (also in the events of force majeure or of armed conflicts); TL Head Office will have to be notified. Upon checking of the facts, the further procedure will then be decided on.

In extraordinary cases and with TL Head Office agreement, it is possible to call for an external expert, whose report is, however, subject to examination by TL, who will decide on whether or not the ship will have to be re-surveyed.

2. Selection of Surveyors

On principle, the acting Surveyors will be chosen by TL. However, the Naval Authority is free to have any findings of surveys and decisions resulting there from, which deem to be doubtful, checked by other TL Surveyors upon special request to Head Office.

3. Documentation of Surveys, Confirmation of Class

3.1 The records of each survey, as well as any requirements upon which maintenance of Class has been made conditional, will be entered into the respective Survey Statement.

By his signature in the Certificate and other documents the Surveyor only certifies what he himself has seen and checked during the particular survey.

3.2 The reports prepared by the Surveyor will be sent to TL Head Office. If there are no objections, the results will be documented in the TL Register, see Section 1, E.1.4.3, and the confirmation of Class effected by the Surveyor in the Certificate will acquire final validity.

3.3 In the Register the dates of the surveys will be indicated, such as Class Renewal, intermediate and annual Class surveys, boiler surveys, surveys in connection with continuous Class Renewal, bottom and propeller shaft surveys. Records on periodical repeat tests on steam boilers will be also entered in special Test Certificates, which are to be kept on board.

3.4 A confirmation of class effected by the Surveyor relates to the kind of survey referred to in the report and is valid under the reservation that examination will not give cause for any objections, see 3.2.

3.5 On request, the Class may be confirmed in writing by a separate Certificate. However such Certificates are valid only if issued by TL Head Office or if in exceptional cases, TL Head Office has expressly authorized the field service representatives to do so.

3.6 Where defects are repaired provisionally only, or where the Surveyor does not consider immediate repair or replacement necessary, the ship's Class may be confirmed for a limited period by making an entry in the Survey Statement of the Certificate of Classification. Cancellation of such limitations will also have to be indicated in the Survey Statement.

4. Surveys Required by the Naval Authority

4.1 Where surveys are requested by the Naval Authority on account of international conventions and/or of corresponding laws and regulations of a Flag State, TL will carry them out by order or within the framework of the contract between TL and the Naval Authority based on the respective provisions. This includes surveys according to SOLAS 74, LLC66/88 or MARPOL 73/78.

Where possible, such surveys will be carried out simultaneously with the Class surveys.

4.2 TL will also undertake on request other surveys and checks stipulated by additional regulations and requirements of the flag state. Such surveys are subject to agreements made in each individual case and/or to the regulations of the country concerned.

4.3 If for some reason a ship's Class has expired or has been withdrawn by TL, all certificates according 4.1 issued by TL will automatically become void. If subsequently the Class is renewed or reassigned, the validity of these certificates may be revived within the scope of their original period of validity, provided that all surveys meanwhile having fallen due have been carried out.

5. External Service Suppliers

Personnel or firms engaged in services affecting Classification and statutory work are subject to approval by TL. For further details see TL- R Z17.

6. Calibration of Measuring Equipment

The inspection, measuring and test equipment used in workshops, shipyards and on board ships, which may form the basis for Surveyor's decisions affecting Classification or statutory work, shall be appropriate for the services to be performed. The firms shall individually identify and calibrate each unit of such equipment to a recognized national or international standard **(1)**.

B. Surveys for Maintenance of Class, Definitions, Due Dates

1. Periodical Surveys

1.1 General

1.1.1 The periodical surveys listed in the following are to be conducted for the hull, machinery including electrical installations as well as special equipment and installations included in the Classification of the ship.

If for some obvious reason, e.g. a temporary out of service condition of certain equipment, parts included in the Classification cannot be surveyed, this will be noted in the Survey Statement.

For scope and details of the surveys, see C.

(1) For requirements see TL- R Z19.

1.1.2 Where Flag State regulations are applicable which impose inspection intervals deviating from the Class related intervals, the intervals will be harmonized in the individual case to reduce the number of single surveys, where possible.

1.2 Annual surveys

1.2.1 Annual surveys are to be conducted at nominal intervals of 12 months, as from the date of commencement of the Class period **p** indicated in the Class Certificate.

1.2.2 The survey has to be carried out within a time interval of 3 months before to 3 months after the day at which one year of the current Class period expires.

1.3 Intermediate surveys

Extended annual surveys are referred to as intermediate surveys, see C.2.

The intermediate survey falls due at half the nominal time interval between two Class Renewal Surveys (i.e. $p/2$). If **p** is an uneven number of years, the survey may be carried out on the occasion of the preceding or following annual survey. If **p** is an even number of years, the intermediate survey replaces the annual survey.

1.4 Class Renewal Surveys

1.4.1 Class Renewal Surveys -also called special surveys - are to be carried out for the ship's hull, machinery, including electrical plant and, for any special equipment classed at the intervals **p** indicated by the Character of Classification.

In exceptional cases extension of the Class period by 3 month at the most may be granted by **TL** upon request.

A Class Renewal Survey may be carried out in several parts. The survey may be commenced at the last annual survey during the Class period and must have been completed by the end of the Class period. Considering 1.2.2, the total survey period of the Class Renewal Survey must not exceed 15 months.

Regarding dry docking, see 1.10.

1.4.3 The periodical surveys and inspections of propulsion systems and machinery as per 1.6 and 1.7 form an integral part of the surveys required for Class Renewal, unless otherwise specified in the following.

1.4.4 Class Renewals for the hull are numbered in the sequence I, II, III, etc. Class Renewal IV and subsequent ones correspond to Class Renewal III. Regarding their scope see C.3.2. A survey planning meeting is to be held prior to the upcoming survey, see also D.1.2.

1.4.5 The new period of Class will commence:

- With the following day, after which the previous Class expires, provided that the Class Renewal Survey has been completed within the 3 months preceding that date. This applies also to a granted extension of the Class period by 3 months at the most;
- With the date on which the Class Renewal Survey has been completed, if this is the case more than 3 months before expiry of the previous Class.

1.5 Continuous Class Renewal Surveys

1.5.1 On request of the Naval Authority, the surveys required for Class renewal may be split, according to a schedule to be agreed, such as to extend over the entire period of Class so that about 20 % of all surveys required for Class renewal will be completed every year.

This means that all areas subject to survey as defined by **TL** Head Office are to be surveyed at least once per Class period, unless closer intervals are prescribed by the Naval Authority, see Section 1, B.3. The time interval between two subsequent surveys of each individual area or part shall not exceed **p** years.

For ships more than 10 years of age, the ballast tanks are to be internally examined twice in each five-year class period, i.e. once within the scope of the intermediate survey and once within the scope of the Continuous Class Renewal Survey (hull).

The survey in dry-dock for Continuous Class Renewal (hull) may be held at any time within the p year Class period provided all the requirements of 1.8 are also complied with.

1.5.2 Regarding the duration of the period of Class and due dates of surveys, the requirements as per 1.4.1 and 1.4.4 remain mandatory.

1.5.3 Continuous Class Renewal may be separately requested for hull, machinery as well as special equipment and installations.

1.5.4 Surveys held within the Continuous Class Renewal procedure may be combined with annual and intermediate surveys in a reasonable manner. However, the requirements for annual and intermediate surveys remain mandatory.

1.5.5 At the end of the Class period, for the purpose of Class renewal, a final survey will be performed, during which the Surveyors will satisfy themselves as to whether all areas required to be surveyed have been surveyed throughout and with satisfactory results. If there are special reasons, a Surveyor may inspect individual parts again.

1.5.6 Surveys Based on Planned Maintenance System

1.5.6.1 On request of the Naval Authority, an optimized Continuous Class Renewal system may be agreed upon as outlined in the following for ships the machinery of which is maintained with the aid of an approved, computer-assisted maintenance system. The Naval Authority will introduce a Planned Maintenance System comprising at least the survey scopes / systems as covered by the normal Continuous Class Renewal system.

1.5.6.2 For approval by TL, the following documentation shall be submitted:

- Detailed description of the maintenance system, indicating the flow of information,
- List of components/systems to be covered by the maintenance and Class renewal system (inventory content),

- Indication of intervals for each of the maintenance measures in general,

- List of maintenance intervals (time between overhaul - TBO) and of the expected lifetime (LT) of the main and auxiliary machinery components essential for operation, taking into account manufacturers' recommendations and specific operational requirements,
- list of instructions (Maintenance Procedures) underlying the maintenance concept,
- Description of maintenance documentation (reports containing important operational information, component condition, offset sheets, measures carried out),
- Documentation on the maintenance strategy applied prior to filing of the application.

1.5.6.3 Within the scope of a shipboard survey the TL Surveyor will confirm that:

- The current maintenance system complies with the approved documentation,
- The current maintenance system takes into account, without reservations, the specific service conditions,
- The maintenance documentation permits conclusions to be drawn as to the construction condition and operability of the machinery,
- The personnel in charge of operation of the machinery is properly qualified and hold the necessary qualification certificates.

1.5.7 Surveys Based on Condition Monitoring System

Machinery or technical installations, which are subject to a Condition Monitoring System, may be surveyed in line with the requirements and prerequisites described in the TL Rules, Chapter 25 - Guidelines for Machinery Condition Monitoring. Prerequisite for this special Survey Arrangement CM is the existence of a computerized Planned Maintenance System (PMS).

The elements of the PMS considering the machinery components or part of them covered by Condition Monitoring shall be approved by TL according to 1.5.6.

The Condition Monitoring System is not limited to the equipment used to determine the machinery's condition, but includes also the applied procedures and schedules for data collection and analysis.

If the Condition Monitoring information are giving evidence to the Surveyor that the machinery, or part of it, is in an acceptable running condition, he may grant a waiver from dismantling of the machinery, or part of it, for direct inspection. Any item of the installation or machinery not covered by the Survey Arrangement CM shall be surveyed and credited in the conventional way.

1.5.8 Class extension

See 1.4.1.

1.6 Periodical surveys of propeller shafts and tube shafts, propellers and other systems

For maintenance of the Class, periodical surveys and tests of propeller shafts and tube shafts, propellers and other systems of naval ships are to be carried out.

The scope of surveys and tests unless specifically restricted is defined in C.4.

1.6.1 Propeller shafts and tube shafts

The following surveys are applicable:

- Normal survey
- Modified survey
- Partial survey

1.6.1.1 Normal survey

Propeller shafts and tube shafts are to be sufficiently drawn to permit entire examination at the following intervals unless alternative means are provided to assure the condition of the shaft.

1.6.1.1.1 Where the propeller shafts and tube shafts are

fitted with continuous liners or approved oil sealing glands, or are made of corrosion resistant materials, the interval of survey is to be:

- 3 years for single shafting arrangement,
- 4 years for multi-shafting arrangement.

The interval of drawing may be raised to:

- p years for single shafting arrangement,
- p years for multi-shafting arrangement.

at the most, in any of the following three cases:

- where
 - The propeller is fitted to a keyed shaft taper,
 - The design details of which are approved,
 - The shaft is protected from seawater,
 - A non-destructive examination is made at each survey by an approved crack-detection method 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, or
- 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,
 - A non-destructive examination of the fillet radius of the propeller shaft flange may be required If the visual examination of the area is not satisfactory, or

- where
 - The propeller is fitted keyless to the shaft taper,
 - The shaft is protected from seawater,
 - The design details are approved,
 - A non-destructive examination is made at each survey by an approved crack detection method of the forward part of the aft shaft taper.

In all other cases the nominal interval of survey is to be $p/2$ years with an admissible time window of ± 6 months.

1.6.1.1.2 Propeller shafts and tube shafts are to be sufficiently drawn to permit entire examination. For further details see C.4.1.1.1.

For oil lubricated arrangement, the shaft need not be drawn at the occasion of the normal survey, provided that all exposed areas of the after shaft area as described in 1.6.1.1.1 are examined by an approved crack-detection method where,

- The clearances and wear down of the bearings,
- The records of lubricating oil analysis, oil consumption and bearing temperature,
- The visible shaft areas.

are examined and found satisfactory. The crack detection test of the aft flange fillet area may be dispensed with for the solid flange couplings fitted at the end of the shaft, see also 1.6.1.1.1.

Lubricating oil and bearing temperature controls are to be performed as specified in 1.6.1.2.2. For further details see C.4.1.1.2. Where any doubt exists regarding the findings of the above, the shaft is to be sufficiently drawn to permit an entire examination.

1.6.1.2 Modified survey

1.6.1.2.1 For single and multi-shafting arrangements a

modified survey may be accepted instead of the normal survey at alternate p yearly survey intervals, at the most, subject to:

- The shaft is fitted with oil lubricated bearings and oil sealing glands,
- The shaft and its fittings are not exposed to corrosion,
- New oil seals may be fitted without removal of the propeller (except in the case of keyed propeller),
- The design details are approved.

and provided that the clearances of the aft bearing are found in order and the lube oil and the oil sealing arrangements have proved effective in any of the following three cases:

- Where the propeller is keyed on the shaft taper and suitable crack-prevention measures are taken, or
- Where the propeller is fitted to a solid flange coupling at the end of the shaft, or
- Where the propeller is fitted keyless to the shaft taper.

The maximum interval between two successive normal surveys is not to exceed $2p$ years.

1.6.1.2.2 The shaft is to be sufficiently drawn to permit examination of the aft bearing contact area of the shaft. For further details see C.4.1.2.1.

Drawing of the shaft to expose the aft bearing contact area of the shaft may not be required where a lubricating oil analysis is carried out regularly at intervals not exceeding 6 months, and the oil consumption and bearing temperature are recorded and considered to be within permissible limits. The documentation on lubricating oil analysis is to be available on board and be checked. Each analysis should include the minimum parameters:

- Water content,

- Chloride content,
- Content of bearing metal particles,
- Oil aging (resistance to oxidation).

Oil samples should be taken under service conditions. For further details see C.4.1.2.2. The class notation CM-PS assumes the fulfillment of these requirements. Where any doubt exists regarding the findings of the above, the shaft is to be sufficiently drawn to permit an examination according to C.4.1.2.1.

1.6.1.3 Partial survey

1.6.1.3.1 Upon request by the Naval Authority for shafts where the modified survey is applicable and

- A prolonged service fatigue life of seals is expected due to the appropriate combination of materials and controlled pressures in way of seals

consideration may be given to a prolongation of the p-yearly interval between normal surveys, provided a partial survey is performed.

In no case must the interval between normal surveys exceed 1.5 times the due interval.

1.6.1.3.2 The partial survey consists of checking the oil sealing glands and the clearance of the bearings. For keyed propellers, the propeller is to be dismantled to expose the forward part of the taper, and a non destructive examination by an approved crack detection method is to be performed. For further details see C.4.1.3.

1.6.2 Propellers

During normal or modified surveys of the propeller shafts and tube shafts, the propellers as well as the remote and local control gear of controllable pitch propellers are to be surveyed at the Surveyor's discretion, depending on the findings.

1.6.3 Other systems

Other systems for main propulsion purposes, such as rudder and steering propellers, azimuthing propulsor

systems, pump jet units, etc., are subject to the same survey intervals as propeller shafts and tube shafts.

1.7 Periodical surveys and tests of individual machinery items

1.7.1 The periodical surveys of individual machinery items or installations listed below are to be carried out in addition to those prescribed in 1.4 and C.1.3 for maintenance of class.

1.7.2 Auxiliary steam boiler plants

1.7.2.1 Steam boilers are to be subjected to the following examinations and tests at regular intervals. The term 'steam boilers' includes exhaust gas boilers and warm water and hot water generators (except where they are heated by steam or liquids).

1.7.2.2 External inspection

Boilers are to be subjected at annual intervals to an external inspection in accordance with the TL inspection programme.

For the external inspection a time window of ± 3 months is applicable.

1.7.2.3 Internal inspection

Steam boilers are to be subjected to internal inspections at least twice in every Class period. On no account the maximum interval between two internal inspections shall exceed 3 years.

1.7.2.4 An extension of the internal inspection of the boiler up to 3 months can be granted under exceptional circumstances. The extension may be granted by TL after the following is satisfactorily carried out:

- External inspection of the boiler
- Functional test of the boiler safety valves
- Functional test of the boiler protective devices
- Review of the following records since the last internal inspection:

- operational documentation
- maintenance documentation
- repairs carried out
- records of water analysis

1.7.3 Steam pipes

1.7.3.1 Steam pipes are to be examined regularly every **p** years, possibly in connection with a class renewal survey. Starting from Class Renewal II the steam pipes are to be examined as to their internal and, where advisable, as to their external condition as well, employing non-destructive testing methods, where necessary, see C.5.3.

1.7.3.2 Steam pipes with service temperatures exceeding 500 °C are to be examined for expansion at **p** year intervals, starting from class Renewal II, at the latest.

1.7.4 Pressure vessels

1.7.4.1 Pressure vessels which are subject to survey by **TL** according to the Construction Rules, are to be examined internally and externally every **p** years, possibly in connection with a Class Renewal Survey.

1.7.4.2 Pressure vessels having a product of pressure [bar] by cubic capacity [l] of $p \cdot l \leq 200$ are to be surveyed on the occasion of checking of the pertinent piping system.

1.7.4.3 Periodical tests of CO₂ cylinders and other gas cylinders for fire-extinguishing purposes are to be carried out at intervals not exceeding **2p** years, as follows:

At least 10 % of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. If one or more gas cylinders fail, a total of 50 % of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. If further gas cylinders fail at the extended test, all gas cylinders are to be subjected to foregoing tests. In

any case, all gas cylinders having failed shall be replaced by new ones.

Halon containers of existing fixed Halon fire extinguishing systems are exempted from this requirement.

Irrespective thereof, on the occasion of recharging CO₂ cylinders, Halon containers and other gas cylinders are to be tested, if the last test dates back 10 years or more.

1.7.4.4 Low pressure CO₂ bulk storage containers are subject to internal survey if the content has been released and the container is more than 5 years old but not more frequently than once within five years.

1.7.4.5 In the case of vessels for powder extinguishing agents, periodical pressure tests may be dispensed with, provided that their internal inspection does not reveal any deficiencies.

1.7.4.6 Receivers in hydraulic or pneumatic control systems are to be examined during maintenance and repairs at the system; air receivers with a product of pressure by cubic capacity $p \cdot l \geq 1000$ (p in bar) are to be subjected to an internal inspection at least once during each class period and/or at intervals not exceeding 5 years.

1.7.4.7 The intervals between surveys as referred to may be reduced, depending on the findings.

1.7.5 Automation equipment

1.7.5.1 For confirmation of the Class Notation, machinery having been assigned the Notations AUT-N or AUT-Nnh is to be inspected in accordance with **TL** programmes during Annual, Intermediate or Class Renewal Surveys, respectively.

1.8 Bottom surveys

1.8.1 Naval ships are generally to be subjected to a bottom survey twice during the Class period **p**.

As a matter of principle, Class renewal includes the second bottom survey. The first required bottom survey shall be planned as follows:

For **p** = 5, the bottom survey may be carried out in connection with the second or third regular annual survey within the Class period, but not later than 36 months after the last bottom survey.

For **p** = 6, the bottom survey should be carried out on the occasion of the intermediate survey, but not later than 39 months after the last bottom survey.

In exceptional circumstances **(2)**, an extension of examination of the ship's bottom of 3 months beyond the due date can be granted.

1.8.2 Bottom surveys will generally have to be carried out in dry dock. For in-water surveys see 1.9. Bottom surveys serve the purpose of periodical checking the underwater hull, the openings and closures in the shell relating to machinery systems and externally arranged components of the steering and propulsion systems. For details, see C.4 and C.6.

1.8.3 If a bottom survey is intended to be credited to a Class renewal, all checking of hull and machinery prescribed for the respective Class renewal and usually requiring dry docking will have to be carried out.

A bottom survey for Class renewal may be carried out up to 15 months before completion of the Class Renewal Survey, see 1.4.

1.8.4 It is also expected that for each bottom survey performed in addition to the bottom surveys stipulated by the Classification requirements a **TL** Surveyor will be called to attend.

1.8.5 Bottom surveys at an "Extended dry-dock interval" can be credited as IW survey during Intermediate and Class Renewal Surveys in terms of the 1,5p years interval, see 1.10.

1.9 In-water surveys

1.9.1 For ships assigned the Class Notation **IWS**, an in-water survey performed with the assistance of

approved divers may be recognized as a substitute for every second periodical bottom survey in a dry dock, see C.4.

1.9.2 On request and in exceptional cases only, in-water surveys with the assistance of approved divers may also be carried out as a substitute for every second bottom survey in a dry dock for ships not carrying the Class Notation **IWS**. In any such case **TL** Head Office is to be informed. The relevant permission will be endorsed in the annex to the Class Certificate.

1.9.3 Special consideration will be given to ships aged 15 years and over, prior to permission being granted to carry out an in-water survey in lieu of a bottom survey in dry dock.

1.10 Extended dry-dock interval

The "Extended dry-dock interval" applies also to naval ships.

1.10.1 The "Extended dry-dock interval" for 1,5p years is limited from the delivery of the ship to the age of 15 years.

1.10.2 At the 7,5 years interval it is possible to perform the first two forthcoming bottom surveys as underwater survey in the scope of an in-water survey. The third bottom survey at 1,5p years has to be performed in dry-dock. The interval is independent whether the bottom survey will be performed at an Intermediate or Class Renewal Survey.

1.10.3 The Naval Authority has the possibility to join the "Extended dry-dock interval" from delivery of the ship or between the years to an age of 10 years. The interval of bottom survey will be adapted according to the date of entry. The necessary bottom surveys with in-water survey and dry-docking will be performed in accordance with interval created by date of entry.

1.10.4 Necessary requirements for implementation of the "Extended dry-dock interval":

- Requirements of IWS notation
- Planned Maintenance System Hull
- Planned Maintenance System Machinery according to "Instructions for Planned Maintenance System"

(2) *Exceptional circumstances*", e.g. means unavailability of drydocking facilities, unavailability of repair facilities, unavailability of essential materials, equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.

- Shaft bearing and sealing system of approved design and regular monitoring procedures implemented
- Hull, rudder and shafting systems to be inspectable during in-water survey
- Protective coating in double bottom/double side ballast tanks, void spaces and all other spaces adjacent to the shell should be maintained in GOOD condition (*);

Once the conditions for the scheme are no longer present, the ship will return to the normal docking interval and any due dock survey shall be carried out by the due date.

The extended Dry-Docking Scheme is in any case subject to approval by the Naval Authority.

(*) GOOD condition: Condition with only minor spot rusting

2. Non-Periodical Surveys

2.1 Damage and repair surveys

Damage and repair surveys fall due whenever the ship's hull, machinery, as well as special equipment and installations covered by the Classification have suffered a damage which might affect validity of Class, or if damage may be assumed to have occurred as a consequence of an average or some other event, see Section 1, D.2.3.

2.2 Voyage repairs and maintenance

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

Maintenance and overhaul to hull, machinery, as well as special equipment and installations in accordance with the recommended manufacturer's procedures and established marine practice and which does not require TL approval, are not included. However, any repair as a result of such maintenance and overhauls which affects or may affect Class is to be noted in the ship's log and submitted to the attending Surveyor for use in determining further survey requirements.

2.3 Conversion surveys

In case of conversion of the ship's hull or machinery, surveys are to be conducted in accordance with the relevant approved particulars, as in the case of new buildings, see Section 1, D.3.

2.4 Extraordinary surveys

TL reserve the right to require extraordinary surveys to be held independently of any regular surveys. Such surveys may become necessary for examining the ship's technical condition and are understood to be a part of TL's Quality Assurance System.

3. Special equipment

Periodical surveys and tests of special equipment covered by the Class, such as diving installations, firefighting installations, incinerators or sea-water desalination systems, are to be carried out in accordance with the respective programmes fixed or to be fixed by TL for such special equipment characteristic of a particular type of ship.

4. Additional Safety Measures

For all concerned ships the strength of the small hatches and their securing devices fitted on the exposed fore deck, are to comply with additional requirements (3) for these structures.

The strength requirements to resist sea forces of items, such as air and ventilator pipes and their closing appliances, and the securing of windlasses located within the forward quarter length, are to comply with additional requirements (4) for fore deck fittings and equipment

C. Performance and Scope of Periodical Surveys

1. Annual Surveys

1.1 General

Unless a dry docking survey is due, see B.1.8, annual surveys may be carried out with the ship afloat.

(3) *Additional requirements see TL- R S 26*

(4) *Additional requirements see TL- R S 27.*

1.2 Hull structure and related equipment

The main structural elements of the hull are to be subjected to a general visual inspection, as far as accessible. Engine rooms, storage and service spaces, ro-ro decks are to be surveyed at random, depending on the ship type and the age and general condition of the ship. Where damages or excessive wastage affecting the Class are suspected, the Surveyor is entitled to carry out further investigations.

1.2.1 Hatches and covers, bulkhead doors, ramps and any openings in the outer shell shall be surveyed at each opportunity arising, but at least once a year, regarding structural integrity as well as tightness and operability of all closures.

Additionally to the overall survey the following structural members of bow, side and stern doors are to be thoroughly inspected:

- All hinges and the pertinent hydraulic cylinders in way of their securing points,
- All securing elements of the locking devices and stoppers.

Bow, side and stern doors with a clear opening of less than 12 m² are to be checked as per the surveyor's instructions for their operability and unobjectionable technical condition. Car decks are to be surveyed in respect of operational safety, technical condition and accident prevention.

1.2.3 The rudder and maneuvering arrangement and the anchor equipment are to be checked for visible damages. For the related machinery and for operability, see 1.3.

1.2.4 For ballast tanks, in the case of substantial corrosion damages **(5)**, annual surveys may be required, see 2.2.1.

(5) *“Substantial Corrosion” is an extreme of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75 % of allowable margins, but within acceptable limits.*

1.3 Machinery

The machinery including electrical installations will be subjected to the following surveys and operational checks:

- General inspection of machinery and boiler rooms, with special regard to the propulsion system, the auxiliary engines, possible fire and explosion sources, and checking of emergency exits as to their free passage,
- External inspection of boilers and pressure vessels, with their appliances and safety devices. For details regarding boilers, see 5.2.,
- Inspection and checking of the remote control, quick-closing/stopping devices of pumps, valves, ventilators, etc.,
- Random checking of the remote control and automation equipment,
- Inspection and functional checking of the main and auxiliary steering gear, including their appliances and control systems,
- Checking of all communication systems between bridge and machinery, boiler and steering gear rooms,
- Inspection of the bilge system, including remote control actuators and bilge filling level monitors,
- Checking of the main and emergency power supply systems, including the switch gear and other important electrical installations,
- Survey of explosion-proof installations,
- Checking of further permanently installed installations to the Surveyor's discretion, e.g. provision cooling plant, air conditioning, incinerating plant, etc.
- For Class Notation CM-PS the stern tube lubrication oil system has to be surveyed and the correct performance of oil sampling, evaluation

of the temperature of the stern tube bearings and the evaluation of the oil consumption as well as the results of the required measurements according CM-PS record file have to be checked and confirmed in the relevant forms of the record file.

- where harmonic filters are installed on main busbars of electrical distribution system, other than those installed for single application frequency drives such as pump motors; As a minimum, harmonic distortion levels of main busbar on board a ships are to be measured annually 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 from a qualified outside source.

Records of all the above measurements are to be made available to the surveyor at each periodical survey.

1.4 Fire extinguishing and fire alarm systems

1.4.1 The following items/systems are subject to inspection and/or testing, where applicable:

- Fire mains system, including at least 20% of hoses and nozzles,
- Gas fire extinguishing system,
- Dry powder fire extinguishing system,
- Foam fire extinguishing system,
- Sprinkler system, including water mist sprinkler System, if applicable,

- Water and/or foam drencher system,
- Any other fixed fire extinguishing system provided,
- Portable fire extinguishers, mobile fire extinguishers, including portable foam application units,
- Fire detection and alarm systems,
- Emergency stops for ventilation fans, boiler forced draft fans, fuel transfer pumps, fuel oil purifiers,
- Quick-closing fuel valves,
- Fire closures, fire dampers, etc.,
- Fireman's outfits.

1.4.2 Additional requirements

1.4.2.1 Fixed fire extinguishing systems

Fixed fire extinguishing systems, such as gas, foam, dry powder or water mist systems, are subject to maintenance by approved or recognized specialists every 2 years.

Water-spray systems supplied by the fire main and consisting solely of an isolating valve and open nozzles may be excluded from this requirement and may be subjected to the shipborne maintenance scheme (e.g. for paint store).

On the occasion of these inspections all CO₂ hose assemblies must be subjected to a visual check. All CO₂ hose assemblies made of synthetic rubber must be replaced not later than 10 years from the date of manufacture.

1.4.2.2 Pressure vessels

Pressure vessels of fixed gas based fire extinguishing systems are subject to level checks every 2 years. These checks may be performed by the ship's staff, provided that the results are recorded and an entry is made into the ship's log. In the event of loss of more than 10 % of CO₂, respectively more than 5 % of other

extinguishing gases including halon, charging is to be arranged for. For periodical testing, see 3.3.5.

1.4.2.3 Fixed foam fire-extinguishing systems

Foam concentrate for fixed foam fire extinguishing systems is to be examined not later than 3 years after filling into the system, and yearly thereafter. The examination is to be performed by the manufacturers or by an independent recognized laboratory. Reports are to be presented to the Surveyor. Manufacturer's certificates stating the properties of the foam concentrate shall be available onboard for reference of the surveyor.

1.4.2.4 Portable foam applicator units

The foam concentrate for the portable foam applicators is to be renewed on the occasion of every 5 years.

1.4.2.5 Portable and mobile fire-extinguishers

Portable fire-extinguishers and mobile fire-extinguishers are subject to periodical inspections in accordance with the manufacturer's instructions and shall be serviced at intervals not exceeding one year.

Inspection and service shall only be undertaken by, or under the supervision of, a person with demonstrable competence and should follow the inspection guide in Table 9.1.3 of IMO Res. A.951(23). Each fire-extinguisher is to be provided with a label showing the date of inspection and name and signature of the competent person.

At least one portable fire-extinguisher of each type manufactured in the same year shall be test discharged as part of a fire drill at 5 yearly intervals. Fire-extinguishers used shall be provided with a visual indication of discharge. Instructions for recharging fire-extinguishers are to be supplied by the manufacturer and be available for use on board.

All portable fire-extinguishers together with propellant cartridges, if any, shall be hydraulically tested in accordance with the recognized standard or the manufacturer's instruction at intervals not exceeding 10 years.

Records of inspections at fire-extinguishers are to be kept on board. They shall show the date of inspection, the type of maintenance carried out and whether or not a pressure test was performed.

1.4.2.6 More extensive regulations of the Naval Authority regarding other inspection intervals / performance of the tests should be observed.

1.5 Bridge control stand

On the occasion of the annual survey an operational test of the relevant equipment is to be performed on board of ships assigned the Class Notation NAV or NAV-INS.

1.6 Equipment related to the Notation NBC

Equipment and provisions, such as closures, ventilation systems, filters, sensors, alarms etc., serving the protection against nuclear, biological or chemical fall-out, shall be surveyed according to the instructions established by the parties involved.

2. Intermediate Surveys

2.1 General

2.1.1 Intermediate surveys shall include all the inspections and checks required for annual surveys. Additionally, the following requirements shall be observed.

2.1.2 The requirements apply to naval ships in general. Additional requirements may have to be observed for particular ship types, due to request of the Naval Authority or in connection with manufacturer's recommendations for special equipment.

2.2 Hull structure

2.2.1 Ballast tanks

2.2.1.1 In ships aged **p** to **2p** years, selected ballast tanks are to be examined for corrosion damages and/or damage of their coatings. Depending on the survey result, and in particular in the case of poor hard protective coating condition **(6)**, if soft coating **(7)** or semihard coating has been applied, or if when built the tanks were not provided with a hard protective coating,

the survey is to be extended to additional tanks of same type.

2.2.1.2 If the hard protective coating in ballast tanks except the double bottom tanks is found to be in poor condition **(6)**, but is not renewed, if soft coating **(7)** or semihard coating has been applied, or if when built, the tanks were not provided with a hard protective coating, or if corrosion respectively other defects are found, maintenance of Class is to be subject to the tanks in question being examined at annual intervals, and thickness measurements carried out as considered necessary.

Also in case of double bottom tanks, annual surveys may have to be carried out.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate survey commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in above.

2.2.1.3 In ships aged 2p years and over, during the intermediate survey, selected ballast tanks are to be examined for damages to the hull structural elements and to the hard protective coating. If applicable the procedure as outlined in 2.2.1.2 shall be followed.

2.2.1.4 If such inspections reveal no visible structural defects, the examination may be limited to a verification that the corrosion protection system remains efficient.

2.2.1.5 If the hard protective coating is to be partly or totally renewed, only approved coating is applicable in case of a repair. The whole working procedure including the surface preparation has to be documented.

(6) *Poor condition: breakdown of protective coating over 20 % or more of areas, or hard scale at 10 % or more areas under consideration*

(7) *“Soft coating” means: Solvent-free coating on base of wool grease, grease, mineral oils and/or wax that remains soft so that it wears off when touched.*

2.2.1.6 Compartments and rooms normally not accessible, or accessible only after special preparations, may be required to be opened for inspection, depending on the ship's age and available information about service conditions.

2.2.2 Bow, side and stern doors

Additionally crack tests shall be carried out at structural members of bow, side and stern doors as per 1.2.2.

Essentially, the crack tests will cover:

- Main joining welds and their interfacial areas both on the vessel's hull and on the doors,
- Highly stressed areas in way of the centers of rotation of the hinges,
- Highly stressed areas of the locking devices and their stoppers,
- Repair welding.

For crack detection the dye penetration method or the magnetic particle inspection method shall be employed, and a test protocol is to be prepared.

2.3 Machinery and electrical installations

2.3.1 Measurements

The following measurements are generally to be performed and/or proved by up-to-date protocols that they have been carried out:

- Crank web deflection, main engine(s),
- Crank web deflection, auxiliary diesel engine(s) (where relevant),
- Axial thrust bearing clearance of shafting system(s),
- Axial thrust bearing clearance of main and auxiliary gas turbine rotors (where applicable),

- Insulation resistance of generators and electrical motors, including cabling and switch gear.

2.3.2 Operational tests

In addition to the requirements under 2.3.1, the following system components are to be subjected to operational tests:

- Emergency generating set, including emergency switchboard (where applicable),
- Emergency bilge valve(s),
- Bilge, ventilation and monitoring systems for the carriage of dangerous substances,
- Drainage facilities of starting-air and control-air receivers,
- General operational test of the machinery and electrical installation to demonstrate unrestricted operability, as indicated by the Surveyor.

2.3.3 Automation equipment

The automation equipment is to be checked according to B,1.7.5.

2.3.4 Elastic mounting of deck houses

Elastic mounting of deckhouses have to be thoroughly checked for the general condition and operability of:

- The spring elements (possibly pre-stressing of screwed connections)
- The insulation
- The securing devices to prevent shifting and lifting
- The pipe and cable connections to the hull

If damages are suspected, mountings not easily accessible are to be dismantled and examined in detail.

3. Class Renewal Surveys

3.1 General

3.1.1 In addition to the inspections and checks to be carried out on occasion of the annual and intermediate surveys, for Class renewal the following requirements shall be observed.

3.1.2 The Class Renewal Survey is in principle to be held when the ship is in dry dock or on a slipway, unless a dry docking survey has already been carried out within the admissible period, see B.1.8.

The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating, the rudder and any other installations at the bottom can be examined in a satisfactory manner.

3.1.3 For surveys normally requiring dry-docking, and where the Notation IWS has been assigned, the requirements according to B,1.9. have to be observed.

3.2 Hull structure

3.2.1 Class Renewal I

Class Renewal I has to be performed at the end of the first Class period **p**. For definition see B.1.4.2.

3.2.1.1 Hull, general

At the Surveyor's discretion, the survey on principle covers the whole hull structure, particularly those areas which from experience are known to be exposed to fatigue and corrosion, such as openings in the shell and in the deck including doors and hatch coamings and covers, tanks, engine foundations and ends of superstructures. As a matter of principle, all machinery spaces, dry spaces, store rooms, pipe tunnels, cofferdams and void spaces are to be examined, including the piping systems.

3.2.1.2 Preparation for inspection

All spaces required to be inspected are to be cleared, cleaned and ventilated where necessary at the Surveyor's discretion so that all structural parts, such as frames, floor plates, stringers, inner bottom, etc. can be examined. For tanks, see 3.2.1.3.

Where soft (7) or semi-hard coating has been applied, safe access is to be provided for the surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

Where ships have no double bottom, it is left to the Surveyor's discretion to have portions of the bottom ceiling of each watertight compartment removed on either side of the ship, especially near the centre-line girder and in way of the bilge pipes and sounding pipes, so that the bottom structure below may be examined.

Where ships have a double bottom, the ceiling is to be removed at several points, at the Surveyor's discretion.

Where the structural elements are covered, the Surveyor may require parts of the covering to be removed. If deemed necessary by the Surveyor, defective cement and asphalt covering is to be removed. The steel work is to be examined before painting or before the cement or other coverings are renewed.

3.2.1.3 Tank surveys

In principle all ballast tanks are to be inspected; if applicable; the procedure as outlined in 2.2.1.2 shall be followed.

If the inspection reveals no visible structural defects, the examination may be limited to a verification that the protective coatings remain efficient.

Fuel oil, lubricating oil and fresh water tanks need not to be emptied, if their tightness can be verified by an external examination while they are completely filled and there is no reason for doubt as to their unobjectionable condition. However, fore and after peak are in any case subject to internal examinations at

each Class Renewal Survey, see also Table 3.1.

3.2.1.4 Tightness tests

Each compartment of the double bottom and all tanks, the boundary plating of which forms part of the ship's main structure, are to be subjected to pressure tests. Fuel oil, lubricating oil and fresh water tanks may be tested by filling with the respective liquid.

The test pressure applied is to correspond to a head of water up to the top of the overflow/air pipe or up to the hatch of a tank, where applicable, whichever is higher.

The tightness of pipe tunnels outside the inner bottom, and of void spaces, may be tested by air pressure. Air pressure testing of other spaces is to be agreed with the Surveyor from case to case. The overpressure must not exceed 0,2 bar.

3.2.1.5 Thickness measurements

If the Surveyor has reason to suspect premature inadmissible corrosion, he may require the rust to be removed from parts of the structure and thickness measurements to be carried out, see D.

3.2.1.6 Rudder, equipment, deck openings, etc.

The Class Renewal Survey also covers other parts essential for the operation and safety of the ship, such as rudder and steering gear, watertight doors, sluice valves, air and sounding pipes, gas freeing and safety arrangements of cargo tanks, life-boat davits, companionways, hatches, scuppers and water drain pipes with their valves, fire protecting arrangements, masts, anchors, anchor chains and hawsers.

Doors, if any, are to be checked, see 2.2.2.

The rudder, rudder couplings and bearings, as well as the stock are to be surveyed in mounted condition, the rudder clearance to be measured and documented. The steering gear is to be subjected to an operational trial.

If considered necessary in view of the inspection results, the rudder and/or parts of the steering gear may have to be dismantled.

3.2.1.7 Engine room structure

The engine room structure is to be examined. Particular attention is to be given to tank tops, shell plating in way of tank tops, brackets connecting side shell frames and tank tops, engine room bulkheads in way of tank top and the bilge wells. Where wastage is evident or suspected, thickness measurements are to be carried out.

3.2.1.8 Loading instruments and loading manual

Where necessary for the ship, at each Class Renewal, the satisfactory operation of the approved loading computer systems is to be tested in the presence of a TL Surveyor using the approved test conditions.

At least 3 test conditions are to be checked, and the results may not deviate from the approved figures by more than 5 %.

The weights of the cargo, ballast, fuel, etc. are to be read in step by step.

Where necessary for the ship, the Surveyor has to check that the approved Loading Manual is on board.

3.2.2 Class Renewal II (age of ship p to 2p years)

3.2.2.1 The requirements for the second Class renewal include those for Class Renewal I. Additionally, the following investigations are to be carried out.

3.2.2.2 The structural parts behind ceilings, floor coverings and insulation are to be examined, as required by the Surveyor and depending on the general condition of the ship, see 3.2.1.2.

3.2.2.3 In principle, all tanks are to be examined internally.

Lubricating oil and fresh water tanks are to be at least examined at random examinations, as required by the Surveyor, see Table 4.1.

In the case of seawater ballast tanks the procedure as

outlined in 2.2.1.2 shall be followed, if applicable. Peak tanks see 3.2.1.3

3.2.2.4 The chain cables are to be ranged so that they can be examined for wear and other damages throughout their length. The mean diameter of the anchor chain cables is to be determined on at least 3 links per length.

3.2.2.5 For thickness measurements, see 6.

3.2.2.6 Where hull structural members are made of steel with yield strength of 460 N/mm² and above, additional ultrasonic testing of the butt welds is to be carried out.

3.2.3 Class Renewal III and subsequent ones (age of ships over 2p years)

3.2.3.1 The requirements for the third and the subsequent Class renewals include those for the Class Renewal II. Additionally, the following investigations are to be carried out.

3.2.3.2 Ceilings, linings and insulation of all spaces adjacent to the shell plating and the inner bottom shall be removed, as indicated by the Surveyor, to enable the steel structure to be examined in detail.

For Class Renewals IV and subsequent ones the inner bottom ceilings are to be completely removed and the tank top is to be carefully cleaned, such as to enable proper assessment of the tank top's condition.

3.2.3.3 The wall lining underneath windows in the outer shell is to be lifted as required by the Surveyor so that the structure behind may be examined.

3.2.3.4 All tanks are to be examined internally. The fuel oil, lubricating oil and fresh water tanks are to be examined internally and tested to the maximum working overpressure, at the Surveyor's discretion, see 3.2.1.3 and Table 4.1. In the case of seawater ballast tanks the procedure as outlined in 2.2.1.2 shall be followed, if applicable.

3.2.3.5 The rudder body is to be examined. The connections to the rudder stock and pertinent securing

devices are to be inspected. For clearances, see 6.2.2.

The rudder stock is to be surveyed as far as accessible. If deemed necessary in view of findings during this external inspection, the stock is to be dismantled. In way of the bearings, stock and pintle are to be examined for corrosion.

3.2.3.6 The weight of the anchors is to be checked.

3.3 Machinery including electrical installations

3.3.1 General

3.3.1.1 Except for individual machinery components as indicated in the following, the scope of all Class Renewal Surveys related to the machinery including electrical installations is identical. If the Continuous Class Renewal system is applied, the indications according to B.1.5 are to be observed.

3.3.1.2 Surveys requiring dry docking

While the ship is in dry dock, the sea inlet and discharge valves are to be examined as to their condition and to be opened up and overhauled once within a Class period **p**.

Bow thrusters and positioning equipment are to be subjected to a general survey, and to trials upon floating of the ship.

For propeller(s), propeller and stern tube shaft(s), see 4.

3.3.2 Propulsion system

3.3.2.1 Inspection of the propulsion system is mainly to cover:

- Intermediate shafts and bearings, including thrust bearings,
- Gearing,
- Mechanical and flexible couplings,

- Turning gear,
- The main propulsion engines or gas turbines, see 3.3.2.2 and 3.3.2.3; for auxiliary engines see 3.3.3.

For electrically driven propellers, see 3.3.8.

Spring elements made of rubber ring - with or without plies of fabric - of rubber ring clutches with or without plies of fabric and under shear load, and other rubber or fibre reinforced plastic couplings are to be renewed, if required on account of negative inspection results.

1.3.2.2 Main propulsion engines

The following components are to be inspected and checked in the dismantled condition, where deemed necessary by the Surveyor:

- Cylinders, cylinder covers, pistons, piston rods and bolts, cross heads, crankshaft and all bearings,
- Camshaft, with drive and bearings,
- Tie rods, frame, foundation and fastening elements,
- Injection system, attached pumps and compressors, superchargers, suction and exhaust lines, charging air coolers, filters, monitoring, control, protective and safety devices, starting, reversing and maneuvering equipment.

Note:

In case of medium speed diesel engines, dismantling and replacement of main and crank bearings may be postponed until the service life limits have been reached. The acceptable intervals between overhauls are determined by TL Head Office.

Table 3.1 Minimum requirements for internal examination at Hull Class Renewal Surveys of structural fuel oil, lube oil and fresh water tanks

Class renewal survey [no] and ship's age [years]				
Tank (1), (2)	II. Age ≤ p	III. p < age ≤ 2p	III. 2p < age ≤ 3p	IV. and subsequent, age > 3p
Fuel oil bunker tanks (engine room)	None	None	One	One
Lube oil	None	None	None	One
Fresh water	None	One	All	All
(1) <i>If a selection of tanks is accepted to be examined, then different tanks are to be examined at each Class Renewal Survey, on a rotational basis</i>				
(2) <i>Fore peak tanks and after peak tanks are subject to internal examination at each Class Renewal Survey</i>				

3.3.2.3 Main propulsion gas turbines

On occasion of each Class renewal, the vibration behaviour of the main propulsion gas turbines is to be investigated, possibly by regular checks during operation. Depending on the result and as required by the Surveyor, the turbine casing(s) will have to be opened up and the rotor(s), bearings, etc. inspected in detail.

The safety arrangements of the turbines are to be tested.

3.3.3 Auxiliary engines

For all auxiliary engines, the survey scope is identical to that applying to the main engines. A reduction in the scope of survey may be agreed to upon examination of the maintenance protocols.

3.3.4 Steam boilers

3.3.4.1 For internal and external inspections of boilers, see 5.2.

3.3.4.2 Steam pipes and heating coils shall be examined according to agreed procedures.

3.3.5 Pressure vessels

3.3.5.1 Pressure vessels are to be inspected internally and externally.

Pressure vessels for which pressure [bar] times cubic capacity [l] is less than or equal to 200 are to be surveyed on the occasion of checking of the pertinent piping system.

3.3.5.2 Where pressure vessels cannot be satisfactorily examined internally and where their unobjectionable condition cannot be clearly stated during the internal inspection, approved non-destructive test methods and/or hydraulic pressure tests are to be carried out.

The hydraulic pressure test is to be performed at a test pressure of 1,5 times the maximum allowable working pressure. If the maximum allowable working pressure is less than 2 bar, then the test pressure should be at least 1 bar more than the maximum allowable working pressure. Pressure vessels manufactured in accordance with DIN Standard 4810 are, subject to that Standard, to be tested to 1,3 times the admissible working pressure. The test pressure must in no case exceed the initial test pressure.

3.3.6 Auxiliary machinery, equipment and piping

The following components are to be inspected and tested in dismantled condition, where deemed necessary by the Surveyor:

- All pumps of the essential systems,
- Air compressors, including safety devices,

- Separators, filters and valves,
- Coolers, pre-heaters, see 3.3.5,
- Main and auxiliary steering gear,
- Anchor and other windlasses, including drives,
- Piping, pipe connections, compensators and hoses,
- Emergency drain valves and bilge piping systems,
- Tank filling level indicators,
- Installations preventing the ingress of water into open spaces,
- Fresh water distillation plant, where provided ,
- Oil purifier and sewage systems,
- Additional systems and components, where deemed necessary by the Surveyor, as well as special equipment and installations if included in the scope of Classification.

3.3.7 Automation equipment

The monitoring equipment and the automated functions of the machinery installation are to be subjected to operational trials under service conditions in port. The bridge remote control equipment of the propulsion system will be examined as required.

3.3.8 Electrical installations

3.3.8.1 Propulsion machinery

If the ship is propelled by electrical machinery, the propulsion motors, the propulsion generators and exciters, particularly the windings of these machines and

their ventilating systems are to be examined and tested. Checking of the electric switch gear for operability is to cover also the protective, safety and interlocking devices.

The electric cables and their connections are to be inspected.

The insulation resistance of all electric machinery and equipment is to be tested.

3.3.8.2 Dynamic positioning systems

Dynamic positioning systems according to Section 2, C.4.3, including control systems, are to be subjected to operational tests.

3.3.8.3 Auxiliary machinery

The electrical machinery and equipment, including the generators, the motors of the essential services, the switch gear including its protective and interlocking devices, as well as the cable network are to be inspected externally.

The insulation resistance is to be measured.

3.3.8.4 Explosion protection

Electrical installations and equipment located in spaces in which there is a risk of inflammable gas or vapour/air mixtures accumulating, spaces with explosive and ammunition are to be checked as to the explosion protection provided.

3.3.9 Pipes in tanks

Where pipes are led through tanks, they are to be examined and, if required by the Surveyor, subjected to hydraulic tests, if for the respective tanks an internal examination is required according to 3.2.1.3. Depending on the results obtained, thickness measurements may be required. If heating coils are installed, pressure testing is required.

3.3.10 Fire extinguishing and fire alarm systems

3.3.10.1 General requirements

Proof is to be furnished to the Surveyor that the entire fire extinguishing equipment is ready for operation and in a satisfactory condition.

For details and trials, see 1.4.

Emergency exits/escapes are to be inspected.

CO₂ cylinders (Halon bottles, where still used), see 5.4.3 and for due dates B,1.7.4.

On the occasion of every Class Renewal Survey all CO₂ hose assemblies must be subjected to a visual check. All CO₂ hose assemblies shall be replaced by type approved CO₂ hose assemblies not later than 2p years from the date of manufacture.

3.3.10.2 Periodical tests of CO₂ cylinders for fire extinguishing purposes are to be carried out at intervals not exceeding 2p years. At least 10 % of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. Halon containers of existing fixed Halon fire-extinguishing systems are exempted from this requirement.

Irrespective thereof, on the occasion of recharging CO₂ cylinders and Halon containers are to be tested, if the last test dates back 2p years or more.

Following a hydraulic pressure test, the vessels or bottles are to be carefully dried.

3.3.10.3 In the case of vessels for powder extinguishing agents, periodical pressure tests may be dispensed with, provided that their internal inspection does not reveal any deficiencies.

3.3.10.4 The intervals between surveys as referred to may be reduced, depending on the findings.

3.3.11 For automation equipment see 5.5.

3.3.12 Dangerous goods

In ships carrying the Class Notation **DG** the equipment

for the carriage of dangerous goods, e.g. special fire-fighting, alarm, ventilation and explosion protection equipment is to be surveyed as required.

3.3.13 Spare parts

Spare parts are to be checked for completeness as per the Rule requirements and/or according to the lists approved by TL and kept in the ship's files, as well as for their operability.

3.3.14 Trials

Upon completion of the surveys for Class renewal, the Surveyor must be satisfied that the entire machinery installation including electrical installations and steering gear, as well as special equipment and installations are operable without any restrictions. In case of doubt, trials and/or operational tests may be necessary.

4. Periodical Surveys of Propeller Shafts and Tube Shafts, Propellers and Other Systems

The periodical surveys and tests of propeller shafts and tube shafts, propellers and other systems defined in B. 1.6 are to be performed as follows.

4.1 Propeller shafts and tube shafts

4.1.1 Normal survey

The prerequisites are defined in B.1.6.1.1. It is distinguished between:

- Survey with drawing of the shaft,
- Survey without drawing of the shaft.

4.1.1.1 Survey with drawing of the shaft

The scope of normal survey consists in the following:

- Dismantling of propeller and key, where fitted, visual inspection of all parts of the shaft especially the cone, the keyway, the bearing contact areas of the shaft, the bearings, and the thread of the propeller nut, or the fillet of the flange, examination of the propeller fit,

- Non-destructive examination by an approved crack detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of the keyway, or the fillet of the flange in case of a solid flange coupling, The crack detection test of the aft flange fillet area may dispensed with for the solid flange couplings fitted at the end of the shaft, see also B.1.6.1.1.1.
- Examination of the bearing clearances and/or wear down before dismantling and after reassembling of the shaft with recording of the values measured,
- Overhaul of the shaft sealing glands according to manufacturer's instructions (sealing rings, liners, etc.).

4.1.1.2 Survey without drawing of the shaft

Where the prerequisites as defined in B. 1.6.1.1.2 apply, for oil lubricating arrangement the scope of normal survey without drawing of the shaft consists in the following:

- Examination of all accessible parts of the shaft including the propeller connection to the shaft,
- Non-destructive examination by an approved crack-detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of the keyway for keyed propellers, or of the forward part of the aft shaft taper for keyless propellers, or of the after fillet flange area of the shaft for solid flange coupling propellers. The crack detection test of the aft flange fillet area may be dispensed with for the solid flange couplings fitted at the end of the shaft, see also B.1.6.1.1.1. The area to be examined is to be sufficiently exposed, if necessary by shifting of the propeller shaft or backing-off of the propeller,
- Examination of the bearing clearances, respectively wear down of the aft bearing,

- Overhaul of the shaft sealing glands according to manufacturer's instructions (sealing rings, liners, etc.),

- Examination of the records of all regularly carried out lubricating oil analyses,
- Examination of the records of the oil consumption and the bearing temperatures.

Where doubts exist regarding the findings, the shaft is to be drawn to permit an entire examination.

4.1.2 Modified survey

The prerequisites are defined in B. 1.6.1.2. It is distinguished between:

- Survey with exposing the aft bearing contact area of the shaft,
- Survey without exposing the aft bearing contact area of the shaft.

4.1.2.1 Survey with exposing the aft bearing contact area of the shaft

The scope of the modified survey consists in the following:

- Drawing the shaft to expose the aft bearing contact area of the shaft,
- Examination of the forward bearing as far as possible and of all accessible parts of the shaft including the propeller connection to the shaft,
- Examination and overhaul of the oil sealing glands according to manufacturer's instructions (sealing rings, liners, etc.),
- Examination of the bearing clearances and/or wear down of the shaft with recording of the values measured,
- Examination of the lubricating oil analysis and consumption to be within permissible limits,
- For keyed propellers, performing a non

destructive examination by an approved crack-detection method of about one third of the length of the taper from the large end, for which dismantling of the propeller is required, examination of the propeller fit.

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.

4.1.2.2 Survey without exposing the aft bearing contact area of the shaft

Where the prerequisites as defined in B. 1.6.1.2.2 apply, the scope of the modified survey without exposing the aft bearing contact area of the shaft consists in the following:

- Examination and overhaul of the oil sealing glands according to manufacturer's instructions (sealing rings, liners, etc.),
- Examination of the bearing clearances and/or wear down of the shaft with recording of the values measured,
- For keyed propellers, performing a non destructive examination by an approved crack detection method of about one third of the length of the taper from the large end, for which dismantling of the propeller is required, examination of the propeller fit.

In addition to this the survey shall include the following:

- Examination of the records of all regularly carried out lubricating oil analyses,
- Examination of the records of the oil consumption and the bearing temperatures.

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.

4.1.3 Partial survey

The prerequisites are defined in B.1.6.1.3. The partial survey consists in the following:

- Checking of the oil sealing for leakages,

- Examination of the bearing clearances and/or wear down of the shaft with recording of the values measured,

- Examination of the records of the lubricating oil analysis,
- Examination of the records of the oil consumption and the bearing temperatures.

Where the propeller is fitted to a keyed shaft taper, in addition:

- Dismantling of the propeller and examination of the propeller fit,
- Non-destructive examination by an approved crack-detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of keyway are to be performed.

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.

4.2 Propellers

Propellers are to be examined visually on the occasion of each propeller shaft or tube shaft survey.

Damages, such as cracks, deformation, cavitation effects, etc. are to be reported and repaired at the Surveyor's discretion.

Controllable pitch propellers are to be checked for oil leakages. The function of the controllable pitch propellers has to be tested. The maintenance according to manufacturer's instructions has to be checked.

4.3 Other systems

As far as practicable, the gearing and control elements of rudder and steering propellers are to be examined through inspection openings. For other systems such as pod propulsion systems, pump jet units, etc., the scope of survey is to be agreed with TL Head Office. The maintenance according to manufacturer's instructions is to be checked. A function

test is to be carried out.

5. Periodical Surveys and Tests of Individual Machinery Items

5.1 The periodical surveys and tests of individual machinery items defined in B.1.7 are to be performed as outlined below.

5.2 Steam boilers

5.2.1 External inspection

External inspection including functional test of the safety and protective devices as well as the test of the safety valves is to be carried out annually.

The operability and general condition of the entire boiler, including its valves and fittings, pumps, piping, insulation, foundation, control and regulating systems and its protective and safety equipment, are to be examined. Also, the boiler manual, operating instructions and qualifications of the operating personnel are to be checked.

For exhaust gas boilers, the safety valves are to be functional tested by the Chief Technical Officer at sea within the boiler external survey window. This test is to be recorded in the log book for review by the attending Surveyor prior to crediting the Annual Survey of Machinery.

5.2.2 Internal inspection

Where deemed necessary by the Surveyor, the boiler is to be cleaned on the water and flue gas sides and, if required, its outside surfaces are to be uncovered as well, so that all walls subject to pressure may be examined.

At each survey the boilers, superheaters and economizers are to be examined on water and steam side as well as flue gas or exhaust gas side. Boiler mountings and safety valves are to be examined at each survey. They are to be opened up as considered necessary by the Surveyor.

The set pressure and the function of the safety valves are to be verified during each internal boiler inspection.

For exhaust gas boilers, if steam pressure cannot be raised at port, the safety valves are to be adjusted at the test bench. The correct set pressure is to be verified by the Chief Technical Officer at sea and the results to be recorded in the log book for review by TL.

Review of the following records since the last boiler survey is to be carried out as part of the survey:

- Operational documentation
- Maintenance documentation
- Repairs carried out
- Records of water analysis

Where the design of the boiler does not permit an adequate internal inspection, hydraulic tests may be required. It is left to the Surveyor's discretion to have the internal inspection supplemented by hydraulic tests, if considered necessary on account of the general condition/appearance of the boiler.

Where there are doubts concerning the thickness of the boiler walls, measurements shall be made using a recognised gauging method. Depending on the results, the allowable working pressure for future operation is to be determined.

The hydraulic pressure test is to be carried out to a test pressure of 1.5 times the allowable working pressure. If the maximum allowable working pressure is less than 2 bar, the test pressure shall be at least 1 bar above the maximum allowable working pressure. In no case the test pressure should exceed the test pressure applied during the constructional check and hydrostatic pressure test of the boiler after completion.

5.2.3 Extraordinary inspection

Beyond the above mentioned periodical inspections, extraordinary inspections including non-destructive tests and hydraulic pressure tests may be required at the Surveyor's discretion, e.g. in case of damages, repairs and maintenance work.

5.3 Steam pipes/heating coils

5.3.1 Steam pipes with steam temperatures of up to 350 °C and with outside diameters of more than 75 mm, are to be examined at random. Examinations of the internal condition of the pipelines, especially of pipe bends, or additional more detailed examinations may be required. Instead of the internal inspection, a hydraulic test may be affected to a pressure equal to 1,5 times the design pressure, but not exceeding that of the prescribed test pressure for the pertinent boiler plant.

5.3.2 In the case of steam pipes with steam temperatures exceeding 350 °C (at least two) selected individual parts of pipes are to be dismantled from each piping system (main steam pipe and auxiliary steam pipes of each service group) having an outside diameter exceeding 32 mm. Approximately 10 % of the welding seams at bends, flanges or tee-branches are to be subjected to an inspection for cracks by recognized non-destructive test methods.

Before being used again, removed screws of flanged joints are to be inspected for their general condition and cracks and renewed, if necessary.

5.3.3 Steam pipes designed to resist steam temperatures exceeding 500 °C and welded piping systems are to be examined as follows:

Flanged pipes in accordance with B.1.7.3.2; however, the inspection for cracks has to cover at least 20 % of the welded seams.

If internal examination of welded piping systems through the inspection holes appears to be inadequate or if their reliable assessment is not possible even by ultrasonic testing or an equivalent examination method, it may be necessary to cut out certain parts of pipes. At least 20 % of the welding seams are to be inspected for cracks.

Removed screws of flanged joints, see above 5.3.2.

5.3.4 Heating coils in oil tanks and vessels are to be subjected to a pressure test to 1,5 times the allowable working pressure.

The same applies to heating coils in cargo tanks.

5.4 Pressure vessels

5.4.1 Subject to B.1.7.4, pressure vessels are to be inspected internally and externally.

5.4.2 Supplementary tests

Where pressure vessels cannot be satisfactorily examined internally and where their unobjectionable condition cannot be clearly recognized during the internal inspection, recognized non-destructive test methods are to be applied and/or hydraulic pressure tests are to be carried out.

The hydraulic pressure test is to be performed at a test pressure of 1,5 times the maximum allowable working pressure. If the maximum allowable working pressure is less than 2 bar, then the test pressure should be at least 1 bar more than the maximum allowable working pressure. Pressure vessels manufactured in accordance with DIN Standard 4810 are, subject to that Standard, to be tested to 1,3 times the admissible working pressure. The test pressure shall in no case exceed the initial test pressure.

5.4.3 CO₂ low-pressure fire-extinguishing systems and halon tanks

The surfaces are to be checked for corrosion at the Surveyor's discretion.

Insulated vessels are to be exposed at some selected points, such as to offer a general impression of the vessel's external condition.

Following a hydraulic pressure test, the vessels and/or bottles are to be carefully dried, see also B.1.7.4.4.

5.5 Automation equipment

The monitoring equipment and the automated functions of the machinery installation are to be subjected to operational trials according to B.1.7.5. The bridge remote control equipment of the propulsion system will be examined as required.

6. Dry Docking Surveys

6.1 General

For the survey the ship is to be placed on sufficiently high and secure blocks, so that all necessary examinations can be carried out. It may be necessary to clean the bottom and outer shell and/or remove rust from some areas.

6.2 Hull bottom survey

6.2.1 The survey covers an examination of the bottom and side plates of the shell plating, including any attachments, the rudder, the scuppers and water drain pipes, including their closures.

6.2.2 Steering gear

The rudder, rudder couplings and bearings, as well as stocks and pintles, are to be surveyed in place, the rudder clearance is to be measured and documented. The steering gear is to be subjected to an operational trial.

If considered necessary in view of the inspection results, the rudder or parts of the steering gear will have to be dismantled.

Bow thrusters are normally to be inspected in place.

6.2.3 Machinery and propulsion systems

6.2.3.1 For propeller(s), propeller shaft(s), stern tube(s), see 4.2.

6.2.3.2 Sea and discharge valves - including those of special equipment, if any - are to be checked as to their condition during each dry docking survey and to be opened up and overhauled once within a period of Class.

7. In-Water Surveys

7.1 Approvals

7.1.1 The diving firm assisting in in-water surveys must be approved by TL for this purpose.

7.1.2 The validity of the approval will depend on the

continued qualification for satisfactorily carrying out the work required. The approval will have to be renewed after a period not exceeding 5 years.

7.2 Performance of survey

7.2.1 Unless accessible from outside with the aid of the ship's trim and/or heel, underwater parts are to be surveyed and/or relevant maintenance work is to be carried out with assistance by a diver whose performance is controlled by a Surveyor, using an underwater camera with monitor, communication and recording systems.

7.2.2 Surveys of the underwater body are to be carried out in sufficiently clear and calm waters.

The ship should be in light ship condition.

The shell sides below the water-line and the bottom must be free from fouling.

7.2.3 The underwater pictures on the surface monitor screen must offer reliable technical information such as to enable the Surveyor to judge the parts and/or the areas surveyed.

7.2.4 Documentation suited for video reproduction including voice is to be made available to TL.

7.3 Additional examinations

7.3.1 Where, for instance, grounding is assumed to have taken place, the Surveyor may demand individual parts of the underwater body to be additionally inspected from inside.

7.3.2 If during the in-water survey damages are found which can be assessed reliably only in dry-dock or require immediate repair, the ship is to be dry docked. If the coating of the underwater body is in a condition which may cause corrosion damages affecting ship's Class to occur before the next dry docking, the ship is to be dry docked.

D. Thickness Measurements and Corrosion Tolerances

1. General

1.1 The thickness of structural elements is checked by measurements, in order to assess whether or not the values stipulated in the Construction Rules are observed, taking into account the admissible tolerances. Unless severe corrosion has occurred owing to particular service conditions, thickness measurements will not be required until Class Renewal II, see C,2.2.1 and C,3.2.1.5.

1.2 Thickness measurements are to be carried out in accordance with recognized methods and by authorized personnel or companies, see 2. Rust and contamination are to be removed from the components to be examined. The Surveyor is entitled to require check measurements or more detailed measurements to be performed in his presence. The thickness measurements are to be witnessed by the Surveyor on board to the extent necessary to control the process.

The scope of thickness measurement as well as the reporting shall be fixed in a survey planning meeting between the Surveyor, representatives of the Naval Authority and the approved thickness measurement operator/firm well in advance of measurements and prior to commencing the survey.

Special attention should be given for close-up surveys at areas affected by weapons, like missile launchers, automatic guns, etc.

Thickness measurements of structures in areas where close-up surveys are required on demand.

2. Authorization

2.1 The personnel or the company entrusted with thickness measurements as well as the procedure for documentation must be approved by **TL** for this purpose.

2.2 The validity of the approval will depend on the continued qualification. The approval will have to be renewed after a period not exceeding 3 years.

3. Scope of Measurements

3.1 Main hull structural elements

In Class Renewal II and all subsequent ones the plate thickness of the main hull (essential longitudinal and transverse) structural elements are to be checked by measurements. The number of measurements depends on the ship's maintenance condition and is left to the Surveyor's discretion. The minimum requirements for thickness measurements on the occasion of Class Renewal Surveys are stated in Table 3.2, depending on the ship's age. Respective thickness measurements to determine the general level of corrosion are to be carried out.

3.2 The extent of thickness measurements may be reduced, in comparison with those stated in Table 3.2, provided during the close-up examination according to Table 3.3 the Surveyor satisfies himself that there is no structural diminution, and the protective coating, where applied, continues to be effective.

The Surveyor may extend the scope of the thickness measurement as deemed necessary. This applies especially to areas with substantial corrosion.

Transverse sections should be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements.

3.3 Seawater ballast tanks

In the case of major corrosion damages, the structural elements of seawater ballast tanks are to be checked by thickness measurements, see C,2.2.1.

3.4 Where special reasons exist, the Surveyor may demand thickness measurements to be carried out already on the occasion of Class Renewal I, also outside the area of 0.5 L amidships, see C,3.2.1.5. The same applies in the case of conversion or repair of a ship.

3.5 In order to be used as a basis for Class renewal, thickness measurements should, as far as practicable, be carried out already on the occasion of the p-1, i.e. fourth respectively fifth annual survey respectively 2p-1 for class renewal II.

3.6 Hull equipment

In Class Renewal II and all subsequent Class renewals the cross sectional areas of the anchor chain cables are to be determined (chains Renewal II + anchors Renewal II). The mean diameters of the anchor chain cables are to be determined by representative measurements, approx. 3 links per length of 27.5 m, made at the ends of the links where the wear is greatest.

4. Corrosion and Wear Tolerances

4.1 Where thickness measurements according to 3. result in corrosion and wear values exceeding those stated in the following, the respective hull structural elements will have to be renewed.

TL reserves the right where applicable to modify the indicated values according to 4.3 and 4.5.3 referring to the maximum permissible large-surface corrosion allowances.

Where reduced material thickness was admitted for the new building (effective system of corrosion prevention), the permissible corrosion allowances are to be based on the unreduced rule thickness.

4.2 Longitudinal strength

Maximum permissible reduction of midship section modulus : 10%.

4.3 Local strength

4.3.1 Steel

Where applicable, the maximum permissible large surface reduction t_k of plate thickness and web thickness of profiles is:

- $t_k = 0.5 \text{ mm}$ in general
- $t_k = 0.7 \text{ mm}$ for lubrication oil, gas oil or equivalent tanks
- $t_k = 1.0 \text{ mm}$ for water ballast tanks

- $t_k =$ as agreed with **TL** in case of special applications

If $t_k = 0.0 \text{ mm}$, the fabrication tolerances as defined in **TL** Rules Chapter 2- Material, shall not be exceeded. Maximum permissible locally limited reduction of thickness: 0.1t.

4.3.2 Aluminium alloys

If the measures for corrosion protection described in the **TL** Rules, Chapter 102 - Hull Structures and Ship Equipment, Section 3, F. are fully applied, the corrosion reduction t_k can be assumed as 0,0 mm for the aluminium alloys defined in D. of the same Section. In no case the fabrication tolerances as defined in **TL** Rules Chapter 2 - Material shall be exceeded.

4.4 Anchor equipment

Maximum permissible reduction of the mean diameter of chain links: 12 %.

Maximum permissible reduction in weight of anchors: 10 %.

4.5 High speed craft

4.5.1 For naval vessels with Class Notation HSC-N or HSDE which are designed as high speed (seagoing) craft according to the **TL** Rules for High Speed Craft, the following corrosion and wear tolerances apply,

4.5.2 Longitudinal strength

Maximum permissible reduction of midship section modulus: 10 %.

4.5.3 Local strength

Where applicable, the maximum permissible large-surface reduction t_k of plate thickness and web thickness of profiles is:

for $t \leq 10,5 \text{ mm}$: $t_k = 0,5 \text{ mm}$

for $t > 10,5 \text{ mm}$: $t_k = 0,03 t + 0,2 \text{ mm}$,
max. 1,0 mm

Tank bottoms: $t_k = 1,0$ mm

Maximum permissible locally limited reduction of thickness: 0,1 t.

If the measures for corrosion prevention described in the TL Rules, Chapter 7, High Speed Craft, Section 3, K.3.1.5 are fully applied, the corrosion reduction t_k can be

assumed as 0,0 mm for steel. The requirements for aluminium alloys are defined in Section 3, K.3.2.3. In no case the under-thickness tolerances as defined in K.3.2.2.2 and K.3.2.3.3 shall be exceeded.

4.5.4 For anchor chain cables the maximum permissible reduction of the mean diameter of chain links is 10 %.

Table 3.2 Class Renewal Surveys (Hull) - Minimum Requirements for Thickness Measurements

Class Renewal Survey [No.] and ship's age [years]			
I. age \leq p	II. p < age \leq 2p	III. 2p < age \leq 3p	IV. and subsequent, age > 3p
Suspect areas through the ship			
	One transverse section within 0.5 L amidships	Two transverse sections within 0.5 L amidships	Three transverse sections within 0.5 L amidships (1)
		All covers and coamings (plating and stiffeners)	
		All exposed main deck plating within 0.5 L amidships	All exposed main deck plating full length
		All wind- and water strakes within 0.5 L amidships	All wind- and water strakes full length
		Internals in forepeak tank and aft peak tank	Internals in forepeak and after peak tanks
		Lowest strake and strakes in way of tween decks of selected transverse bulkheads together with internals in way	Lowest strake and strakes in way of tween decks of selected transverse bulkheads together with internals in way
			Representative exposed superstructure deck plating
			All keel plates full length. Also, additional bottom plates in way of cofferdams, machinery space and aft ends of tanks
		Plating of seachests. Shell plating in way of overboard discharges as considered necessary by the Surveyor	
(1) For seagoing ships with $L \leq 100$ m only two sections may be investigated.			

Table 3.3 Class Renewal Surveys - Minimum Additional Requirements for Close-up Surveys

Class Renewal survey [No.] and ship's age [years]			
I. age \leq p	II. p < age \leq 2p	III. 2p < age \leq 3p	IV. and subsequent, age > 3p
Selected shell transverse frames in one forward and one aft compartment and associated tween deck spaces	Selected shell transverse frames in all compartments and associated tween deck spaces	All shell frames in the forward lower compartment and 25 % of frames in each of the remaining compartments, and tween deck spaces including upper and lower end attachments and adjacent shell plating	All shell frames in all compartments and tween deck spaces including upper and lower end attachments and adjacent shell plating
One transverse bulkhead in one selected compartment including bulkhead plating, stiffeners and girders	One transverse bulkhead in each compartment including bulkhead plating, stiffeners and girders Forward and aft transverse bulkhead in one side water ballast tank including stiffening system	All compartment transverse bulkheads including bulkhead plating, stiffeners and girders All transverse bulkheads in water ballast tanks including stiffening system	Other items: As for class renewal survey No. III
All hatch covers and coamings (plating and stiffeners)			
	One transverse web frame or watertight transverse bulkhead with associated plating and framing in two representative water ballast tanks of each type	All transverse web frames or watertight transverse bulkheads with associated plating and framing in each water ballast tank	
	Selected areas of all deck plating and under deck structure inside line of hatch openings between all hatches Selected areas of inner bottom plating	All deck plating inside line of hatch openings between hatches All areas of inner bottom plating	
<p>Note :</p> <p>Close-up survey of transverse bulkheads to be carried out at the following levels:</p> <ul style="list-style-type: none"> - mid-height of the bulkheads for holds without tween decks - immediately below the main deck plating and tween deck plating 			

E. Damage and Repair Surveys

1. Where damage has occurred to the ship's hull, machinery including electrical installations or special equipment and installations, the automatic/ remote-control systems, etc., the damaged parts are to be made accessible for inspection in such a way that the kind and extent of the damage can be thoroughly examined and ascertained, see also Section 1, D.2.3.

In the case of grounding, dry docking or, alternatively, an in-water survey is required.

2. The repair measures are to be agreed with the Surveyor such as to render possible confirmation of the Class without reservations upon completion of the repairs. In general, a Class confirmation with Conditions of Class, e. g. in the case of a preliminary repair ("emergency repair"), requires to be approved by **TL** Head Office.

3. Surveys conducted in the course of repairs are to be based on the latest experience and instructions by **TL**. In exceptional cases advice is to be obtained from **TL** Head Office, in particular where doubts exist as to the cause of damage.

4. For older ships, in the case of repairs and/or replacement of parts subject to Classification, as a matter of principle, the Construction Rules in force during their period of construction continue to be applicable.

This does not apply in the case of modifications required to the structure in the light of new knowledge gained from damage analyses, with a view to avoiding recurrence of similar damages.

5. Regarding the materials employed and certificates required, the requirements for new buildings are applicable, see Section 1, D.3.

6. Regarding damages or excessive wastage beyond allowable limits that affect the ship's Class See Section 1, D.2.4.

SECTION 4**GENERAL INFORMATION AND PROJECT DATA**

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A. Scope

In order to estimate the scope of Classification and Services, TL need to be provided with the following general information and data as far as already available in the initial phase of the project.

B. Basic Design Data for Initial Information**1. Functional military demands**

Relevant information covers:

- Planned type of ship, see Section 2, C.
- Military tasks, such as:
 - General patrol,
 - Anti air warfare,
 - Anti submarine warfare,
 - Flight operations,
 - Military transport,
 - Landing operations,
 - Mine warfare, etc.

2. Detailed military demands

The detailed military demands include:

- Military loads caused by the weapons and sensors, etc. of the naval ship and influencing the hull girder strength,
- Extent/location of storage rooms for explosives,
- Military loads for transport tasks, if any
- Acoustic and electromagnetic demands,
- Equipment and materials causing radiation hazards,

- Shock strength demands,
- Special demand to withstand local impacts,
- Residual strength demands,
- Damage control zones,
- Fire resisting divisions,
- Extent of NBC (nuclear-biological-chemical) citadel, if requested
- Scope of redundancies for main propulsion and auxiliaries,
- Replenishment at sea,
- Planned duty conditions, like battle stations, combat readiness, cruise, etc.

3. Basic Ship Parameters

The basic parameters are:

- Main design parameters,
- Area of operation,
- Ambient conditions,
- Intact and damage stability requirements,
- Operational profile,
- Expected lifetime [years],
- Materials for construction including special properties, corrosion protection measures, etc.

4. Regulations

Additional international and national regulations, as well as regulations of the Naval Authority to be applied.

5. Building Specification

Preliminary building specification or technical part of a building contract, if already available.

6. Strength Calculations

Intended direct strength calculations of the hull structures, as well as extent and type of software to be used, are to be stated.

7. Updates and Changes

Updates and changes of all relevant design assumptions shall be forwarded to **TL**.

C. Main Ship Parameters

1. General

For the definition of parameters only SI units (metric system) should be used.

2. Principal Dimensions

2.1 Length L

The length L of the ship is the length from the moulded side of the plate stem to the fore side of the stern or transom measured on the waterline at draught T . Other forms of stem are to be specially considered.

2.2 Length L_{OA}

The length over all L_{OA} is the distance between the most forward and most aft element of the ship, permanent outfit included, measured parallel to the design waterline.

2.3 Breadth B

The breadth B is the maximum moulded breadth at the design waterline.

2.4 Breadth B_{max}

The breadth B_{max} is the greatest moulded breadth of the ship. For ships with unusual cross section the breadth will be specially considered.

2.5 Depth H

The depth H is the vertical distance, at the middle of the length L , from the moulded base line to top of the deck

beam at side on the uppermost continuous deck.

2.6 Draught T

The draught T is the vertical distance, at the middle of the length L , from base line to deepest design waterline, as estimated for the lifetime of the ship.

2.7 Draught T_{max}

The draught is T_{max} the vertical distance between the lowest point of the immersed hull including appendages (e.g. domes, rudders, propellers, thrusters, etc.) and the design waterline, movable parts considered retracted.

3. Ship Speed

3.1 Rated speed v_0

Expected maximum, continuous ahead speed v_0 [kn] of the ship in calm water at the draught T when the total available rated driving power is exclusively used for propulsion purposes.

3.2 Maximum speed v_{max}

Expected maximum ahead speed [kn] of the ship in calm water at the draught T , when the total available maximum driving power is exclusively used for propulsion purposes. This speed is related to an overload condition, permissible only for a defined and relatively short time period.

3.3 Cruising speed v_M

Expected economic, continuous ahead cruising speed [kn] of the ship, in calm water at the draught T , which provides the maximum radius of action.

4. Rated Driving Power

The rated driving power [kW] is defined as continuous power to be delivered by the propulsion machinery when running at rated speed and with the total available power exclusively used for propulsion purposes.

5. Auxiliary Electrical Power

The auxiliary electrical power [kVA] is defined as the

continuous electrical power which is not directly used for propulsion of the ship at continuous speed v_0 , but for driving all kinds of auxiliary devices and equipment. The degree of redundancy shall be defined in the building specification.

D. Production Standard

A production standard which considers the special requirements for the manufacturing of naval ships has to be defined by the Shipyard and accepted by **TL**.

E. Documents to be Submitted for Approval

1. All documents have to be submitted to **TL** in Turkish or English language.
2. Before the commencement of manufacture, documents (plans, calculations, etc.) of all components subject to compulsory inspection, wherever applicable and to the extent specified in Table 4.1 are to be submitted to **TL** for approval.
3. The drawings shall contain all the data necessary to check the design and loading of the equipment. Wherever necessary, calculations relating to components and descriptions of the system are to be submitted.
4. Calculations shall contain all necessary information concerning reference documents (parts of the specification, relevant drawings, etc.). Literature used for the calculations has to be cited, important but not commonly known sources shall be added in copy.

The choice of computer programs according to "State of the Art" is free. It is recommended to use computer programs which are accepted by **TL** as appropriate to solve the actual problems. If the computer programs to be used are not known to **TL**, they may be checked by **TL** through comparative calculations with predefined

test examples. Reference applications, already achieved acceptance by other institutions and other relevant information shall be provided in advance. A generally valid approval for a computer program is, however, not given by **TL**.

The calculations have to be compiled in a way which allows identifying and checking all steps of the calculations in an easy way. Hand-written, easily readable documents are acceptable.

Comprehensive quantities of output data shall be presented in graphic form. A written comment to the main conclusions resulting from the calculations has to be provided

5. **TL** reserve the right to request additional documentation if the submitted one is insufficient for an assessment.
6. The drawings are to be submitted in triplicate and all calculations and supporting documentation in one copy for examination. Ship owners or Shipyard or Designers are responsible to take into account the delivery date of the project. And all documents are to be submitted at a sufficiently early date to ensure that they are approved and available to the Surveyor at the beginning of the manufacture or installation of the ship or of important components.
7. Once the documents submitted have been approved by **TL** they are binding for the execution of the work. Subsequent modifications and extensions require the approval of **TL** before becoming effective.
8. For classification of a naval ship the following documents have to be submitted, as far as applicable. **TL** reserve the right to request additional information and documentation depending on ship's type and Naval Authority's requirements.

Table 4.1 Documentation to be submitted for classification

Serial No.	Description
	General Requirements
1	General arrangement plan
2	Deck plan
3	Technical specification
4	Lines Plan
5	Material specification for hull
6	List of submitted drawings
	Hull Structures and Ship Equipment
	Hull
7	Midship section
8	Other typical sections
9	Bottom structure
10	Engine room structure (including engine foundations)
11	Shell expansion plan
12	Ice strengthening
13	Decks
14	Superstructures and deckhouses
15	Bulkheads
16	Tank arrangement plan
17	Rudder body
18	Rudder stock
19	Rudder bearings, pintles and couplings, etc.
20	Large openings
21	Special foundations
22	Welded joints for steel or aluminium
23	Coating plan
24	NDT-plan (Non-Destructive-Testing)
25	Equipment number and anchoring equipment
26	Mooring equipment
	Supporting Calculations (Structure)
27	Design loads summarized in a load plan
28	Distribution of still water shear forces and bending moments
29	Longitudinal strength calculation
30	Geometry properties of significant hull girder cross sections
31	Local stress calculations, if applicable
32	Finite element analysis, if applicable
33	Fatigue stress calculations, if applicable
34	Shock calculations, if applicable
35	Residual strength, if applicable
36	Safety Requirements for the Hull
37	Closing appliances
	Information to calculation of freeboard:
	- Arrangement and detail of exterior doors
	- Arrangement of watertight doors
	- Arrangement and details of hatches
	- Arrangement and details of air pipes and ventilators
	- Arrangement and details of side shell penetration by scuppers and discharges
	- Details of spurling pipes and chain lockers
	- Arrangement and details of side scuttles, windows and skylights
	- Arrangement and details of deck drainage

Table 4.1 Documentation to be submitted for classification (cont.)

Serial No.	Description
38	Bulwarks and guard-rails
39	Arrangement and details of shell doors
40	Watertight integrity plan
41	General stability information
42	Intact stability calculations
43	Damage stability calculations
44	Damage control plan
45	Inclining test, report and evaluation
46	Structural fire protection
47	Documentation on storage rooms and transport lines for explosives (ammunition, missiles, etc.)
48	Rigging plan
49	Masts
50	Specification of standing rigging
51	Specification of further equipment
	Machinery Installations
	General Layout
52	General arrangement of machinery spaces
	Internal Combustion Engines
53	Data on main parameters for each type of internal combustion engine to be used
54	Detailed drawings of the complete engine, including cross/longitudinal sections
55	Documentation on provisions or additional equipment for low load operation of the engines, if applicable
56	Documentation on changes to already approved types of engines
	Gas Turbines and Exhaust Gas Turbochargers
57	Assembly drawings and cross sections
58	Detailed drawings of main components
59	Documentation on the fuel and lubricating systems (incl. circuits, control and safety devices)
60	Documentation on the starting system
61	Data concerning operation conditions
62	Proof of sufficient safety for critical components (incl. results of trials on turbine components)
63	Data concerning welding conditions for welded components
	Power Transmission and Propulsion Systems
64	General drawings of the entire shafting
65	Component parts transmitting torque (shafting, couplings, bearings, etc.)
66	Propeller shaft brackets
67	Stern tube arrangement
68	Cast resin mount
69	Shaft alignment calculation
70	Assembly and sectional drawings of gears and couplings (calculations, parts list)
71	Design drawings of propellers in main propulsion (for engine output in excess of 300 kW)
72	Design drawings of transverse thrust systems (for engine output in excess of 100 kW)
73	General drawings, sectional drawings and functional characteristics of controllable pitch propeller unit
74	Rudder propeller/azimuthing propulsors, if applicable

Table 4.1 Documentation to be submitted for classification (cont.)

Serial No.	Description
	Other Documents
75	Operation and maintenance manuals, if applicable
76	Spare parts list
77	Trial programs (FAT, HAT, SAT)
	Electrical Installations
	Power Plant
78	Details of the scope and type of electrical plant
79	Details about the construction of electrical equipment in hazardous areas
80	General layout for electrical power generation and distribution
81	Details on generators and UPS units
82	Details on hazardous areas
83	Short circuit calculation
84	Electrical power balance
85	Details on main and emergency switchgear, main distribution boards
86	Details on lighting network
87	Details on feeding of weapons and sensors
88	Details on concept to avoid radiation hazards
89	Documentation on switch gear, monitoring and controls for the refrigerating plant
90	Main cableways for different voltage systems
91	Details on electromagnetic compatibility measures
92	Bulkhead/deck penetrations
93	Cable layout/-list
	Manoeuvring System
94	Details on steering gear drive and control systems
95	Details on azimuthing propulsors
96	Controllable pitch propeller system, if applicable
97	Details on dynamic positioning system, if applicable
	Lighting
98	General lighting arrangement
99	Primary lighting
100	Secondary lighting
101	Transitional lighting
102	Escape, evacuation and rescue lighting
103	Portable lighting
104	Operational lighting, if applicable
105	Documentation lighting, if applicable
	Control and Alarm System
106	Monitoring and safety systems for machinery
107	Starting arrangements for main and auxiliary engines
108	Control and regulation for essential equipment and drives
109	Documentation on general and special alarm systems
110	Documentation on position and navigation lights
111	Documentation on fire and CO ₂ alarm system
112	Documentation on watertight and fire door operation and position monitoring system
113	Documentation on tank level indicators, alarms, shut-off facilities
114	Documentation on gas and NBC (nuclear-biological-chemical) detection systems, if applicable
115	Documentation on all essential intercommunication systems

Table 4.1 Documentation to be submitted for classification (cont.)

Serial No.	Description
	Board Computer
116	Hardware and software documentation on computers (as relevant for classification)
	Propulsion
117	Electrical propulsion plants
	Automation
118	General layout
119	Description of functional relationship
120	Software documentation
121	List of sensor types and location of monitoring system
122	Safety programmes giving details of limit values
123	Details of bridge arrangement
	Other Documents
124	Operation and maintenance manuals, if required
125	Spare parts list
126	Trial programs (FAT, HAT, SAT)
	Auxiliary Systems and Equipment
	Pressure vessels
127	List of pressure vessels and equipment
	Auxiliary steam boilers
128	Design drawings for all pressurized parts of the steam boiler
129	Documentation on strength calculations
130	Documentation on types and location of the fittings of the boiler
131	Description of the installation of the boiler plant in the naval ship
132	Cross sections of every burner type to be used
	Tanks and piping
133	Details on fuel and oil tanks
134	Diagrammatic plans of all piping systems
135	Details on remotely controlled valves
136	Supply and transfer for replenishment at sea system, if applicable
137	Manipulation systems for liquids
138	Aircraft refuelling system, if applicable
	Fire extinguishing systems
	Diagrammatic plans, detailed drawings and documents for:
139	Water fire extinguishing equipment
140	CO ₂ fire extinguishing system or systems using other gases
141	Portable and mobile fire-extinguishers
142	Foam extinguishing systems
143	Pressure water spraying systems
144	Fire-extinguishing systems for special rooms, like paint lockers, fight decks and hangars, etc
145	Systems for carriage of dangerous goods in packaged form
146	Quick flooding system for ammunition and weapon rooms
147	NBC spraying system, if applicable
148	Cooling system for reduction of infrared signature, if applicable
149	Water drainage system
150	Fire control plan

Table 4.1 Documentation to be submitted for classification (cont.)

Serial No.	Description
	<p>Equipment Assembly and general drawings, diagrams of hydraulic and electrical equipment, details of all important load transmitting components for:</p> <p>151 Steering gear</p> <p>152 Azimuthing propulsors, if applicable</p> <p>153 Anchor windlasses</p> <p>154 Fire door control system</p> <p>155 Replenishment at sea system</p> <p>156 Manipulation systems, lifts, etc.</p> <p>157 Aircraft handling system</p> <p>158 Hydraulic systems for special devices, if safety-relevant</p> <p>Other Documents (for sub-systems and components)</p> <p>159 Operation and maintenance manuals, if required</p> <p>160 Spare parts list</p> <p>161 Trial programs (FAT, HAT, SAT)</p>