

# TÜRK LOYDU



## **RULES FOR TESTING AND CERTIFICATION OF MATERIALS AND EQUIPMENT TO BE USED IN SHIPS CLASSED BY TÜRK LOYDU JANUARY 2020**

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 No.29 is on or after 1<sup>st</sup> of January 2020. 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.

"General Terms and Conditions" of the respective latest edition will be applicable (see Rules for Classification and Surveys).

If there is a difference between the rules in English and in Turkish, the rule in English is to be considered as valid. This publication is available in print and electronic pdf version. Once downloaded, this document will become UNCONTROLLED. Please check the website below for the valid version.

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## 1. PURPOSE

The aim of these rules is to define which materials and products to be used in ships classed by Türk Loydu is to be subjected to certification and which certification procedures is to be applied to these materials and products..

## 2. DEFINITIONS AND ABBREVIATIONS

**TL :** Türk Loydu

**Customer:** Legal entities or persons who apply to receive service from TL on its behalf or by authorization.

**Certificate:** The written document on which the competent body indicates that a product, process or service is sufficiently conformant to a specific Standard or the related document.

**Certification:** The act of documentation by a competent body that a product, process or service is sufficiently conformant to a specific Standard or the related document.

**Certification Method :** The systems that have rules relating to the process and the method created to carry out the conformity certification.

**Type Approval:** The certification of conformity of a product to predefined standards, rules or specifications by issuing a certificate upon determination of such conformity as a result of tests and controls carried out on one or on a group of products representing that product.

**List of Type Approved Products :** The publications where the products approved by TL are listed.

**Product:** The materials and equipment that are subject to certificate.

**QMS (Quality Management System):** The organizational structure, procedures, responsibilities, instructions, processes and the sources required for the quality management.

**Recognized Organization by Türk Loydu:** IACS Member Societies, Organizations with whom Türk Loydu has signed a Recognition Agreement.

**Requirements:** Requirements within the scope of certification in relation to the product. These can be the TL Rules relating to design, structure and operation and other standards, codes, rules, specifications, the engineering criteria and user requirements..

## 3. GENERAL APPLICATION (RULES)

These Rules are general guideline for the application of valid TL Classification Rules, procedures and instructions relating to the certification of materials and products to be used in ships under TL class. For the issues not included in or conflicted with these rules, applicable TL Classification Rules, procedures and instructions apply.

These rules are applicable to the ships classed by Türk Loydu having + notation. In case where different class notation are affixed, applicable parts of these rules is to be decided upon agreement between customer and TL.

In the scope of these rules, in cases where it is specified that the certificates of Recognized Class Societies by TL are to be accepted, than an agreement between customer and TL must be reached.

#### **4. MATERIALS and EQUIPMENT REQUIRED TO BE TESTED AND CERTIFIED**

##### **4.1 Materials and Equipment Required to be Tested and certified for all ships (see Annex 1)**

1. Ship Construction Materials
2. Hull Outfitting
3. Steering Gears, Lateral Thrusters, Anchor Windlasses, Hydraulic Systems
4. Internal Combustion Engines (Main and Auxiliary)
5. Auxiliary Engines and Accessories
6. Steam Turbines
7. Gas Turbines
8. Pumps, Air Compressors
9. Propeller, Shafting System
10. Reduction Gears, Couplings
11. Steam Boilers
12. Thermal Oil Systems
13. Pressure Vessels and Apparatus
14. Electric System Components
15. Refrigerating Installations
16. Piping Components, Oily Water Separators
17. Fire Protection Equipment
18. **Life-Saving Appliances**

#### **5. CERTIFICATION SCHEMES**

##### **5.1 Certification according to Türk Loydu Rules**

If a material or product is stated to be certified according to Türk Loydu Rules, than this material or product is to be certified according to applicable procedures described in "Rules for Testing and Certification of Materials and Equipment to be Used in Ships Classed by Türk Loydu". Inspections and test for certification stated in respective rule is to be carried out according to "Rules for Testing and Certification of Materials and Equipment to be Used in Ships Classed by Türk Loydu".

##### **5.2 Certification according to international rules such as IMO, ILO, etc.**

If a material or product is requested to be certified according to specification of IMO, ILO or other international rules, than TL inspects and tests this material or product according to the requirements of IMO, ILO or other international rules/standards and issues certificate.

### 5.3 Certification according to MED, CE, etc. EU Directives

If a material or product is requested to be certified according to MED, CE, etc. EU Directives, in cases where TL is designated as notified body for these Directives, this material or product is to be inspected, examined and tested by TL according to procedures and requirements included in MED, CE, etc. EU Directives. If the result of such inspections, examinations and tests are found to be satisfactory, TL issues a certificate specified in respective Directives.

### 5.4 Certification according to EN ISO 10204

Certification according to EN ISO 10204 standard is to apply to all products produced both by metallic materials such as plates, bars, forgings, castings and non-metallic products in conformity with requirements determined in the order.

TL issues a certificate according to EN ISO 10204, after recording that the results of tests are seen and in conformity with requirements identified in the order, together with inspector of manufacturer independent from production department and TL surveyor

## 6. CERTIFICATION OF MATERIALS

### 6.1 Certification of Materials – General

The raw and processed materials to be used in ships built under TL class or in products to be certified, are to be inspected and tested according to the requirements of TL Material Rules or national/international standards and certified.

Inspection and taking of test samples is to be carried out by TL Surveyors. Test samples taken is to be marked according to TL Stamping Procedure.

Tests are to be performed in;

- Independent accredited test laboratories in which samples and test results can be traceable,
- University laboratories having calibrated instruments,
- Non-accredited laboratories on the condition that they are found to be satisfactory according to Work Instruction “ST-E14 Guidelines for the Approval of Firms Supplying Laboratory Services” attended by TL Surveyors or by subcontractor authorised by TL for related test,
- Manufacturer’s laboratory on the condition that it is found to be satisfactory according to Work Instruction “ST-E14 Guidelines for the Approval of Firms Supplying Laboratory Services” attended by TL Surveyors or by subcontractor authorised by TL for related test,

The contents and validity periods of calibration certificates except those stated in 1<sup>st</sup> item above, should be controlled. If found to be satisfactory, one copy of calibration certificate is to be taken, otherwise information about number, validity period, issuing body of calibration certificate should be introduced to survey report.

The test reports of tests carried out in laboratories of TL approved raw material producers or those producing type approved products is to be evaluated by TL Surveyor and approved if found satisfactory and than a certificate according to EN ISO 10204-3.2 issued.

## 6.2 Certification of raw materials

Certification materials as ingots or casted in shaped moulds from natural ores or pure blocks is to be performed according to raw materials certification rules. Raw materials or semi-finished materials to be utilized as a part of products to be used in ships built under TL class, are to be inspected and tested in accordance with the requirements of TL Rules or national/international standards and certified. Unless otherwise requested, raw materials or semi-finished materials for which product certificate issued by TL, can be used in products installed on ships built under TL class or ships classed by TL or directly to ships without subject to acceptance test. For performing of tests and certification, requirements stated in item 6.1 are to be observed.

## 6.3 Certification of processed materials

Processed materials to be utilized as a part of products to be used in ships built under TL class, are to be inspected and tested in accordance with the requirements of TL Rules or national/international standards and certified. During inspection, the values included in the TL approved drawings relevant to material in question, if any, are to be taken into account. Unless otherwise requested, processed materials for which product certificate issued by TL, can be used in products installed on ships built under TL class or ships classed by TL or directly to ships without subject to acceptance test. For performing of tests and certification, requirements stated in item 6.1 are to be observed.

## 7. PRODUCT CERTIFICATION

Products to be used in ships built under TL class are to be inspected and tested according to the requirements of TL Rules or national/international standards and certified.

Unless otherwise requested, products for which product certificate issued by TL, can be installed on ships built under TL class or ships classed by TL without subject to acceptance test. The tests carried out during dock and sea trials are exempted.

Product certification can be made for individual product or for lots of products. If certification is carried out for lots of products, whether all products or number of samples taken randomly be tested is to be decided according to product related TL Rules or national/international standards.

Product certification is to be carried out according to the requirements of TL Rules or national/international standards with the application of the following processes.

### 7.1 Review and approval of required plans, calculations and documents

The plans, calculations and documents of products to be certified by TL required in Türk Rules or national/international standards is to be submitted to TL. Submitted plans, calculations and documents is to make it possible to clearly understand the design, manufacture and operation of the product and is to include the following:

- A general description of the product,
- The conceptual design, the manufacturing drawings, the schemes of components and sub-assemblies,
- Description and explanations necessary for the understanding of product,

- Calculations related with the design,
- Preliminary test reports, if any,
- Manuals for maintenance and operation,
- Control and test procedures.

The conditions (if any) of TL in submitted plans and documents are to be dealt with. If the plans and documents are approved as amended, amendments is to be fulfilled. Where the documentation submitted is found to be satisfactory, accuracy of the information concerning with material and product included in these documentation is to be checked.

## **7.2 Approval of Materials**

Materials to be used in the products to be certified by TL are to be certified according to item 6. In cases where the quantity of material to be certified is limited and TL surveyor transportation expences for certification is extremely high, TL may authorise a recognized class society to carry out material certification or accept EN ISO 10204 type 3.2 certified materials.

## **7.3 Control and test of components**

If components which are integral part of a product have to be certified according to TL Rules, the certificate stated in the rules is required. This component is evaluated for the compatibility with the main product. This component is to be examined by TL Surveyor, if necessary is to be tested witnessed by TL Surveyor before being assembled into main product.

## **7.4 Control and tests of product**

Upon completion of production, the product is to be subjected to control and test according to the following Rules and standards defined for the certification:

- TL Rules,
- IMO, ILO, etc. International Rules / standards,
- MED,CE, etc. EU Directives.

## **8. TYPE APPROVAL**

### **8.1 General**

For commencement of Type Approval Certificate process of a product by TL, official application should be made to TL by the manufacturer or his authorized representative and the necessary stages should be completed according to TL procedure no. TL 1100. These stages are:

- Application, TL's offer, following the confirmation of offer determination of the rules and standards to be applied for Type Approval and signing of the contract,
- Submission of documents requested by TL,
- Submission of necessary technical documents (drawings, calculations, etc.) to be requested by TL,
- Auditing of QMS and production processes of manufacturer,

- Certification of materials and components to be used in type product or product group,
- Performing of type tests of product in accordance with applicable rules and standards,
- Issuance of Type Approval Certificate after fulfilling the requirements of above mentioned items,
- Publishing of product and manufacturer in TL Type Approved Products List.

TL Type Approved products can be used in ships being built under TL class directly or with subject to necessary inspections and tests as stated in the annexes of item 11 of this rule.

Unless otherwise requested, TL Type Approved products, can be installed on ships being built under TL class or ships classed by TL without subject to acceptance test. The tests carried out during dock and sea trials are exempted.

Product certification can be made for individual product or for lots of products. If certification is carried out for lots of products, whether all products or number of samples taken randomly be tested is to be decided according to product related TL Rules or national/international standards.

Product certification is to be carried out according to the requirements of TL Rules or national/international standards with the application of the following processes.

## **8.2 Acceptance of raw materials**

It should be proved by certificates submitted by manufacturer that the raw materials to be used in TL type approved products fulfill the requirements of TL Rules for this product. The raw material certificate required by TL rules for this product, if any, should be declared by the manufacturer as a acceptance criterion. If there is no requirement in TL Rules for the certificates of raw materials to be used in product, than the agreement between the manufacturer and TL must be reached how to prove the fulfillment of the requirements of TL Rules.

TL may request to perform material tests for raw materials used for sample product or EN ISO 10204 type 3.2 certified materials can be accepted after examination of traceability in the quality records.

## **8.3 Acceptance of processed materials**

It should be proved by certificates submitted by manufacturer that the processed materials to be used in TL type approved products fulfill the requirements of TL Rules for this product. The processed material certificate required by TL rules for this product, if any, should be declared by the manufacturer as a acceptance criterion. If there is no requirement in TL Rules for the certificates of processed materials to be used in product, than the agreement between the manufacturer and TL must be reached how to prove the fulfillment of the requirements of TL Rules.

TL may request to perform material tests and inspections for processed materials used for sample product or EN ISO 10204 type 3.2 certified materials can be accepted after examination of traceability in the quality records.

## **8.4 Acceptance of components**

If a product to be type approved contains one or more components, the latter should have an acceptable certificate by TL. The manufacturer should declare this certificate as a acceptance criterion of component.



TL may request the functional tests of component used in the sample product to prove that the component is fit for its envisaged purpose

## **9. CERTIFICATION of TYPE APPROVED PRODUCTS**

In order to use of type approved products in ships classed by TL or in products certified by TL, certification is to be performed on the product basis, if required by TL Rules. Type of certification required in accordance with the type of material or product is mentioned in Annex 1 of this rule. Selected type of certification is to be carried out by applying for this rule and other relevant procedure, instruction and rules.

## **10. PRODUCTION QUALITY ASSURANCE CERTIFICATION**

### **10.1 Certification of raw material manufacturer**

If the results of tests and checks of a produced representative sample or group of samples are found in compliance with TL Rules, standards or identified specifications agreed with the processed material manufacturer and upon satisfactory completion of the audit for quality assurance system providing continuity of such compliance, a certificate is to be issued.

Production Quality Assurance Certificate issued by TL, proves that the manufacturer has ability to produce the material in compliance with standards, rules and identified specifications, the inspections and tests are performed in compliance with TL Rules, recorded and certified, on the condition that the quality assurance system applied by the manufacturer and production conditions remain unchanged.

Production Quality Assurance Certificate does not come to mean that tests and checks stipulated in standards, rules and identified specifications are performed under the supervision of TL Surveyor for each of the materials produced by the manufacturer and launched to the market. The manufacturer having Production Quality Assurance Certificate is sole responsible for the product that is produced by him.

### **10.2 Certification of processed material manufacturer**

If the results of tests and checks of a produced representative sample or group of samples are found in compliance with TL Rules, standards or identified specifications agreed with the processed material manufacturer and upon satisfactory completion of the audit for quality assurance system providing continuity of such compliance, a certificate is to be issued.

Type Approval Certificate is to be issued for the processed material manufacturer if the material is correlated with the definition of "Type". Processes and conditions for Type Approval Certification is stated in "1100/D Type Approval Procedure". If there is no definable "Type" for the processed material, than Production Quality Assurance Certificate is to be issued.

Production Quality Assurance Certificate issued by TL, proves that the manufacturer has ability to produce the material in compliance with standards, rules and identified specifications, the inspections and tests are performed in compliance with TL Rules, recorded and certified, on the condition that the quality assurance system applied by the manufacturer and production conditions remain unchanged.

Production Quality Assurance Certificate does not come to mean that tests and checks stipulated in standards, rules and identified specifications are performed under the supervision of TL Surveyor for each of the materials produced by the manufacturer and launched to the market. The manufacturer having Production Quality Assurance Certificate is sole responsible for the product that is produced by it.

### **10.3 Certification of product manufacturer having type approval certificate**

Issuance of Type Approval Certificate for a product after performing necessary inspections, surveys and tests by TL proves that the manufacturer has ability to produce the certified product in compliance with standards, rules and identified specifications, on the condition that the quality assurance system applied by the manufacturer and production conditions remain unchanged, but the manufacturer is responsible for the conformity of the product with the conditions and standards stated in Type Approval Certificate.

For installation of products having Type Approval Certificate on board ships or utilizing as a component of a product, TL may request product based certification according to TL Rules. For such certification of TL Type Approved product, inspection and FAT (Factory Acceptance Tests) in accordance with TL Rules should be carried out. For the Type Approved product manufacturer having Production Quality Assurance Certificate issued by TL, FAT and final inspection can be carried out by the manufacturer without attendance of TL Surveyor. In this case, TL may issue Product Certificate or Test Certificate based on the reports of FAT and final inspections carried out by the manufacturer. The scope of reports basis for these certificates is to be agreed between TL and manufacturer having Production Quality Assurance Certificate and recorded as quality document.

## **11. ALTERNATIVE CERTIFICATION SCHEME**

For Alternative Certification Scheme, TL Rules, Classification and Surveys, Section 2,F apply.

## **12. ANNEXES**

### **12.1 ANNEX 1 – The List of Materials and Equipment Required to be Tested and Certified for All Ships**

#### **12.1.1 Purpose and application of list**

The following list is prepared to identify the type of certificate required for the materials and equipment before being installed in ships together with the controls and tests of materials and equipment having such certificate required to be performed before coming into service. Tests and controls that may be requested in the dock and sea trials procedures does not included into this list. But, upon agreement with TL, a test or control may be performed during dock or sea trial.

Rules and processes included in this document are intended to summarise the requirements concerning with certification and acceptance of materials and equipment located in TL Rules. In the event of discrepancy between the requirements in this document and TL Rules in relation with certification of materials and equipment, the latter are to be considered valid.

If it is necessary to certify and install a material or equipment not considered in the following list into the ship, an agreement should be reached for the applicable procedure.

### 12.1.2 Form and contents of the list

The list in Annex 1 is grouped under the headlines in accordance with sub-items included in the para 4.1 of this document. The list in Annex 1 is to be updated independently from the text of document and published with

revision number and date. Indices located in the individual list are only related with the materials and equipment grouped into the headline in question.

Column 1 indicates an identification number for the materials and equipment,

Column 2 indicates a description of the materials and equipment. There may be more than one line at the right side of the column 2. In such cases, one of the lines can be selected for the materials and equipment in question.

Column 3 indicates TL Rules, national or international rules and standards basis for the certification of the materials and equipment and having the requirements to be met by them.

Column 4 indicates which type of certificate is required for the materials and equipment to be used in ships classed by TL.

### 12.1.3 Abbreviations and symbols used in the Annex

|       |  |
|-------|--|
| KK    | : Requirements of Türk Loydu Classification Rules        |
| BK    | : Flag State Rules                                       |
| TO    | : Türk Loydu Type Approval Certificate                   |
| ÜB    | : Türk Loydu Product Certificate                         |
| TS    | : Türk Loydu Test Certificate                            |
| MR    | : Inspection Report                                      |
| ÜRS   | : Manufacturer Certificate                               |
| BB    | : Flag State Certificate                                 |
| MED   | : Certificate as per Directive 96/98/EC                  |
| YTS   | : Authorised test stand                                  |
| OÜR   | : Approved manufacturer                                  |
| TK TO | : Type Approval of Organisation recognized by Türk Loydu |
| TKS   | : Certificate of Organisation recognized by Türk Loydu   |

Not: If the information in this document conflicts with the rules, the rules shall be followed.

## Annex 1 – List of Materials and Equipment Required to be Tested and Certified for All Ships

## 4.1.1 Hull Construction Materials

| NO                         | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----------------------------|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                            |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01                         | Steel plates, profiles, structural tubes   | KK                        | TS                             |                      | X                 | X   | X                            | X                              | X                 |               |
|                            |  |                           | TO+TS                          |                      | X                 | X   | X                            | X                              | X                 |               |
|                            |  |                           | TKS+TS                         |                      | X                 | X   | X                            | X                              | X                 |               |
| 02                         | Aluminium alloy plates, profiles, tubes  | KK                        | TS                             |                      | X                 | X   | X                            | X                              | X                 |               |
|                            |  |                           | TO+TS                          |                      | X                 | X   | X                            | X                              | X                 |               |
|                            |  |                           | TKS+TS                         |                      | X                 | X   | X                            | X                              | X                 |               |
| 03                         | Cast or forged steel stem or stern frame, rudder horn, hawse pipes, propeller shaft brackets | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|                            |  |                           |                                |                      |                   |     |                              |                                |                   |               |
|                            |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 04                         | Welding consumables  | KK                        | TS                             |                      | X                 | X   |                              |                                | X<br>(1)          |               |
|                            |  |                           | TKS + TS                       |                      | X                 | X   |                              |                                | X<br>(1)          |               |
|                            |  |                           | TO                             |                      |                   |     |                              |                                |                   |               |
| <b>(1)</b> Test on sample. |  |                           |                                |                      |                   |     |                              |                                |                   |               |

4.1.2 Hull Outfitting

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Anchors, HHP anchors                               | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(2)(3)           |               |
|    |  |                           | TO+TS                          |                      | X                 | X   |                              | X                              | X(2)              |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 02 | Anchor chain cables                                | KK                        | ÜB                             |                      | X                 | X   | X                            | X                              | X(2)              |               |
|    |  |                           | TO+TS                          |                      | X                 |     |                              |                                | X(2)              |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 03 | Anchor chain cable accessories                     | KK                        | ÜB                             |                      | X                 | X   | X                            | X                              | X(2)              |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              |                                | X(2)              |               |
|    |  |                           | TKS+TS                         |                      |                   |     |                              | X                              | X(2)              |               |
| 04 | Rudder parts (rudder stock, rudder bearings, etc.) | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |

(1) Test on sample.  
(2) Load test.  
(3) Anchor holding power test for HHP and SHHP type anchor

4.1.3 Steering Gears, Lateral Thrusters, Anchor Windlasses, Hydraulic Systems

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Electric motors for steering gears or anchor windlasses (rated power $\geq 50$ kW), electric motors for lateral thrusters (rated power $\geq 100$ kW) | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 02 | Hydraulic pumps of steering gears and anchor windlasses with driving power $> 50$ kW  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 03 | Steering gear (complete)  | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 04 | Anchor windlass (complete)  | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 06 | Rudder blade  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 07 | Thruster tunnel   | KK                        | TKS                            | X                    |                   |     |                              | X(2)                           |                   |               |
|    |   |                           | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 08 | Hydraulic Power Unit  | KK                        | ÜB                             | x                    |                   |     |                              | X                              | X                 | X (1)         |
|    |   |                           | TKS                            | X                    |                   |     |                              |                                | X(2)              | X (1)         |
|    |   |                           | TO                             |                      |                   |     |                              |                                | X                 |               |

(1) Performance test.

(2) Document review (TKS approved ndt reports, material reports, production reports report will be reviewed by TL)

#### 4.1.4 Internal Combustion Engines

For Internal Combustion Engines and their components certification please see: "SP 03/17 Alternative Survey Arrangement guidelines under Alternative Certification Scheme for Trunk Engines manufactured in Mass or in Series."

#### 4.1.5 Auxiliary Machinery and Accessories

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Air, water and oil coolers   | KK                        | See table 4.1.13               |                      |                   |     |                              |                                |                   |               |
| 02 | Clutches   | KK                        | ÜB                             | X                    | X                 |     |                              | X                              | X(1)              |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |
| 03 | Control, monitoring and alarm systems  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
|    |  |                           | TK TO +TS                      | X                    |                   |     |                              |                                | X                 | X             |
| 04 | Cooling water, lubricating oil, fuel oil injection and fuel oil transfer pumps | KK                        | TS                             |                      |                   |     |                              |                                | X                 |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 05 | Fuel oil ejectors  |                           | TS                             |                      |                   |     |                              |                                | X(1)              |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 06 | Elastic couplings  | KK                        | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 07 | Electric panels and apparatus  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 08 | Fuel oil and lubricating oil tanks   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 09 | Fuel oil and lubricating oil purifiers   | KK                        | TS                             |                      |                   |     |                              | X                              | X(1)              |               |
|    |  |                           | TO                             |                      |                   |     |                              | X                              | X(1)              |               |
|    |  |                           | TK TO                          |                      |                   |     |                              | X                              | X(1)              |               |

(1) Hydrostatic test

4.1.5 Auxiliary machinery and accessories - continued -

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 10 | Injectors, buster pumps and injection pipes  | KK                        | TS                             |                      |                   |     |                              |                                | X                 |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 11 | Oil mist detector  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 |               |
|    |  |                           | TO                             |                      |                   |     |                              | X                              | X                 |               |
|    |  |                           | TK TO                          | X                    |                   |     |                              | X                              | X                 |               |
| 12 | Piping systems   | KK                        | TS                             |                      | X                 |     |                              | X                              |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 13 | Pressure filters   | KK                        | TS                             |                      |                   |     |                              |                                | X                 |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 14 | Rotors and shafts for scavenge blowers and turbochargers for engines having a power of 1000 kW and above | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X                 |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 |               |
| 15 | Rotors and shafts for scavenge blowers and turbochargers for engines having a power less than 1000 kW    | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 16 | Scavenge air main  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 17 | Safety valves (crankcase)  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 18 | Scavenging pumps   | KK                        | TS                             |                      |                   |     |                              |                                | X                 |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 19 | Starting air compressor  | KK                        | ÜB                             | X                    | X                 |     |                              | X                              | X                 |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |



4.1.5 Auxiliary machinery and accessories - continued -

| NO | PRODUCT                                     | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |  |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|--|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 20 | Starting motors (electrical)                | KK                        |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | TO                             |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | TS                             |                      |                   |     |                              | X                              | X                 |               |  |
| 21 | Starting motors (hydraulic or pneumatic)    | KK                        |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | TS                             |                      |                   |     |                              |                                |                   | X             |  |
|    |   |                           | TO                             |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |  |
| 22 | Turbocharger (Complete) (less than 1000 kW) | KK                        |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           | ÜRS                            |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |  |
| 23 | Turbocharger (Complete) (1000 kW and above) | KK                        | ÜB                             | X                    |                   |     |                              |                                | X                 | X             |  |
|    |   |                           | TO                             |                      |                   |     |                              |                                | X                 | X             |  |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |  |

## 4.1.6 Steam Turbines

| NO | PRODUCT                              | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--------------------------------------|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |                                      |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Rotor                                | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 |               |
|    |                                      |                           | TO                             |                      |                   |     | X                            | X                              |                   |               |
| 02 | Blades                               | KK                        | TS                             |                      | X                 | X   |                              | X                              |                   |               |
|    |                                      |                           | TS                             |                      | X                 | X   |                              |                                | X(1)              |               |
| 04 | Circulation pump                     | KK                        | TS                             |                      |                   |     |                              | X                              | X                 |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     | X                            | X(1)                           |                   |               |
| 05 | Clutch                               | KK                        | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     | X                            | X(1)                           |                   |               |
| 06 | Control, monitoring and alarm system | KK                        | ÜB                             | X                    |                   |     | X                            | X                              | X                 | X             |
|    |                                      |                           | TK                             | X                    |                   |     | X                            | X                              | X                 |               |
|    |                                      |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |
| 07 | Bolts-nuts (coupling)                | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |
| 08 | Coupling                             | KK                        | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |
| 09 | Disk                                 | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|    |                                      |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           | TK                             |                      |                   |     |                              | X                              |                   |               |
| 10 | Dump condenser                       | KK                        | TK TO                          |                      |                   |     |                              | X                              | X                 |               |
|    |                                      |                           | TO                             |                      |                   |     |                              |                                | X                 |               |
| 11 | Ejektör                              | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |
| 12 | Electric apparatus                   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |
| 13 | Extraction pump                      | KK                        | ÜB                             |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | TO                             |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           | TK TO                          |                      |                   |     |                              | X                              |                   |               |

(1) Hydrostatic test

4.1.6 Steam Turbines - continued -

| NO                          | PRODUCT                   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE    | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|-----------------------------|---------------------------|---------------------------|-----------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                             |                           |                           |                                   | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 14                          | Main condenser            | KK                        |                                   |                      |                   |     |                              |                                |                   |               |
|                             |                           |                           | See Table 4.1.13 Pressure Vessels |                      |                   |     |                              |                                |                   |               |
| 15                          | Piping systems            | KK                        |                                   |                      |                   |     |                              |                                |                   |               |
|                             |                           |                           | See Table 4.1.16 Piping System    |                      |                   |     |                              |                                |                   |               |
| 16                          | Safety valves             | KK                        |                                   |                      |                   |     |                              |                                |                   |               |
|                             |                           |                           | See Table 4.1.13 Pressure Vessels |                      |                   |     |                              |                                |                   |               |
| 17                          | Nozzles and diaphragms    | KK                        | ÜS                                |                      | X                 | X   |                              | X                              |                   |               |
|                             |                           |                           | TO + TS                           |                      |                   |     |                              | X                              |                   |               |
|                             |                           |                           | TK TO+TS                          |                      | X                 | X   |                              | X                              |                   |               |
| 18                          | Shafts                    |                           | ÜB                                |                      | X                 | X   |                              | X                              |                   |               |
|                             |                           |                           | TO +TS                            |                      |                   |     |                              | X                              |                   |               |
|                             |                           |                           | TK TO+TS                          |                      | X                 | X   |                              | X                              |                   |               |
| 19                          | Internal piping (turbine) | KK                        | ÜRS                               |                      |                   |     |                              | X                              |                   |               |
|                             |                           |                           |                                   |                      |                   |     |                              |                                |                   |               |
| 20                          | Turbine (complete)        | KK                        | ÜB                                | X                    |                   |     | X                            | X                              | X(1)              | X             |
|                             |                           |                           | TO                                |                      |                   |     |                              | X                              | X(1)              | X             |
|                             |                           |                           |                                   |                      |                   |     |                              |                                |                   |               |
| 21                          | Welded structures         | KK                        | TS                                |                      | X                 | X   | X                            | X                              |                   |               |
|                             |                           |                           |                                   |                      |                   |     |                              |                                |                   |               |
| <b>(1) Hydrostatic test</b> |                           |                           |                                   |                      |                   |     |                              |                                |                   |               |

4.1.7 Gas Turbines

| NO | PRODUCT                              | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE                    | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--------------------------------------|---------------------------|---|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |                                      |                           |   | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Rotor                                | KK                        | ÜB  |                      |                   |     |                              | X                              | X                 |               |
|    |                                      |                           | TO  |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           | TK TO   |                      |                   |     |                              | X                              | X                 |               |
| 02 | Blades                               | KK                        | ÜS  |                      | X                 | X   |                              | X                              |                   |               |
|    |                                      |                           | TO +TS  |                      |                   |     |                              | X                              |                   |               |
| 03 | Casing                               | KK                        | TS  |                      | X                 | X   |                              |                                | X(1)              |               |
| 04 | Clutch                               | KK                        |   |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | <b>See Table 4.1.9 Propeller,shafting</b>         |                      |                   |     |                              |                                |                   |               |
| 05 | Combustion chamber                   |                           | ÜRS   |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           |   |                      |                   |     |                              |                                |                   |               |
| 06 | Control, monitoring and alarm system | KK                        |   |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | <b>See Table 4.1.14 Electric System Component</b> |                      |                   |     |                              |                                |                   |               |
| 07 | Bolts-nuts                           | KK                        | ÜRS   |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           |   |                      |                   |     |                              |                                |                   |               |
| 08 | Coupling                             | KK                        |   |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | <b>See Table 4.1.9 Propeller,shafting</b>         |                      |                   |     |                              |                                |                   |               |
| 09 | Disk                                 | KK                        | ÜS  |                      | X                 | X   |                              | X                              |                   |               |
|    |                                      |                           | TO  |                      |                   |     |                              | X                              |                   |               |
|    |                                      |                           | TK TO   |                      | X                 | X   |                              | X                              |                   |               |
| 10 | Electric panels and apparatus        | KK                        |   |                      |                   |     |                              |                                |                   |               |
|    |                                      |                           | <b>See Table 4.1.14 Electric System Component</b> |                      |                   |     |                              |                                |                   |               |

(1) Hydrostatic test

4.1.7 Gas Turbines - continued -

| NO                          | PRODUCT                                  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE                             | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|-----------------------------|--|---------------------------|--|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                             |  |                           |  | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11                          | Piping systems                           | KK                        |  |                      |                   |     |                              |                                |                   |               |
|                             |  |                           | <b>See Table 4.1.16 Piping System</b>                      |                      |                   |     |                              |                                |                   |               |
| 12                          | Safety valves                            | KK                        |  |                      |                   |     |                              |                                |                   |               |
|                             |  |                           | <b>See Table 4.1.13 Pressure Vessels</b>                   |                      |                   |     |                              |                                |                   |               |
| 13                          | Nozzles and diaphragms                   | KK                        | ÜS   |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           | TO + TS  |                      |                   |     |                              | X                              |                   |               |
|                             |  |                           | TK TO+TS   |                      | X                 | X   |                              | X                              |                   |               |
| 14                          | Shafts                                   | KK                        | ÜB   |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           | TO +TS   |                      |                   |     |                              | X                              |                   |               |
|                             |  |                           | TK TO+TS   |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           |  |                      |                   |     |                              |                                |                   |               |
| 15                          | Starting motors (electrical)             |                           |  |                      |                   |     |                              |                                |                   |               |
|                             |  |                           | <b>See Table 4.1.14 Electric System Components</b>         |                      |                   |     |                              |                                |                   |               |
| 16                          | Starting motors (hydraulic or pneumatic) | KK                        | ÜB   |                      |                   |     |                              |                                |                   |               |
|                             |  |                           | <b>See Table 4.1.5 Auxiliary Machinery and Accessories</b> |                      |                   |     |                              |                                |                   |               |
| 17                          | Internal piping (turbine)                | KK                        | ÜRS  |                      | X                 |     |                              |                                |                   |               |
|                             |  |                           |  |                      |                   |     |                              |                                |                   |               |
| 18                          | Turbine (Complete)                       | KK                        | ÜB   | X                    |                   |     | X                            | X                              | X(1)              | X             |
|                             |  |                           | TO+TS  |                      |                   |     |                              | X                              | X(1)              | X             |
|                             |  |                           |  |                      |                   |     |                              |                                |                   |               |
| <b>(1) Hydrostatic test</b> |  |                           |  |                      |                   |     |                              |                                |                   |               |

## 4.1.8 Pumps, Air Compressors

| NO | PRODUCT                       | CERTIFICATION<br>REQUIREMENT | TYPE OF<br>ACCEPTABLE<br>CERTIFICATE | APPLICABLE PROCESSES |                      |     |                                    |                                   |                   |               |
|----|-------------------------------|------------------------------|--------------------------------------|----------------------|----------------------|-----|------------------------------------|-----------------------------------|-------------------|---------------|
|    |                               |                              |                                      | DOCUMENT<br>APPROVAL | MATERIAL<br>APPROVAL | NDT | INSPECTION<br>DURING<br>PRODUCTION | FINAL INSPECTION,<br>VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Bilge pump                    | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 02 | Ballast pump                  | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 03 | Sea water cooling pump        | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 04 | Fresh water cooling pump      | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 05 | Fire pump                     |                              | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 06 | Emergency fire pump           | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 07 | Condensate water pump         | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 08 | Boiler feed water pump        | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 09 | Boiler water circulation pump | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |
| 10 | Lubricating oil pump          | KK                           | TS                                   |                      |                      |     |                                    |                                   | X                 | X             |
|    |                               |                              |                                      |                      |                      |     |                                    |                                   |                   |               |

4.1.8 Pumps, Air Compressors – continued –

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11 | Fuel delivery pump  | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 12 | Fuel transfer pump  | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 13 | Fuel injection valve cooling pump   | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 14 | Thermo oil system circulation pump  | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 15 | Sea water cooling pump (for coolers)  |                           | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 16 | Refrigerant circulation pump  | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 17 | Cargo pump  | KK                        | ÜB                             | X                    | X                 |     |                              | X                              | X                 | X             |
|    |   |                           | TO+<br>TS                      |                      |                   |     |                              |                                | X                 | X             |
| 18 | Hydraulic pumps and motors of anchor windlasses, rudder propeller systems and steering gears with driving power > 50 kW | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 19 | Hydraulic pumps and motors of lateral thrusters with driving power >100 kW  | KK                        | TS                             |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 20 | Air compressors   | KK                        | ÜB                             |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |

## 4.1.9 Propeller, Shafting System

| NO  | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |  |
|---|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|--|
|   |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 01  | Bearing bushes   | KK                        | ÜB                             |                      | X                 |     |                              |                                | X                 |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| 02  | Cardan shafts (flanges, crosses, shafts, yokes)                            | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              |                                |                   |               |  |
| 03  | Clutches   | See 4.1.10.               |                                |                      |                   |     |                              |                                |                   |               |  |
| 04  | Control, monitoring and alarm systems                                      | See 4.1.14.               |                                |                      |                   |     |                              |                                |                   |               |  |
| 05  | Controllable pitch propeller and built-up propeller blades                 | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(1)              |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |  |
| 06  | Controllable pitch propeller and built-up propeller connecting bolts/studs | KK                        | ÜB                             | X                    |                   | X   |                              | X                              |                   |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| 07  | Controllable pitch propeller and built-up propeller hubs                   | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(2)              |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(2)              |               |  |
| 08  | Controllable pitch propeller hydraulic control system                      | See 4.1.3.                |                                |                      |                   |     |                              |                                |                   |               |  |
| 09  | Controllable pitch propeller mechanism (mechanical parts)                  | KK                        | ÜB                             |                      | X                 |     |                              | X                              |                   | X             |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   | X             |  |
| 10  | Coupling bolts or studs for couplings                                      | KK                        | ÜB                             | X                    | X                 |     |                              |                                |                   |               |  |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| <p>(1) <i>Balancing Test</i></p> <p>(2) <i>Hydrostatic Test</i></p> |  |                           |                                |                      |                   |     |                              |                                |                   |               |  |



4.1.9 Propeller, Shafting System - continued -

| NO | PRODUCT                 | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |      |                              |                                |                   |               |
|----|-------------------------|---------------------------|--------------------------------|----------------------|-------------------|------|------------------------------|--------------------------------|-------------------|---------------|
|    |                         |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT  | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11 | Coupling keys           | KK                        | ÜB                             | X                    | X                 |      |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 12 | Elastic couplings       | KK                        | ÜB                             | X(3)                 | X                 |      |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 13 | Forgings for tailshafts | KK                        | ÜB                             |                      | X                 | X(4) |                              |                                | X                 |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              |                                | X                 |               |
| 14 | Hydraulic couplings     | KK                        | ÜB                             | X                    | X                 |      |                              | X                              | X(2)              |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              | X(2)              |               |
| 15 | Intermediate shafts     | KK                        | ÜB                             | X                    | X                 | X(5) |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 16 | Propeller nuts          | KK                        | ÜB                             | X                    | X                 |      |                              | X                              | X                 |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              | X                 |               |
| 17 | Fixed pitch propellers  | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              | X                 |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              | X                 |               |
| 18 | Quiller shaft           | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 19 | Sterntube bushes        | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 20 | Sterntube sealing       | KK                        | ÜB                             | X                    |                   |      |                              | X                              |                   |               |
|    |                         |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |

## 4.1.9 Propeller, Shafting System - continued -

| NO   | PRODUCT                | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |      |                              |                                |                   |               |
|--|------------------------|---------------------------|--------------------------------|----------------------|-------------------|------|------------------------------|--------------------------------|-------------------|---------------|
|  |                        |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT  | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 21   | Sterntube              | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              | X(2)              |               |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              | X(2)              |               |
| 22   | Propeller shaft liners | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              |                   |               |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 23   | Propeller shafts       | KK                        | ÜB                             | X                    | X                 | X(5) |                              | X                              |                   |               |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 24   | Teeth coupling         | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              |                   |               |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 25   | Thrust shafts          | KK                        | ÜB                             | X                    | X                 | X(5) |                              | X(5)                           |                   |               |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              |                   |               |
| 26   | Thrust sliding-pads    | KK                        | ÜB                             |                      | X                 |      |                              |                                |                   |               |
|  |                        |                           | TO                             |                      |                   |      |                              |                                |                   |               |
| 27   | Thrusters              | KK                        | ÜB                             | X                    | X                 | X    |                              | X                              | X                 | X             |
|  |                        |                           | TO+TS                          |                      |                   |      |                              | X                              | X                 | X             |
| <p>(3) Only for propulsion couplings</p> <p>(4) Not required for shafts with diameter less than 100 mm</p> <p>(5) Not required for shafts with diameter less than 250 mm</p> |                        |                           |                                |                      |                   |      |                              |                                |                   |               |

4.1.10 Reduction and Reverse Gears, Couplings

| NO                          | PRODUCT  | CERTIFICATION REQUIREMENT              | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|-----------------------------|--|--|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                             |  |  |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01                          | Casings of reduction and reverse gears for propulsion transmitting 220 kW power and above and for essential auxiliaries transmitting 110 kW power and above                                    | KK                                     | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|                             |  |  | TO+TS                          |                      |                   |     | X                            |                                |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 02                          | Clutches   | KK                                     | ÜB                             | X                    | X                 |     |                              | X                              | X(1)              |               |
|                             |  |  | TO+TS                          |                      |                   |     | X                            | X(1)                           |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 03                          | Control, monitoring and alarm systems  | See 4.1.14.                            |                                |                      |                   |     |                              |                                |                   |               |
| 04                          | Couplings of reduction and reverse gears for propulsion transmitting 220 kW power and above and for essential auxiliaries transmitting 110 kW power and above                                  | KK                                     | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|                             |  |  | TO+TS                          |                      |                   |     | X                            |                                |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 05                          | Pinions and wheels of reduction and reverse gears for propulsion transmitting 220 kW power and above and for essential auxiliaries transmitting 110 kW power and above                         | KK                                     | ÜB                             | X                    | X                 | X   |                              | X                              | X                 |               |
|                             |  |  | TO+TS                          |                      |                   |     | X                            | X                              |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 06                          | Plates and profiles for steel welded cases of reduction and reverse gears for propulsion transmitting 220 kW power and above and for essential auxiliaries transmitting 110 kW power and above | KK                                     | TS                             |                      | X                 |     |                              |                                |                   |               |
|                             |  |  | TO+TS                          |                      | X                 |     |                              |                                |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 07                          | Reduction and/or reverse gears for propulsion transmitting 220 kW and above power and for essential auxiliaries transmitting 110 kW power and above  | KK                                     | ÜB                             | X                    |                   |     |                              | X                              |                   | X             |
|                             |  |  | TO+TS                          |                      |                   |     |                              | X                              |                   | X             |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 08                          | Reduction and/or reverse gears others than those indicated in item 7   | KK                                     | ÜRS                            |                      |                   |     |                              | X                              |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 09                          | Shafts of reduction and reverse gears for propulsion transmitting 220 kW power and above and for essential auxiliaries transmitting 110 kW power and above                                     | KK                                     | ÜB                             | X                    | X                 | X   |                              | X                              |                   |               |
|                             |  |  | TO                             |                      |                   |     |                              | X                              |                   |               |
|                             |  |  |                                |                      |                   |     |                              |                                |                   |               |
| 10                          | Valves, pipes, pump coolers  | See 4.1.16<br>See 4.1.11<br>See 4.1.13 |                                |                      |                   |     |                              |                                |                   |               |
| <b>(1) Hydrostatic Test</b> |  |  |                                |                      |                   |     |                              |                                |                   |               |

## 4.1.11 Steam Boilers

| NO                          | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|-----------------------------|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                             |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01                          | Steam boilers  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X(1)              | X             |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 02                          | Cast or forged parts for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels (B), (P), (HE) | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 03                          | Condensers   | See 4.1.13                |                                |                      |                   |     |                              |                                |                   |               |
| 04                          | Control, monitoring and alarm systems  | See 4.1.14                |                                |                      |                   |     |                              |                                |                   |               |
| 05                          | Cylinders for hydraulic plants   | See 4.1.3                 |                                |                      |                   |     |                              |                                |                   |               |
| 06                          | Drums for watertube boilers  | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(1)              |               |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 07                          | Flanges and nozzles for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels                 | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 08                          | Water level indicators   | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(1)              |               |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 09                          | Pipes and valves   | See 4.1.16                |                                |                      |                   |     |                              |                                |                   |               |
| 10                          | Plates, profiles and tubesheets for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels     | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|                             |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
|                             |  |                           |                                |                      |                   |     |                              |                                |                   | "             |
| <b>(1) Hydrostatic Test</b> |  |                           |                                |                      |                   |     |                              |                                |                   |               |

4.1.11 Steam Boilers - continued -

| NO   | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|--|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|  |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11   | Safety valves  | See 4.1.16                |                                |                      |                   |     |                              |                                |                   |               |
| 12   | Seamless bottles   | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(2)              |               |
|  |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
| 13   | Steam heated generators or steam generators heated by another fluid  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X(1)              |               |
|  |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
| 14   | Steel bars for stays of boilers  | KK                        | ÜB                             |                      | X                 |     |                              | X                              |                   |               |
|  |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 15   | Control mechanism actuators  | See 4.1.3.                |                                |                      |                   |     |                              |                                |                   |               |
| 16   | Tubes for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X(1)              |               |
|  |  |                           | TO+TS                          |                      |                   |     |                              |                                | X(1)              |               |
| <p>(1) Hydrostatic Test</p> <p>(2) Burst test on prototypes and hydrostatic tests on production as required by the Rules</p> |  |                           |                                |                      |                   |     |                              |                                |                   |               |

4.1.12 Thermal Oil Systems

| NO                          | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |  |
|-----------------------------|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|--|
|                             |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 01                          | Cast or forged parts for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels            | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 |               |  |
| 02                          | Class 1 pressure vessels and heat exchangers   | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(1)          |  |
| 03                          | Class 2 pressure vessels and heat exchangers   | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(1)          |  |
| 04                          | Class 3 pressure vessels and heat exchangers   | KK                        | ÜB                             | X                    | X                 |     |                              |                                | X                 |               |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 |               |  |
| 05                          | Control, monitoring and alarm systems  | See 4.1.14.               |                                |                      |                   |     |                              |                                |                   |               |  |
| 06                          | Cylinders for hydraulic plants   | See 4.1.3.                |                                |                      |                   |     |                              |                                |                   |               |  |
| 07                          | Flanges and nozzles for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels             | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 |               |  |
| 08                          | Oil fired thermal oil heaters, exhaust gas thermal oil heaters   | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(1)          |  |
| 09                          | Pipes and valves   | See 4.1.16.               |                                |                      |                   |     |                              |                                |                   |               |  |
| 10                          | Plates, profiles and tubesheets for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|                             |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 |               |  |
| <b>(1) Hydrostatic Test</b> |  |                           |                                |                      |                   |     |                              |                                |                   |               |  |

4.1.12 Thermal Oil Systems - continued -

| NO  | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|---|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|   |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11  | Safety valves  |                           |                                | See 4.1.16.          |                   |     |                              |                                |                   |               |
| 12  | Seamless bottles   | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(2)              |               |
|   |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
|   |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 13  | Control mechanism actuators  |                           |                                | See 4.1.3            |                   |     |                              |                                |                   |               |
| 14  | Tubes for class 3 heat exchangers  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|   |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 15  | Tubes for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels | KK                        | ÜB                             |                      | X                 | X   |                              | X                              | X(1)              |               |
|   |  |                           | TO+TS                          |                      |                   |     |                              |                                | X(1)              |               |
|   |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 16  | Tubes for class 2 heat exchangers  | KK                        | ÜB                             |                      | X                 | X   |                              | X                              | X(1)              |               |
|   |  |                           | TO+TS                          |                      |                   |     |                              |                                | X(1)              |               |
|   |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| <p>(1) <i>Hydrostatic Test</i></p> <p>(2) <i>Burst test on prototypes and hydrostatic tests on production as required by the Rule</i></p> |  |                           |                                |                      |                   |     |                              |                                |                   |               |

## 4.1.13 Pressure Vessels and Apparatus

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |  |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|--|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 01 | Cast or forged parts for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| 02 | Cast or forged parts for class 2 pressure vessels   | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| 03 | Cast or forged parts for class 3 pressure vessels   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |  |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |  |
| 04 | Class 1 corrosion resistant pressure vessels  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |  |
| 05 | Class 2 pressure vessels and heat exchangers  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |  |
| 06 | Class 2 corrosion resistant pressure vessels  | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X                 | X(1)          |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |  |
| 07 | Class 3 pressure vessels and heat exchangers  | KK                        | ÜB                             | X                    | X                 |     |                              | X                              |                   |               |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |
| 08 | Control, monitoring and alarm systems   | See 4.1.14                |                                |                      |                   |     |                              |                                |                   |               |  |
| 09 | Cylinders for hydraulic plants  | See 4.1.3                 |                                |                      |                   |     |                              |                                |                   |               |  |
| 10 | Flanges and nozzles for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels  | KK                        | ÜB                             |                      | X                 | X   |                              |                                | X                 |               |  |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |  |

(1) Hydrostatic Test



4.1.13 Pressure Vessels and Apparatus - continued -

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11 | Flanges and nozzles for class 2 pressure vessels   | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 12 | Flanges and nozzles for class 3 pressure vessels   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 13 | Pipes and valves   | See 4.1.16                |                                |                      |                   |     |                              |                                |                   |               |
| 14 | Plates, profiles and tubesheets for boilers, steam generators, oil fired thermal oil heaters, exhaust gas thermal oil heaters and class 1 pressure vessels | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 15 | Plate and profiles for class 2 pressure vessels  | KK                        | ÜB                             |                      | X                 | X   |                              | X                              |                   |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 16 | Plate and profiles for class 3 pressure vessels  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 17 | Pressure vessels with toxic agents   | KK                        | ÜB                             | X                    | X                 | X   | X                            | X                              | X(1)              |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |
| 18 | Safety valves  | See 4.1.16                |                                |                      |                   |     |                              |                                |                   |               |
| 19 | Welded bottles   | KK                        | ÜB                             | X                    | X                 | X   |                              | X                              | X(2)              |               |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X(1)              |               |

(1) Hydrostatic Test  
(2) Burst test on prototypes and hydrostatic tests on production as required by the Rule

## 4.1.14 Electric System Components

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Batteries – for essential and/or emergency services | KK                        | ÜB (9)                         | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS (9)                      |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           | TK TO +TS(9)                   |                      |                   |     |                              | X                              | X                 | X             |
|    |   |                           | ÜRS                            |                      |                   |     |                              |                                |                   | X             |
| 02 | Battery chargers – rated power ≤ 2 kW               | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 03 | Battery chargers – rated power ≥ 2 kW               | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 04 | Main switchboard                                    | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 05 | Item deleted.                                       |                           |                                |                      |                   |     |                              |                                |                   |               |
| 06 | Item deleted.                                       |                           |                                |                      |                   |     |                              |                                |                   |               |
| 07 | Emergency switchboard                               | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 08 | Item deleted.                                       |                           |                                |                      |                   |     |                              |                                |                   |               |
| 09 | Item deleted.                                       |                           |                                |                      |                   |     |                              |                                |                   |               |
| 10 | Item deleted.                                       |                           |                                |                      |                   |     |                              |                                |                   |               |

(9) For "Li" notation

4.1.14 Electric System Components - continued -

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11 | Distribution panels ≥ 500 kW                                  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 12 | Motor starters ≤ 50 kW  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 13 | Motor starters > 50 Kw (Just for primary essential equipment) | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 14 | Item deleted.   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 15 | Main propulsion system switchboards                           | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 16 | Switchboards, panels and motor starters ≥ 1000 V              | KK                        | ÜB                             | X                    |                   |     | X                            | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |
| 17 | Shore connection terminal box                                 | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 18 | Navigation lights switchboard                                 | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 19 | Control, alarm and monitoring systems panels                  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 20 | Item deleted.   |                           | TK TO+TS                       | X                    |                   |     |                              |                                | X                 | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |

## 4.1.14 Electric System Components - continued -

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 21 | Switchboards for watertight door, side door and fire door control, monitoring and alarm  | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 22 | Actuators ( All type )   | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |  |                           | TO                             | X                    |                   |     |                              |                                |                   | X             |
|    |  |                           | TK                             |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO+TS                          | X                    |                   |     |                              | X                              | X                 | X             |
| 23 | Sensors, detectors<br>- Level measuring devices<br>- Level indicators<br>- Temperature sensors<br>- Pressure sensors<br>- Water level sensors<br>- Gas detectors | KK                        |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO                             |                      |                   |     |                              |                                |                   | X             |
|    |  |                           | TK TO                          |                      |                   |     |                              |                                |                   | X             |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 24 | Item deleted.  |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 25 | Alarm, control and monitoring sub-component equipment  | KK                        |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO                             |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |
| 26 | Circuit breakers, load switches, fuses   | KK                        |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO                             |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |
| 27 | Electrical protection equipment and generator protection equipment   | KK                        |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO                             |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |
| 28 | Motor protection equipment   | KK                        |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TO                             |                      |                   |     |                              |                                |                   |               |
|    |  |                           | TK TO                          |                      |                   |     |                              |                                |                   |               |

4.1.14 Electric System Components - continued -

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 29 | Signalling and measuring appliances                 | KK                        | TO                             |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 30 | Insulation resistance meter                         | KK                        | TO                             |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 31 | Measuring instruments and instrument transformers   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO                             |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               | X |
| 32 | Busbar carriers, insulated wires (for switchboards) | KK                        | TO                             |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 33 | Electric cables and busbar (trunking ) systems      | KK                        | ÜB                             |                      |                   |     |                              |                                | X(5)              |               | X |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X(6)              |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 34 | Electrical appliances for hazardous areas           | KK                        | TK TO (1)                      |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TKS                            |                      |                   |     |                              | X (1)                          |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 35 | Complete power generation sets ≤ 100 kW             | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |

## 4.1.14 Electric System Components - continued -

| NO  | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |      |                              |                                |                   |               |   |
|---|--|---------------------------|--------------------------------|----------------------|-------------------|------|------------------------------|--------------------------------|-------------------|---------------|---|
|   |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT  | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 36  | Complete power generation sets<br>≥ 100 kW             | KK                        |                                |                      |                   |      |                              |                                |                   |               |   |
|   |  |                           | ÜB                             | X                    | X(7)              | X(7) |                              | X                              | X                 | X             |   |
|   |  |                           | TO+TS                          |                      |                   |      |                              |                                | X                 | X             |   |
| 37  | Elektrical machinery (motors,<br>alternators) ≤ 100 kW | KK                        | ÜRS                            |                      |                   |      |                              |                                |                   |               | X |
|   |  |                           |                                |                      |                   |      |                              |                                |                   |               |   |
|   |  |                           |                                |                      |                   |      |                              |                                |                   |               |   |
|   |  |                           |                                |                      |                   |      |                              |                                |                   |               |   |
| <p>(5) According to relevant standarts all type test shall be carried out</p> <p>(6) According to relevant standarts all routin shall be carried out</p> <p>(7) Just for gen set's foundation</p> |  |                           |                                |                      |                   |      |                              |                                |                   |               |   |

4.1.14 Electric System Components - continued -

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 38 | Elektrical machinery (motors, alternators) ≥ 100 kW<br>Electric motors intended for propulsion | KK                        | ÜB                             | X                    | X(8)              |     |                              | X                              | X                 | X             |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |
| 39 | Transformers and reactors ≤ 100 kW   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 40 | Transformers and reactors ≥ 100 kW   | KK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |  |                           | TO+TS                          |                      |                   |     |                              | X                              | X                 |               |
| 41 | Item Deleted   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 42 | Static converter, inverters and KGS ≤ 50 kVA   | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   | X             |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |
| 43 | Static converter, inverters and KGS ≥ 50 kVA   | KK                        | ÜB                             | X                    |                   |     |                              |                                | X                 | X             |
|    |  |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X             |
| 44 | Sound signal appliances  | KK+ BK                    | TO                             |                      |                   |     |                              |                                |                   | X             |
|    |  |                           | TK<br>TO(1)<br>MED             |                      |                   |     |                              |                                |                   | X<br>X<br>X   |
| 45 | Navigation and signalling lights   | KK + BK                   | TO                             |                      |                   |     |                              |                                |                   | X             |
|    |  |                           | TK<br>TO(1)<br>MED             |                      |                   |     |                              |                                |                   | X<br>X<br>X   |
| 46 | Computers and related electronic systems   | KK                        | ÜB                             | X                    |                   |     |                              |                                | X                 |               |
|    |  |                           | TO<br>TK TO                    |                      |                   |     |                              | X                              | X                 |               |

(8) Just for propulsion motor's shaft

## 4.1.14 Electric System Components - continued -

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 47 | Software  | KK                        | ÜB                             | X                    |                   |     |                              |                                | X                 | X             |
|    |   |                           | TO                             |                      |                   |     |                              | X                              | X                 |               |
| 48 | Searchlight   | KK+ BK                    | TO                             |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | MED                            |                      |                   |     |                              |                                |                   | X             |
| 49 | Lighting fixtures and socket-outlets  | KK                        | TO                             |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | TK TO                          |                      |                   |     |                              |                                |                   | X             |
| 50 | Fire fighting equipment<br>- Low-locating lighting system<br>- Electrical cable penetrations<br>- Cold weather starting of generator sets<br>- Electric safety lamp<br>- Oxygen analysis and gas detection equipment<br>- Fire detection and fire alarm system components (flame detectors, heat detectors, manual call points, smoke detectors)<br>- Sample extraction smoke detection system components | BK                        | ÜB(4)                          | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO (4)                         |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | TK TO (4)                      |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | MED (1), (3)                   |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 51 | Life saving appliances (1 <sup>st</sup> group)<br>- Lights for life jacket<br>- Lights for life buoys<br>- Position indicating lights for life-saving appliances<br>- Radar reflector for lifeboats and rescue boats<br>- Searchlights for use in lifeboats and rescue boats  | BK                        | TO (4)                         |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | TK TO (4)                      |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | MED (1), (3)                   |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |
| 52 | Life saving appliances (2 <sup>nd</sup> group)<br>- Morse code signal light<br>- Public address and general alarm system<br>- Radar reflector for liferafts   | BK                        | ÜB                             | X                    |                   |     |                              | X                              | X                 | X             |
|    |   |                           | TO (4)                         |                      |                   |     |                              |                                |                   | X             |
|    |   |                           | TK TO (4)                      |                      |                   |     |                              |                                |                   | X             |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |



4.1.14 Electric System Components - continued -

| NO           | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES   |                   |        |                              |                                |                   |               |   |   |  |
|--------------|---|---------------------------|--------------------------------|--|-------------------|--------|------------------------------|--------------------------------|-------------------|---------------|---|---|--|
|              |   |                           |                                | DOCUMENT APPROVAL  | MATERIAL APPROVAL | NDT    | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |   |  |
| 53           | Navigating equipment (1 <sup>st</sup> group)<br>- 9 Hz SAR transponder (SART)<br>- Chayka<br>- Compass for lifeboats and rescue boats<br>- Echo-sounding equipment<br>- Electronic chart display and information system (ECDIS), raster chart display system (RCDS)<br>- GLONASS equipment<br>- GPS<br>- Gyrocompass<br>- Heading control system (HSC)<br>- Integrated bridge system<br>- Loran-C equipment<br>- Magnetic compass<br>- Propeller pitch indicator<br>- Propeller revolution indicator<br>- ARPA<br>- ATA<br>- EPA<br>- Radar reflector<br>- Rate-of-turn indicator<br>- Rudder angle indicator<br>- SDME equipment<br>- Track control system<br>- Magnetic heading device (magnetic compass)<br>- AIS equipment<br>- VDR equipment | BK                        |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           | TO (4)                         |  |                   |        |                              |                                |                   |               | X |   |  |
|              |   |                           | TK TO (4)                      |  |                   |        |                              |                                |                   |               |   | X |  |
|              |   |                           | MED (1), (3)                   |  |                   |        |                              |                                |                   |               |   | X |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           | 54                             | Navigating equipment (2 <sup>nd</sup> group)<br>- Chart facilities for shipborne radars<br>- Combined GPS/GLONASS equipment<br>- Daylight signalling lamp<br>- DGPS, DGGLONASS equipment<br>- Integrated navigation system<br>- Thrust, pitch and speed indicator<br>- Night vision equipment for HSC<br>- Radar target enhancer<br>- Searchlight for HSC<br>- Sound reception system<br>- Thrust indicator<br>- THD (GNSS method)<br>- THD (gyroscopic method)<br>- THD (magnetic method) | BK                |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   | TO (4) |                              |                                |                   |               |   |   |  |
| TK TO (4)    |   |                           |                                |  |                   |        |                              |                                |                   |               |   | X |  |
| MED (1), (3) |   |                           |                                |  |                   |        |                              |                                |                   |               |   | X |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |
|              |   |                           |                                |  |                   |        |                              |                                |                   |               |   |   |  |

## 4.1.14 Electric System Components - continued -

| NO   | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|--|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|  |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 55   | Radio communication equipment   | BK                        |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - 406 MHz EPIRB (COSPAS-SARSAT)   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - Two-way radiotelephone  |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - DSC MF receiver   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - EGC receiver  |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - Fixed survival craft two-way VHF radiotelephone   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - Portable survival craft two-way VHF radiotelephone  |                           |                                |                      |                   |     |                              |                                |                   |               | X |
|  | - HF marine safety information (MSI) equipment (HF NBPD receiver)                             |                           | TO (4)                         |                      |                   |     |                              |                                |                   |               | X |
|  | - Inmarsat-B SES  |                           | TK TO (4)                      |                      |                   |     |                              |                                |                   |               | X |
|  | - L-band EPIRB (INMARSAT)   |                           | MED (1), (3)                   |                      |                   |     |                              |                                |                   |               | X |
|  | - MF radio installation capable of transmitting and receiving DSC and radiotelephony          |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - MF/HF radio installation capable of transmitting and receiving DSC, NBPD and radiotelephony |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  | - MF/HF, DSC watchkeeping receiver  |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| - NAVTEX receiver  |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| - VHF DCS watchkeeping receiver  |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| - VHF radio installation capable of transmitting and receiving DSC and radiotelephony  |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| <p>(1) Examination of certificate issued by notified bodies.<br/> (2) For ships flying European Community Member and Candidate Administration flags<br/> (3) TL is not yet authorised to issue MED certificate.<br/> (4) For ships flying non-European Community Administration flags.<br/> (5) According to relevant standarts all type test shall be carried out<br/> (6) According to relevant standarts all rutin shall be carried out<br/> (7) Just for gen set's foundation<br/> (8) Just for propulsion motor's shaft</p> |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |

4.1.15 Refrigerating Installations

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01 | Cast iron or steel evaporator and condenser casings (3) |                           |                                | See 4.1.11, 4.1.13.  |                   |     |                              |                                |                   |               |
| 02 | Coils (3)   |                           |                                | See 4.1.16.          |                   |     |                              |                                |                   |               |
| 03 | Complete refrigerating unit                             | KK (1)                    | ÜB                             | X                    |                   |     |                              | X                              | X(2)              | X             |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(2)          |
| 04 | Compressor coupling, connecting ve piston rod           | KK (1)                    | ÜB                             |                      | X (4)             | X   |                              | X                              |                   |               |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 05 | Compressor liner, cylinder head and other parts         | KK (1)                    | ÜB                             | X                    |                   |     |                              | X                              | X(2)              |               |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(2)          |
| 06 | Compressor  | KK (1)                    | ÜB                             |                      |                   |     |                              | X                              | X(2)              |               |
|    |   |                           | TO+TS                          |                      |                   |     |                              |                                | X                 | X(2)          |
| 07 | Compressor crankshaft                                   | KK (1)                    | ÜB                             |                      |                   | X   |                              | X                              |                   |               |
|    |   |                           | TO+TS                          |                      |                   |     |                              | X                              |                   |               |
| 08 | Condenser and evaporator (3)                            |                           |                                | See 4.1.11, 4.1.13.  |                   |     |                              |                                |                   |               |
| 09 | Control, monitoring and alarm systems                   |                           |                                | See 4.1.14.          |                   |     |                              |                                |                   |               |
| 10 | Electrical apparatus                                    |                           |                                | See 4.1.14.          |                   |     |                              |                                |                   |               |

## 4.1.15 Refrigerating Installations - continued -

| NO  | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|---|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|   |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 11  | Refrigerated chamber insulation material              | KK (1)                    | ÜRS                            |                      |                   |     |                              |                                |                   |               |
| 12  | Oil separator, air receivers and pressure vessels (3) | See 4.1.11. , 4.1.13.     |                                |                      |                   |     |                              |                                |                   |               |
| 13  | Piping for refrigerating system (3)                   | See 4.1.16.               |                                |                      |                   |     |                              |                                |                   |               |
| 14  | Refrigerant   | KK (1)                    | ÜRS                            |                      |                   |     |                              |                                |                   |               |
| 15  | Regulating valve (3)                                  | See 4.1.16.               |                                |                      |                   |     |                              |                                |                   |               |
| 16  | Thermometers  | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
| <p>(1) Only for ships with class notation "QUICK FREEZING".</p> <p>(2) Hydrostatic test and keak test is to be carried out.</p> <p>(3) For ships with class notation "QUICK FREEZING", in addition to the tests required in Tables 4.1.11 and 4.1.16, the leak test is also to be carried out.</p> <p>(4) 110 kW'den büyük kompresörler için.</p> |   |                           |                                |                      |                   |     |                              |                                |                   |               |

4.1.16 Piping Systems, Oily Water Separators

| NO                          | PRODUCT  | CERTIFICATION REQUIREMENT   | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|-----------------------------|--|-----------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|                             |  |                             |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
| 01                          | Centrifugal separators   | KK                          | ÜB                             |                      |                   |     |                              | X                              | X(1)              | X             |
|                             |  |                             | TO+TS                          |                      |                   |     |                              |                                | X(1)              | X             |
| 02                          | Class I and II prefabricated pipe lines  | KK                          | ÜB                             |                      |                   | X   |                              | X                              | X(1)              |               |
|                             |  |                             | TO+TS                          |                      |                   |     |                              |                                | X(1)              |               |
| 03                          | Item deleted   |                             |                                |                      |                   |     |                              |                                |                   |               |
| 04                          | Class III prefabricated pipe lines   | KK                          | ÜRS                            |                      |                   |     |                              |                                |                   |               |
|                             |  |                             |                                |                      |                   |     |                              |                                |                   |               |
| 05                          | Compressors (complete), except associated containers and pressure vessels  | KK                          | ÜB                             |                      |                   |     |                              | X                              | X(1)              |               |
|                             |  |                             | TO+TS                          |                      |                   |     |                              |                                | X(1)              |               |
| 06                          | Control, monitoring and alarm systems  | See 4.1.14.                 |                                |                      |                   |     |                              |                                |                   |               |
| 07                          | Expansion joints and metallic compensators   | KK                          | ÜB                             | X                    | X                 | X   |                              | X                              | X(1)              | X             |
|                             |  |                             | TO+TS                          |                      |                   |     |                              | X                              | X(1)              | X             |
| 08                          | Filters  | See 4.1.11, 4.1.12, 4.1.13. |                                |                      |                   |     |                              |                                |                   |               |
| 09                          | Fittings for class I piping systems having internal diameter equal to or greater than 32 mm and for class II piping having internal diameter equal to or greater than 100 mm | KK                          | ÜB                             |                      | X                 | X   |                              | X                              | X(1)              |               |
|                             |  |                             | TO + TS                        |                      |                   |     |                              |                                | X(1)              |               |
| 10                          | Fittings for class I piping systems having internal diameter less than 32 mm and for class II piping having internal diameter less than 100 mm                               | KK                          | ÜB                             |                      | X                 | X   |                              | X                              | X(1)              |               |
|                             |  |                             | TO + TS                        |                      |                   |     |                              |                                | X(1)              |               |
| <b>(1) Hydrostatic Test</b> |  |                             |                                |                      |                   |     |                              |                                |                   |               |

## 4.1.16 Piping Systems, Oily Water Separators - continued -

| NO   | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |      |                              |                                |                   |               |  |
|--|---|---------------------------|--------------------------------|----------------------|-------------------|------|------------------------------|--------------------------------|-------------------|---------------|--|
|  |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT  | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 11   | Fittings for class III piping systems   | KK                        | ÜRS                            |                      |                   |      |                              |                                |                   |               |  |
| 12   | Fittings for plastic pipes  | KK                        | ÜB                             | X                    | X                 |      |                              | X                              | X(1)              |               |  |
|  |   |                           | TO                             |                      |                   |      |                              |                                | X(1)              |               |  |
|  |   |                           | TK TO                          | X                    | X                 |      |                              | X                              | X(1)              |               |  |
| 13   | Flexible hoses – metallic   | KK                        | ÜB                             |                      |                   |      |                              |                                |                   |               |  |
|  |   |                           | TO                             |                      |                   |      |                              | X                              | X                 |               |  |
|  |   |                           | TK TO                          |                      |                   |      |                              | X                              | X                 |               |  |
| 14   | Flexible hoses – non metallic   | KK                        |                                |                      |                   |      |                              |                                |                   |               |  |
|  |   |                           | ÜB                             |                      |                   |      |                              |                                |                   |               |  |
|  |   |                           | TO                             |                      |                   |      |                              | X                              | X                 |               |  |
|  |   |                           | TK TO                          |                      |                   |      |                              | X                              | X                 |               |  |
| 15   | Flexible hoses conveying oil and fuel oil   | See 4.1.17.               |                                |                      |                   |      |                              |                                |                   |               |  |
| 16   | Level indicators for flammable fluids   | KK                        | ÜB                             |                      |                   |      |                              |                                |                   |               |  |
| 17   | Materials other than steel for pipes conveying oil or fuel oil  | See 4.1.17.               |                                |                      |                   |      |                              |                                |                   |               |  |
| 18   | Pipes, Pipe elbows, Fittings :<br>Materials: Steel Copper, Copper alloys Aluminium Aluminium alloys<br>Plastics<br>- Class I<br>- DN>50 | KK                        | ÜB                             |                      | X                 | X(1) |                              | X                              |                   |               |  |
|  |   |                           | TO+TS                          |                      | X                 | (1)  |                              | X                              |                   |               |  |
| 19   | Other Pipes, Pipe elbows, Fittings which not mentioned above item 18  | KK                        | ÜB                             |                      | X                 |      |                              |                                |                   | X             |  |
|  |   |                           |                                |                      |                   |      |                              |                                |                   |               |  |
| 20   | Plastic pipes   |                           | TO                             |                      |                   |      |                              |                                |                   |               |  |
|  |   |                           |                                |                      |                   |      |                              |                                |                   |               |  |
| <b>(1)</b> As required by the applicable Rules |   |                           |                                |                      |                   |      |                              |                                |                   |               |  |

4.1.16 Piping Systems, Oily Water Separators - continued -

| NO | PRODUCT   | CERTIFICATION REQUIREMENT  | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |  |
|----|---|----------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|--|
|    |   |                            |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |  |
| 21 | Item deleted.   |                            |                                |                      |                   |     |                              |                                |                   |               |  |
| 22 | Prime movers for compressors  | See 4.1.4, 4.1.5 ve 4.1.6. |                                |                      |                   |     |                              |                                |                   |               |  |
| 23 | Prime movers for pumps  | See 4.1.4, 4.1.5 ve 4.1.6. |                                |                      |                   |     |                              |                                |                   |               |  |
| 24 | Pumps (complete)  | KK                         | ÜB                             |                      |                   |     |                              | X                              | X                 | X             |  |
|    |   |                            | TO                             |                      |                   |     |                              |                                | X                 | X             |  |
| 25 | Safety valves   | KK                         | ÜB                             | X                    | X                 |     | X                            | X                              | X                 | X             |  |
|    |   |                            | TO+TS                          |                      |                   |     |                              | X                              | X                 | X             |  |
| 26 | Valves and flanges:<br><br>Material Steel, Cast steel, Nodular cast iron<br>- Design temprature > 300 °C<br>- Class I or II<br>- DN> 100<br><br>Or<br><br>Material : Copper and copper alloy<br>- Design temprature > 225 °C<br>- Class I or II<br>- DN> 100<br><br>Or<br><br>Material Steel, Cast steel, Nodular cast iron<br>- Design temprature ≤ 300 °C<br>- Class I or II<br>- PBx DN ≥ 2500 or DN > 250<br><br>Or<br>Material : Copper and copper alloy<br>- Design temprature ≤ 225 °C | KK                         |                                |                      |                   |     |                              |                                |                   |               |  |
|    |   |                            | ÜB                             | X                    | X                 |     | X                            | X                              | X                 | X             |  |
|    |   |                            | TO                             |                      |                   |     |                              | X                              | X                 | X             |  |

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |
|    | - Class I or II<br>- PBxDN > 1500              |                           |                                |                      |                   |     |                              |                                |                   |               |
| 27 | Other valves which not mentioned above item 26 | KK                        | ÜRS                            |                      |                   |     |                              |                                |                   |               |
| 28 | Plastic Valves ( Only use class III systems)   |                           | TO                             |                      |                   |     |                              |                                |                   |               |
| 29 | Valves for sea inlet and overboard discharge   | KK                        | ÜB                             | X                    | X                 |     | X                            | X                              | X                 | X             |
|    |  |                           | TO                             |                      |                   |     | X                            | X                              | X                 |               |
|    |  |                           |                                |                      |                   |     |                              |                                |                   |               |



4.1.17 Fire Protection Equipment

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 01 | Portable and mobile foam fire fighting systems            | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 02 | Automatic or manual fire detection systems                | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 03 | Fixed fire extinguishing systems                          | KK, - BK                  | ÜB                             |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 04 | Materials having low flame-spread characteristics         | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 05 | Materials equivalent to 100 % wool                        | KK, BK                    | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO (2)                      |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 06 | Non-combustible materials                                 | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 07 | Non-readily igniting materials for primary deck coverings | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 08 | Sprinkler heads   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 09 | Fire doors  | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 10 | Nozzles   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |

## 4.1.17 Fire Protection Equipment- continued –

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 11 | "A" and "B" class divisions, fire integrity   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 12 | Fire dampers  | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 13 | Fire doors  | KK, BK                    | ÜB                             | X                    | X                 |     | X                            | X                              | X                 |               | X |
|    |   |                           | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 14 | Materials other than steel for pipes conveying oil or fuel oil:<br>Pipes and fittings Valves Flexible pipe assemblies   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 15 | Penetrations through "A" and "B" and "C" class divisions Electrical cable transits Pipe, duct, trunk, etc. penetration  | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 16 | Primary deck covering   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 17 | Compressed air line breathing apparatus   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 18 | Fire hoses  | KK, BK                    | MED                            |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| 19 | Fireman's outfit:<br>- protective clothing (close proximity clothing)<br>- boots<br>- gloves<br>- helmet<br>- lifelines | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 20 | Dedectors   | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |

4.1.17 Fire Protection Equipment- continued –

| NO   | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|--|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|  |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 21   | Manual call point  | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 22   | Non-portable and transportable extinguisher                | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 23   | Flexible hoses and expansion joints for all types of fluid | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 24   | Oxygen analysis and gas detection equipments               | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 25   | Protective clothing resistant to chemical attack           | KK, BK                    | TO                             |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TK TO                          |                      |                   |     |                              |                                |                   |               | X |
| 26   | Self-contained compressed-air-operated breathing apparatus | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 27   | Sprinkler systems and components                           | KK, BK                    | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|  |  |                           |                                |                      |                   |     |                              |                                |                   |               |   |
|  |  |                           |                                |                      |                   |     |                              |                                |                   |               |   |
| <p>(1) For ships flying European Community Administration flags</p> <p>(2) For ships flying non-European Community Administration flags, whose Administrations recognise the certificates issued by TL or authorise TL to issue certificates on their behalf</p> |  |                           |                                |                      |                   |     |                              |                                |                   |               |   |

## 4.1.18 Life-Saving Appliances

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 01 | Automatically self-righting liferafts                             | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 02 | Buoyant smoke signals (pyrotechnics)                              | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 03 | Canopied reversible liferafts                                     | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 04 | Daylight signal mirrors   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 05 | Electric torches for Morse signals                                | BK                        | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO (2)                      |                      |                   |     |                              |                                |                   |               | X |
| 06 | Embarkation ladders   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 07 | Fast rescue boat launching appliances                             | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 08 | Fast rescue boats   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 09 | Float-free arrangements for liferafts (hydrostatic release units) | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 10 | Hand flares (pyrotechnics)  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |

4.1.18 Life-Saving Appliances- continued

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 11 | Immersion suit materials                          | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 12 | Inflatable liferafts                              | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 13 | Inflated rescue boats                             | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 14 | Insulated immersion suits and anti-exposure suits | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 15 | Launching appliances for free-fall lifeboats      | BK                        | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO (2)                      |                      |                   |     |                              |                                |                   |               | X |
| 16 | Life jackets                                      | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 17 | Lifeboat and rescue boat propulsion engine        | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 18 | Lifeboats   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 19 | Lifebuoys   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 20 | Lifebuoys' self-activating smoke signals          | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |

## 4.1.18 Life-Saving Appliances- continued

| NO | PRODUCT  | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|--|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |  |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 21 | Liferaft launching appliances  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 22 | Light material for<br>- buoyancy reserve<br>- life jacket<br>- lifebuoys | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 23 | Line-throwing appliances (pyrotechnics)                                  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 24 | Marine evacuation systems  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 25 | Means of rescue  | BK                        | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TK TO (2)                      |                      |                   |     |                              |                                |                   |               | X |
| 26 | Open reversible liferafts  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 27 | Pilot ladder   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 28 | Public address and general alarm system                                  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 29 | Radar reflector for lifeboats and rescue boats                           | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 30 | Radar reflector for liferafts  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |  |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |

4.1.18 Life-Saving Appliances- continued

| NO | PRODUCT   | CERTIFICATION REQUIREMENT | TYPE OF ACCEPTABLE CERTIFICATE | APPLICABLE PROCESSES |                   |     |                              |                                |                   |               |   |
|----|---|---------------------------|--------------------------------|----------------------|-------------------|-----|------------------------------|--------------------------------|-------------------|---------------|---|
|    |   |                           |                                | DOCUMENT APPROVAL    | MATERIAL APPROVAL | NDT | INSPECTION DURING PRODUCTION | FINAL INSPECTION, VERIFICATION | FINAL TESTS (FAT) | TEST ON BOARD |   |
| 31 | Release mechanism for lifeboats, rescue boats and liferafts launched by a fall or falls | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 32 | Rescue boat propulsion engine – Outboard engines  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 33 | Retro-reflective materials  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 34 | Rigid liferafts   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 35 | Rigid rescue boats  | BK                        | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TK TO (2)                      |                      |                   |     |                              |                                |                   |               | X |
| 36 | Rocket parachute (pyrotechnics)   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 37 | Searchlight for use in lifeboats and rescue boats                                       | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 38 | Thermal protective aids   | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |
| 39 | Winches for survival crafts and rescue boats  | BK                        | MED (1)                        |                      |                   |     |                              |                                |                   |               | X |
|    |   |                           | TO (2)                         |                      |                   |     |                              |                                |                   |               | X |