Tasneef®
Life Environmentally Optimized

RULES FOR THE CLASSIFICATION OF FAST PATROL VESSELS

Effective from 1 January 2016

Part F

Additional Class Notations

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GENERAL CONDITIONS

Definitions:

"*Administration*" means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorized to operate in the specific case.

"IACS" means the International Association of Classification Societies.

"*Interested Party*" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"*Owner*" means the registered owner, the ship owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

"Rules" in these General Conditions means the documents below issued by the Society:

(i) Rules for the Classification of Ships or other special units;
(ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
(iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
(iv) Guides to carry out particular activities connected with Services;
(v) Any other technical document, as for example rule variations or interpretations.

"*Services*" means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Ship" means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

"*Society*" or *"TASNEEF"* means Tasneef and/or all the companies in the Tasneef Group which provide the Services.

"*Surveyor*" means technical staff acting on behalf of the Society in performing the Services.

Article 1

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:
(i) sets forth and develops Rules;
(ii) publishes the Register of Ships;
(iii) issues certificates, statements and reports based on its survey activities.

1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

Article 2

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, although committed also through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.
The Rules for Classification of Ships are published on the Society's website: www.tasneef.ae.

2.3. The Society exercises due care and skill:
(i) in the selection of its Surveyors
(ii) in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

Article 3

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).
The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship, or the issuance of a certificate or other document connected with classification or certificate on and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness,

structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

Article 4

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 1.5% may be demanded.

4.3. The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

Article 5

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of AED5,000 (Arab Emirates Dirhams Five Thousand only). Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than AED5,000,000 (Arab Emirates Dirhams Five Millions only). Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: (i) THREE (3) MONTHS from the date on which the Services were performed, or (ii) THREE (3) MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

Article 6

6.1. These General Conditions shall be governed by and construed in accordance with United Arab Emirates (UAE) law, and any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, shall be determined in accordance with UAE law. The courts of the Dubai International Financial Centre (DIFC) shall have exclusive jurisdiction in relation to any claim or dispute which may arise out of or in connection with the Rules or with the Services of the Society.

6.2. However,

(i) In cases where neither the claim nor any counterclaim exceeds the sum of AED300,000 (Arab Emirates Dirhams Three Hundred Thousand) the dispute shall be referred to the jurisdiction of the DIFC Small Claims Tribunal; and

(ii) for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the

right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.
In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

Article 7

7.1. All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorization of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.
Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

7.2. Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

7.3. In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.
In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

Article 8

8.1. Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.

EXPLANATORY NOTE TO PART F

1. Reference edition

The reference edition for Part F is this edition effective from 1 January 2016.

2. New editions after the reference edition

Except in particular cases, a new edition of the Rules is published annually.

3. Effective date of the requirements

3.1 All requirements in which new or amended provisions with respect to those contained in the reference edition have been introduced are followed by a date shown in brackets.

3.2 The date shown in brackets is the effective date of entry into force of the requirements as amended by the last updating. The effective date of all those requirements not followed by any date shown in brackets is that of the reference edition.

4. Rule Variations and Corrigenda

Until the next edition of the Rules is published, Rule Variations and/or corrigenda, as necessary, will be published on the TASNEEF web site (www.tasneef.ae). Except in particular cases, paper copies of Rule Variations or corrigenda are not issued.

5. Rule subdivision and cross-references

5.1 Rule subdivision

The Rules are subdivided into six parts, from A to F.

Part A: Classification and Surveys

Part B: Hull and Stability

Part C: Machinery, Systems and Fire Protection

Part D: Materials and Welding

Part E: Service Notations

Part F: Additional Class Notations

Each Part consists of:

- Chapters
- Sections and possible Appendices
- Articles
- Sub-articles
- Requirements

Figures (abbr. Fig) and Tables (abbr. Tab) are numbered in ascending order within each Section or Appendix.

5.2 Cross-references

Examples: Pt A, Ch 1, Sec 1, [3.2.1]or Pt A, Ch 1, App 1, [3.2.1]

- Pt A means Part A

The part is indicated when it is different from the part in which the cross-reference appears. Otherwise, it is not indicated.

- Ch 1 means Chapter 1

The Chapter is indicated when it is different from the chapter in which the cross-reference appears. Otherwise, it is not indicated.

- Sec 1 means Section 1 (or App 1 means Appendix 1)

The Section (or Appendix) is indicated when it is different from the Section (or Appendix) in which the cross-reference appears. Otherwise, it is not indicated.

- [3.2.1] refers to requirement 1, within sub-article 2 of article 3.

Cross-references to an entire Part or Chapter are not abbreviated as indicated in the following examples:

- Part A for a cross-reference to Part A
- Part A, Chapter 1 for a cross-reference to Chapter 1 of Part A.

6. Summary of amendments introduced in the edition effective from 1st January 2016.

This edition of the Rules for the classification of Fast Patrol Vessels is considered as a reference edition for future amendments.

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RULES FOR THE CLASSIFICATION OF FAST PATROL VESSELS

Part F
Additional Class Notations

Chapters **1 2 3**

CHAPTER 1
AUTOMATION SYSTEMS

SECTION 1 AUTOMATION SYSTEMS (AUT)

CHAPTER 2
STABILITY AND BUOYANCY

SECTION 1 DAMAGE STABILITY (DAMS)

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SECTION 3 SELF-RIGHTING CAPABILITY (SELF-RIGHT)

CHAPTER 3
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SECTION 1 FIRE FIGHTING EQUIPMENT (FFQ)

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Part F

Additional Class Notations

Chapter 1
AUTOMATION SYSTEMS

SECTION 1 AUTOMATION SYSTEMS (AUT)

SECTION 1 AUTOMATION SYSTEMS (AUT)

1 General

1.1 Application

1.1.1 The additional class notation **AUT** is assigned in accordance with Part A, Ch 1, Sec 4, [7.1.5] when the requirements of this Section are complied with to vessels intended to operate with machinery spaces periodically unattended.

Note 1: Machinery spaces are defined in Part C, Ch 1, Sec 1, [1.4.2].

1.1.2 The arrangements provided are to be such as to ensure that the safety of the vessel in all sailing conditions, including manoeuvring, is equivalent to that of a vessel having the machinery spaces manned.

1.2 Exemptions for vessels having a length L ≤ 24 m

1.2.1 For vessels having a length L not exceeding 24 m, the requirements laid down in [1.3] and [3.4.4] do not apply.

1.2.2 For vessels having a length L not exceeding 24 m, as an alternative to the requirements in [4] an alarm signal is to be activated in the following circumstances:

a) for diesel engine propulsion plant

- lubricating oil system low pressure
- cylinder coolant high temperature
- cylinder coolant low pressure or low flow rate
- cylinder coolant make up tank low level
- sea water cooling low pressure or low flow rate

b) for auxiliary internal combustion engines intended for electricity production of a power higher than 37 kW, supplying essential services:

- cylinder coolant high temperature
- lubricating oil system low pressure.

1.2.3 For vessels having a length L not exceeding 24 m, an automatic stop is to be provided for lubricating oil failure of engines, reduction gears, clutches and reversing gears. A possible override of this automatic stop is to be available at the control stations, and an indication is to be provided at each control station, when override is activated.

1.2.4 The requirements laid down in [3.3.1] do not apply to vessels having a length L not exceeding 24 m, insofar as the arrangements of the machinery space access make it unnecessary.

1.3 Communication system

1.3.1 On vessels having a length L > 24 m, a reliable means of vocal communication is to be provided between the main machinery control room or the propulsion machinery control position, the navigation bridge and the engineer officers' accommodation, as appropriate.

This means of communication is to be foreseen in collective or individual accommodation of engineer officers.

1.3.2 Means of communication are to be capable of being operated even in the event of failure of supply from the main source of electrical power.

2 Documentation

2.1 Documentation to be submitted

2.1.1 In addition to those mentioned in Part C, Ch 3, Sec 1, Tab 1, the documents in Tab 1 are required.

Table 1 : Documentation to be submitted

N.	I/A **(1)**	Documentation to be submitted
1	A	Means of communication diagram
2	A	Technical description of automatic engineer's alarm and connection of alarms to accommodation and bridge, when applicable
3	A	System of protection against flooding
4	A	Fire detection system: diagram, location and cabling
(1)	A: to be submitted for approval I: to be submitted for information	

3 Fire and flooding precautions

3.1 Fire prevention

3.1.1 The requirements regarding piping and arrangements of fuel oil and lubricating oil systems given in Part C, Ch 1, Sec 9 are applicable.

3.1.2 For arrangements of remote stop, the requirements in Part C, Ch 4, Sec 3, [1.1.3] are applicable.

3.2 Fire detection system

3.2.1 For fire detection system, the requirements given in Part C, Ch 4, Sec 3 are applicable.

3.2.2 Means are to be provided to detect and give alarms at an early stage in case of fires:

- in boiler air supply casing and exhausts (uptakes); and
- in scavenging air belts of propulsion machinery unless Tasneef considers this to be unnecessary in particular cases.

3.2.3 An automatic fire detection system is to defined be fitted in machinery spaces of Category A as in Part C, Ch 1, Sec 1, [1.4.1] intended to be unattended.

3.2.4 The fire detection system is to be designed with self monitoring properties. Power or system failures are to initiate an audible alarm distinguishable from the fire alarm.

3.2.5 The fire detection indicating panel is to be located on the navigating bridge, fire control station, or other accessible place where a fire in the machinery space will not render it inoperative.

3.2.6 The fire detection indicating panel is to indicate the place of the detected fire in accordance with the arranged fire zones by means of a visual signal. Audible signals clearly distinguishable in character from any other signals are to be audible throughout the navigating bridge.

3.2.7 Fire detectors are to be of such type and so located that they will rapidly detect the onset of fire in conditions normally present in the machinery space. Precautions are to be taken to avoid false alarms. The type and location of detectors are to be approved by Tasneef and a combination of detector types is recommended in order to enable the system to react to more than one type of fire symptom.

3.2.8 Except in spaces of restricted height and where their use is specially appropriate, detection systems using thermal detectors only are not permitted.

Flame detectors may be installed, although they are to be considered as complementary and are not to replace the main installation.

3.2.9 Fire detector zones are to be arranged in a manner that will enable the operating staff to locate the seat of the fire. The arrangement and the number of loops and the location of detector heads are to be approved in each case. Air currents created by the machinery are not to render the detection system ineffective.

3.2.10 When fire detectors are provided with the means to adjust their sensitivity, necessary arrangements are to be allowed to fix and identify the set point

3.2.11 When fire detectors are provided with the means to adjust their sensitivity, necessary arrangements are to be allowed to fix and identify the set point.

3.2.12 The fire detection indicating panel is to be provided with facilities for functional testing.

3.2.13 The fire detecting system is to be fed automatically from the emergency source of power by a separate feeder if the main source of power fails.

3.2.14 On vessels having a length L > 24 m, facilities are to be provided in the fire detecting system to manually release the fire alarm from the following places:

- passageways having entrances to engine and boiler rooms,
- the navigating bridge,
- the control station in the engine room.

3.3 Fire fighting

3.3.1 Unless otherwise stated, pressurisation of the fire main at a suitable pressure by starting a main fire pump and carrying out the other necessary operations is to be possible from the navigation bridge. Alternatively, the fire main system may be permanently under pressure.

3.4 Protection against flooding

3.4.1 Bilge wells or machinery spaces bilge levels are to be monitored in such a way that the accumulation of liquid is detected in normal angles of trim and heel.

3.4.2 Where the bilge pumps are capable of being started automatically, means are to be provided to indicate when the influx of liquid is greater than the pump capacity or when the pump is operating more frequently than would normally be expected.

3.4.3 Where the bilge pumps in machinery spaces are of an automatic start type, they are to discharge into an oily bilge water tank.

3.4.4 The location of controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system are to be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the vessel in the fully loaded condition so requires, arrangements are to be made to operate the controls from a position above such level.

3.4.5 Bilge level alarms are to be given at the main control station and the navigating bridge.

4 Control of machinery

4.1 General

4.1.1 Under all sailing conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller is to be fully controllable from the navigation bridge.

4.1.2 All manual operations or services expected to be carried out with a periodicity of less than 24 h are to be eliminated or automated, particularly for: lubrication, topping up of make up tanks and filling tanks, filter cleaning, cleaning of centrifugal purifiers, drainage, load sharing on main engines and various adjustments. Nevertheless, the transfer of operation mode may be effected manually.

4.1.3 A centralised control position is to be arranged with the necessary alarm panels and instrumentation indicating any alarm.

4.1.4 Parameters for essential services which need to be adjusted to a preset value are to be automatically controlled.

4.1.5 The control system is to be such that the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured through the necessary automatic arrangements.

4.1.6 It is to be possible for all machinery essential for the safe operation of the vessel to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems.

4.1.7 The design of the remote automatic control system is to be such that in the case of its failure an alarm will be given. Unless impracticable, the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation.

4.1.8 Critical speed ranges, if any, are to be rapidly passed over by means of an appropriate automatic device.

4.1.9 Propulsion machinery is to stop automatically only in exceptional circumstances which could cause quick critical damage, due to internal faults in the machinery. The design of automation systems whose failure could result in an unexpected propulsion stop is to be specially examined.

An overriding device for cancelling the automatic shutdown is to be considered.

4.1.10 Where the propulsive plant includes several main engines, a device is to be provided to prevent any abnormal overload on each of them.

4.1.11 Where standby machines are required for other auxiliary machinery essential to propulsion, automatic changeover devices are to be provided.

4.2 Diesel propulsion plants

4.2.1 When a diesel engine is used for the propulsion plant, monitoring and control of equipment is to be performed according to Tab 2.

4.3 Gas turbine propulsion plants

4.3.1 For gas turbines, monitoring and control elements are required according to Tab 3.

4.4 Electrical propulsion plant

4.4.1 Documents to be submitted

The following additional documents are to be submitted to Tasneef:

- a list of the alarms and shutdowns of the electrical propulsion system
- when the control and monitoring system of the propulsion plant is computer based, a functional diagram of the interface between the programmable logic controller and computer network.

4.4.2 Alarm system

The following requirements are applicable to the alarm system of electrical propulsion:

- Alarms circuits of electrical propulsion are to be connected to the main alarm system on board. As an alternative, the relevant circuit may be connected to a local alarm unit. In any case, a connection between the local alarm unit and the main alarm system is to be provided.
- The alarms can be arranged in groups, and shown in the control station. This is acceptable when a discrimination is possible locally.
- When the control system uses a computer based system, the requirements of Part C, Ch 3, Sec 4 are applicable, in particular, for the data transmission link between the alarm system and the control system.
- Individual alarms are considered as critical and are to be individually activated at the control station, and acknowledged individually.
- Shutdown activation is to be considered as an individual alarm.

4.4.3 Safety functions

The following requirements are applicable to the safety system of electrical propulsion:

- As a general rule, safety stop using external sensors such as temperature, pressure, overspeed, main cooling failure, stop of converter running by blocking impulse is to be confirmed by the automatic opening of the main circuit using a separate circuit.
- In order to avoid accidental stop of the propulsion line and limit the risk of blackout due to wire break, the tripping of the main circuit-breaker is to be activated by an emission coil with a monitoring of the line wire break.

- In the case of a single line propulsion system, the power limitation order is to be duplicated.
- As a general rule, when the safety stop is activated, it is to be maintained until local acknowledgement.

4.4.4 Transformers

For transformers, parameters according to Tab 4 are to be controlled or monitored.

4.4.5 Converters

For converters, parameters according to Tab 5, Tab 6 and Tab 7 are to be monitored or controlled.

4.4.6 Smoothing coil

For the converter reactors, parameters according to Tab 8 are to be monitored or controlled.

4.4.7 Propulsion electric motors

For propulsion electric motors, parameters according to Tab 9 are to be monitored or controlled.

4.4.8 All parameters listed in the tables of this item are considered as a minimum requirement for unattended machinery spaces.

Some group alarms may be locally detailed on the corresponding unit (for instance loss of electronic supply, failure of electronic control unit, etc.).

4.5 Shafting, clutches, CPP, gears

4.5.1 For shafting and clutches, parameters according to Tab 10 are to be monitored or controlled.

4.5.2 For controllable pitch propellers, parameters according to Tab 11 are to be monitored or controlled.

4.5.3 For reduction gears and reversing gears, parameters according to Tab 12 are to be monitored or controlled.

4.6 Auxiliary systems

4.6.1 Where standby machines are required for other auxiliary machinery essential to propulsion, automatic changeover devices shall be provided.

Change-over restart is to be provided for the following systems:

- cylinder, piston and fuel valve cooling
- cylinder cooling of diesel generating sets (where the circuit is common to several sets)
- main engine fuel supply
- diesel generating sets fuel supply (where the circuit is common to several sets)
- sea water cooling for propulsion plant
- hydraulic control of clutch, CPP or main thrust unit.

4.6.2 When a standby machine is automatically started, an alarm is to be activated.

4.6.3 When the propulsion plant is divided into two or more separate units, the automatic standby auxiliary may be omitted, when the sub-units concerned are fully separated with regard to power supply, cooling system, lubricating system etc.

Some of the propulsive plants may be partially used for reasons of economy (use of one shaft line or one propulsion engine for instance). If so, automatic change-over, necessary for this exploitation mode, is to be provided.

4.6.4 Means are to be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion.

4.6.5 Where daily service fuel oil tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages.

4.6.6 Arrangements are to be provided to prevent overflow spillages coming from equipment treating flammable liquids.

4.6.7 For auxiliary systems, the following parameters, according to Tab 13 to Tab 20 are to be monitored or controlled.

4.7 Control of electrical installation

4.7.1 Where the electrical power can normally be supplied by one generator, suitable load shedding arrangements are to be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the vessel.

4.7.2 In the case of loss of the generator in operation, adequate provision is to be made for automatic starting and connecting to the main switchboard of a standby generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the vessel with automatic restarting of the essential auxiliaries including, where necessary, sequential operations.

4.7.3 The standby electric power is to be available in not more than 45 seconds.

4.7.4 If the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision is to be made, for instance by load shedding, to ensure that, in the case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering, and to ensure the safety of the vessel.

4.7.5 Following a blackout, automatic connection of the standby generating set is to be followed by an automatic restart of the essential electrical services. If necessary, time delay sequential steps are to be provided to allow satisfactory operation.

4.7.6 Monitored parameters for which alarms are required to identify machinery faults and associated safeguards are listed in Tab 24. These alarms are to be indicated at the control location for machinery as individual alarms; where the alarm panel with all individual alarms is installed on the engine or in the vicinity, a common alarm in the control location for machinery is required.

5 Alarm systems

5.1 General

5.1.1 A system of alarm displays and controls is to be provided which readily allows identification of faults in the machinery and satisfactory supervision of related equipment. This may be arranged at a main control station or, alternatively, at subsidiary control stations. In the latter case, a master alarm display is to be provided at the main control station showing which of the subsidiary control stations is indicating a fault condition.

5.1.2 Unless otherwise justified, separation of monitoring and control systems is to be provided.

5.1.3 The alarm system is to be designed to function independently of control and safety systems, so that a failure or malfunction of these systems will not to prevent the alarm system from operating. Common sensors for alarms and automatic slowdown functions are acceptable as specified in each specific table.

5.1.4 The alarm system is to be continuously powered and is to have an automatic change-over to a standby power supply in the case of loss of normal power supply.

5.2 Alarm system design

5.2.1 The alarm system and associated sensors are to be capable of being tested during normal machinery operation.

5.2.2 Insulation faults on any circuit of the alarm system are to generate an alarm, when an insulated earth distribution system is used.

5.3 Machinery alarm system

5.3.1 On vessels having a length L > 24 m, the local silencing of the alarms on the bridge is not to stop the audible machinery space alarm.

5.3.2 Machinery faults are to be indicated at the control locations for machinery itself.

5.4 Alarm system on navigating bridge

5.4.1 Alarms associated with faults requiring speed reduction or automatic shutdown are to be separately identified on the bridge.

5.4.2 The alarm system is to activate an audible and visual alarm on the navigation bridge for any situation which requires action by or attention of the officer on watch.

5.4.3 Individual alarms are to be provided at the navigation bridge indicating any power supply failures of the remote control of propulsion machinery.

6 Safety systems

6.1 General

6.1.1 Safety systems of different units of the machinery plant are to be independent.

Failure in the safety system of one part of the plant is not to interfere with the operation of the safety system in another part of the plant.

6.1.2 In order to avoid undesirable interruption in the operation of machinery or systems, the safety system is to intervene sequentially after the operation of the alarm system by:

- starting of standby units,
- load reduction or shutdown, such that the least drastic action is taken first.

6.1.3 The arrangement for overriding the shutdown of the main propelling machinery is to be such as to preclude inadvertent operation.

6.1.4 After stoppage of the propulsion engine by a safety shutdown device, the restart is only to be carried out, unless otherwise justified, after setting the propulsion bridge control level on «stop».

7 Tests

7.1 General

7.1.1 Tests of automated installations are to be carried out according to Part C, Ch 3, Sec 6 to determine their operating conditions. The details of these tests are defined, in each case, after having studied the concept of the automated installations and their construction. A complete test program is to be submitted for approval and may be as follows.

7.1.2 The tests of equipment carried out alongside the quay under normal conditions of use include, for instance:

- the electrical power generating set,
- the automatic bilge draining system,
- automatic centrifugal separators or similar purifying apparatus,
- automatic change-over of service auxiliaries,
- detection of high pressure fuel leaks from diesel generating sets.

7.1.3 Sea trials are used to demonstrate the proper operation of the automated machinery and systems.

For this purpose, for instance, the following tests are to be carried out:

- Test of the remote control of propulsion:
  - checking of the operation of the automatic control system: programmed or unprogrammed starting speed increase, reversal, adjusting of the propeller pitch, failure of supply sources, etc.
  - checking of the crash astern sequence, to ensure that the reversal sequence is properly performed from full head, the ship sailing at its normal operation speed. The purpose of this check is not to control the nautical performances of the vessel (such as stopping distance, etc.)
  - finally, checking of the operation of the whole installation in normal working conditions, i.e. as a general rule without watch-keeping personnel for the monitoring and/or running of the machinery during 6 h at least
  - the following procedure may, for instance, be chosen: «underway» during 2 h, then increasing to «full ahead». Staying in that position during 5 min. Then stopping for 15 min. Then, putting the control lever in the following positions, staying 2 minutes in each one: astern slow, astern half, astern full, full ahead, half ahead, stop, full astern, stop, ahead dead slow, half ahead, then increasing the power until «underway».
- Test of the operating conditions of the electrical production:
  - automatic starting of the generating set in the event of a blackout
  - automatic restarting of auxiliaries in the event of a blackout
  - load-shedding in the event of generating set overload
  - automatic starting of a generating set in the event of generating set overload.
- Test of fire and flooding system:
  - test of normal operation of the fire detection system (detection, system faults)
  - test of detection in the scavenging air belt
  - test of the fire alarm system
  - test of protection against flooding.
- Test of operating conditions, including manoeuvring, of the whole machinery in an unattended situation for 4 hours.

7.1.4 For vessels having a length not exceeding 24 m, the duration and extent of sea trials may be reduced at Tasneef discretion.

Table 2 : Diesel engines

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main engine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
Fuel oil system							
• Fuel oil pressure after filter (engine inlet)	L						
						X	
• Leakage from high pressure pipes where required	H						
Lubricating oil system							
• Lubricating oil to main bearing and thrust bearing pressure	L	R	X				
	LL			X			
• Lubricating oil filter differential pressure		X					
• Lubricating oil inlet temperature	H	R					
					X		
• Oil mist concentration in crankcase (1)	H			X			
• Lubricating oil to turbocharger inlet pressure (2)	L						
Sea water cooling system							
• Sea water cooling pressure	L	X				X	
Cylinder fresh cooling water system							
• Cylinder water inlet pressure or flow	L		X			X	
• Cylinder water outlet temperature	H	R					
• Level of cylinder cooling water in expansion tank	L						
Scavenge air system							
• Scavenging air receiver temperature	H						
Exhaust gas system							
• Exhaust gas temperature after each cylinder (3)	H	R					
• Exhaust gas temperature after each cylinder, deviation from average (3)	H						
Miscellaneous							
• Engine speed		R					
					X		
• Engine overspeed	H			X			
• Control, safety, alarm system power supply failure	X						

(1) Only for medium speed engines having a power of more than 2250 kW or a cylinder bore of more than 300 mm. One oil mist detector for each engine having two independent outputs for initiating the alarm and shutdown would satisfy the requirement for independence between alarm and shutdown system.

(2) If without integrated self-contained oil lubrication system.

(3) For engine power > 500 kW/cyl.

Table 3 : Propulsion gas turbines

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Turbine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
Lubricating oil system							
• Turbine supply pressure	L		X			X	
	LL			X			
• Differential pressure across lubricating oil filter	H						
• Bearing or lubricating oil (discharge) temperature	H						
Mechanical monitoring of gas turbine							
• Speed		R			X		
	H			X			
• Vibration	H						
	HH			X			
• Rotor axial displacement (not applicable to roller bearings)	H						
	HH			X			
• Number of cycles performed by rotating parts	H						
Gas generator monitoring system							
• Flame and ignition failure				X			
• Fuel oil supply pressure	L						
• Fuel oil supply temperature	H+L						
					X		
• Cooling medium temperature	H						
• Exhaust gas temperature or gas temperature in specific locations of flow gas path (alarm before shutdown)	H						
	HH			X			
• Pressure at compressor inlet (alarm before shutdown)	L						
Miscellaneous							
• Control system failure	X						
• Automatic starting failure	X						

Table 4 : Transformers

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indi-cation	Slow-down	Shut-down	Control	Standby start	Stop
• Earth failure on main propulsion circuits	I						
• Circuit-breaker, short-circuit	I **(2)**			X			
• Circuit-breaker, overload	I **(2)**			X			
• Circuit-breaker, undervoltage	I **(2)**			X			
• Temperature of winding on phase 1, 2, 3 **(1)**	G						
	I,H		X **(3)**				
	I, HH			X			
• Temperature sensor failure (short-circuit, open circuit, supply failure)	G						
• Cooling pump pressure or flow	G,L						
			X				
						X	
• Cooling medium temperature	G, H			X			
• Leak of cooling medium	G						
			X				

(1) A minimum of 6 temperature sensors are to be provided :

- 3 temperature sensors to be connected to the alarm system (can also be used for the redundant tripping of the main circuit-breaker)
- 3 temperature sensors connected to the control unit.

(2) To be kept in the memory until local acknowledgement.

(3) Possible override of slowdown by the operator.

Table 5 : Network converters

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Short-circuit current I max	I			X			
• Overvoltage	G			X			
• Undervoltage	G						
• Phase unbalanced	I			(X) **(1)**			
• Power limitation failure	I						
• Protection of filter circuit trip	I						
• Circuit-breaker opening operation failure	I						
• Communication circuit, control circuits, power supplies, watchdog of control system according to supplier's design	G			X			
(1) This parameter, when indicated in brackets, is only advisable according to the supplier's requirements.							

Table 6 : Motor converters

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Short-circuit current I max	I			X			
• Overvoltage	G			X			
• Undervoltage	G			X			
• Phase unbalanced	I						
• Protection of filter circuit trip	I						
• Communication circuit, control circuits, power supplies, watchdog of control system according to supplier's design	G			X			
• Speed sensor system failure	G					X **(1)**	
• Overspeed	I			X			
(1) Automatic switch-over to the redundant speed sensor system.							

Table 7 : Converter cooling circuit

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Air cooling temperature high	I	R					
• Ventilation, fan failure	G						
			X				
• Cooling pump pressure or flow low	G	R					
						X	
• Cooling fluid temperature high	G						
• Leak of cooling medium	G						
			X				
• Temperature sensor failure (short-circuit, open circuit, supply failure)	G						

Table 8 : Smoothing coil

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Temperature of coil	I, H	R					
	I, HH						
• Cooling air temperature	I, H						
• Ventilation fan failure	G						
			X				
• Cooling pump pressure or flow low	G	R					
						X	
• Cooling fluid temperature high	G						
• Leak of cooling medium	G						
			X				
• Temperature sensor failure (short-circuit, open circuit, supply failure)	G						

Table 9 : Propulsion electric motor

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slowdown	Shut-down	Control	Standby start	Stop
• Automatic tripping of overload and short-circuit protection on excitation circuit	G, H			H			
• Loss of excitation	G			X			
• Winding current unbalanced	G						
• Harmonic filter supply failure	I						
• Interface failure with power management system	I		X				
• Earthing failure on stator winding and stator supply	I	R					
• Temperature of winding on phase 1, 2, 3	G	R					
	I, H		X				
	I, HH			X			
• Motor cooling air temperature	I, H	R					
• Cooling pump pressure or flow	G, L	R					
			X				
						X	
• Cooling fluid temperature	G, H						
• Leak of cooling medium	G						
			X				
• Temperature sensor failure (short-circuit, open circuit, supply failure)	G						
• Motor bearing temperature	G, H	R					
• Bearing lubrication oil pressure (for self-lubricated motor, when the speed is under the minimum RPM specified by the manufacturer, shutdown is to be activated)	I, L	R					
			X				
						X	
• Bearing lubrication oil pressure	G, L						
• Turning gear engaged	I						
• Brake and key engaged	I						
• Shaft reduction gear bearing temperature	I, H						
• Shaft reduction gear lubricating oil temperature	I, H						
• Shaft reduction gear bearing pressure	I, L						
				X			

Table 10 : Shafting and clutches of propulsion machinery

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main engine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Temperature of each shaft thrust bearing (not applicable for ball or roller bearings)	H		X				
• Sterntube bush oil gravity tank level	L						
• Clutch control oil pressure	L					X	
	LL			X			

Table 11 : Controllable pitch propellers

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main engine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Oil tank level	L						
• Control oil pressure	L					X	
	LL						

Table 12 : Reduction gears/reversing gears

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main engine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Lubricating oil temperature	H						
• Lubricating oil pressure	L					X	
	LL			X			
• Oil tank level	L						
• Plain bearing temperature	H						
	HH			X			

Table 13 : Control and monitoring of auxiliary electrical systems

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main engine			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Electric circuit, blackout	X						
• Power supply failure of control, alarm and safety system	X						

Table 14 : Fuel oil system

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Fuel oil tank level, overflow	H (1)						
• Air pipe water trap level on fuel oil tanks	H (2)						
• Outlet fuel oil temperature	H (4)			X (5)	X		
• Sludge tank level	H						
• Fuel oil settling tank level	H (1)						
• Fuel oil settling tank temperature	H (3)						
• Fuel oil centrifugal purifier overflow	H			X			
• Fuel oil in daily service tank level	L						
• Fuel oil daily service tank temperature	H (3)				X		
• Fuel oil in daily service tank level (to be provided if no suitable overflow arrangement)	H (1)						

(1) Or sight-glasses on the overflow pipe.

(2) Or alternative arrangement as per Part C, Ch 1, Sec 9, [8.1.5].

(3) Applicable where heating arrangements are provided.

(4) Or low flow alarm in addition to temperature control when heated by steam or other media.

(5) Cut off of electrical power supply when electrically heated.

Table 15 : Lubricating oil system

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Air pipe water trap level of lubricating oil tank See Part C, Ch 1, Sec 9, [8.1.5]	H						
• Sludge tank level	H						
• Lubricating oil centrifugal purifier overflow	H						
• (stop of oil supply)							X

Table 16 : Hydraulic oil system

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Pump pressure	L+H						
• Service tank level	L (1)						
(1) The low level alarm is to be activated before the quantity of lost oil reaches 100 litres or 50% of the circuit volume , whichever is the lesser.							

Table 17 : Compressed air system

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Air temperature at compressor outlet	H						
• Compressor lubricating oil pressure (except where splash lubrication)	LL			X			
• Control air pressure after reducing valves	L+H	R					
					X		
• Starting air pressure before main shut-off valve	L (2)	locale + R (1)					
					X		
	X					X	
• Safety air pressure	L+H						
					X		

(1) Remote indication is required if starting of air compressor is remote controlled, from wheelhouse for example.

(2) For starting air, the alarm minimum pressure set point is to be so adjusted as to enable at least four starts for reversible propulsion engines and two starts for non-reversible propulsion engines.

Table 18 : Cooling systems

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Sea water pump pressure or flow	X					X	
	L						
• Fresh water pump pressure or flow	X					X	
	L						
• Level in cooling water expansion tank	L						

Table 19 : Thrusters

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Thruster			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Control oil pressure (preferably before cooler)	L					L	
• Lubricating oil tank level	L						

Table 20 : Auxiliary reciprocating I.C. engines driving generators

Symbol convention H = High, HH = Very high, G = group alarm L = Low, LL = Very low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Controlled parameter	Alarm	Indication	Slow-down	Shut-down	Control	Standby start	Stop
• Fuel oil leakage from pressure pipes, when required	H						
• Lubricating oil temperature	H	Locale					
• Lubricating oil pressure	L	Locale				X	
	LL			X (1)			
• Oil mist concentration in crankcase (2)	H			X			
• Pressure of cooling water, if not connected to main system	L	Locale					
• Temperature of cooling water or cooling air	H	Locale					
• Engine speed		Locale					
					X		
	H			X			
• Fault in the electronic governor system	X						
• Starting air pressure	L						
• Exhaust gas temperature after each cylinder (3)	H						

(1) Not applicable to emergency generator set.
(2) For engines having a power of more than 2250 kW or a cylinder bore of more than 300 mm.
(3) For engine power above 500 kW/cyl.

Part F

Additional Class Notations

Chapter 2
STABILITY AND BUOYANCY

SECTION 1 DAMAGE STABILITY (DAMS)

1 Application

1.1.1 The additional class notation **DAMS** is assigned to vessels complying with the requirements of this Section regarding damage stability.

1.1.2 The requirements of this Section are additional to those provided in Part B, Ch 3, Sec 3,.

2 General criteria of damage stability

2.1.1 The additional class notation **DAMS** is assigned if the vessel complies with the subdivision and damage stability criteria in the displacement mode referred to in HSC Rules, Ch 2, [2.15].

SECTION 2 UNSINKABILITY (UNSINK)

1 Application

1.1.1 The additional class notation **UNSINK** may be assigned to vessels complying with the requirements of this Section regarding unsinkability of the vessel.

2 Documentation

2.1.1 A plan is to be submitted to Tasneef, which shows the location on board the vessel of the devices proving buoyancy, such as light material of expanded polyurethane, air cases, etc., the material of which they are made and the devices for their permanent securing to the hull, if fitted.

2.1.2 If light material of the expanded type is used, certifications are to be provided confirming that the material used is resistant to sea water, hydrocarbons and high temperature.

3 Carrying out of test

3.1.1 The parts of fitting that can be damaged by water are to be replaced by appropriate weights, equivalent in value and location.

The vessel, thoroughly completed and floating in full load condition, is to be flooded with a water volume equal to the floodable volume, so taking account of the actual volumes of the equivalent weights.

3.1.2 In the abovementioned conditions, a heeling moment is to be applied causing the vessel to submerge on the heeling side, by 0,10 **B**, where **B** is defined in Part B, Ch 1, Sec 2, [2.1.1].

3.1.3 As an alternative to the full scale test as described in the preceding paragraphs, Tasneef may accept that the unsinkability characteristics are demonstrated through flooding calculations.

4 Conditions for acceptance

4.1.1 The test id accepted provided that the following conditions are fulfilled:

- During and on completion of flooding the vessel keeps the trim unchanged and transversely an upright position (no heeling angle);
- On completion of flooding and in upright position, the vessel is to have a positive free board at least fore and aft;
- After the heeling moment referred in [3.1.2] is removed, the vessel spontaneously resumes the upright position.

SECTION 3 SELF-RIGHTING CAPABILITY (SELF-RIGHT)

1 Application

1.1.1 The additional class notation **SELF-RIGHT** is assigned to vessels having the additional class notation **DAMS** and possessing such stability characteristics and/or arrangements that the vessel is capable of self-righting.

2 Stability criteria in damage conditions

2.1.1 For the vessel to be assigned the additional class notation **SELF-RIGHT**, the following flooding conditions are to be considered:

- Complete flooding of the vessel, assuming as zero (0) the permeability of the buoyancy tanks;
- Flooding with a quantity of water equal to the whole volume of the under deck spaces, assuming as zero (0) the permeability of the buoyancy tanks;
- Flooding of two adjacent compartments, assuming as one (1) the coefficient of permeability of the buoyancy tanks fitted in the flooded compartments.

In the final flooding condition, the residual stability is to be positive and the margin line not submerged.

3 Internal arrangements and systems

3.1 General

3.1.1 The internal arrangements are to be such as not to cause damage to things and harm to persons, in the case of capsizing and during the self-righting phase of the vessel.

In particular, the propulsion systems and those connected to the safety and operation of the vessel are to be so constructed as not to leak liquids during capsizing and such as to assure their function after the vessel has self-righted.

Part F

Additional Class Notations

Chapter 3
OTHER ADDITIONAL CLASS NOTATIONS

SECTION 1 FIRE FIGHTING EQUIPMENT (FFQ)

1 General

1.1 Application

1.1.1 The additional class notations **FFQ 1**, **FFQ 2** and **FFQ 3** as defined in Part A, Ch 1, Sec 4, [7.1.9], may be assigned to vessels which have been assigned the service notation **fire fighting** and comply with the requirements of this Section.

1.1.2 Vessels dealt with in this Chapter are to comply with the requirements stipulated in Parts A, B, C and D, as applicable, as well as with the requirements of Part E, Ch 3, which are specific for fire-fighting vessels.

1.2 Documents to be submitted

1.2.1 The documents listed in Tab 1 are to be submitted.

2 Stability

2.1 Intact stability

2.1.1 General

For intact stability the vessel is to comply with the specific requirements of Part B, Ch 3, Sec 2 for the loading conditions defined in Part B, Ch 3, App 2, [1.2.11], as well as the additional requirements given in Ch 2, Sec 3, [2.1.1].

3 Structure design principles

3.1 Hull structure

3.1.1 The strengthening of the structure of the vessels, where necessary to withstand the forces imposed by the fire-extinguishing systems when operating at their maximum capacity in all possible directions of use, are to be considered by Tasneef on a case-by-case basis.

3.2 Water and foam monitors

3.2.1 The monitors are to be of robust construction and are to be of a type approved by Tasneef.

The seatings of the monitors are to be of adequate strength for all modes of operation.

4 Other structures

4.1 Arrangement for hull and superstructure openings

4.1.1 On vessels which are not fitted with a water-spraying system complying with the requirements in [12], all windows and port lights are to be fitted with efficient deadlights or external steel shutters, except for the wheelhouse.

5 Design of machinery systems

5.1 Fuel oil capacity

5.1.1 All vessels are to have fuel oil tanks whose capacity is to be sufficient for continuous fighting of fires whilst all the water monitors are operating for a period of time not less than:

- 24 hours, for vessels having the additional class notation **FFQ 1**,
- 96 hours, for vessels having the additional class notation **FFQ 2** and **FFQ 3**.

This capacity is to be additional to that provided for the normal operation of the ship (propulsion, etc.).

Note 1: The determination of such required capacity is the responsibility of the Designer.

6 General requirements for fire-fighting systems

6.1 General

6.1.1 The requirements of this Article are applicable to both water fire-extinguishing systems and fixed foam fire-extinguishing systems.

6.2 Monitors

6.2.1 Design of monitors

a) Monitors are to be of a type approved by Tasneef.

b) Monitors are to be of robust construction and capable of withstanding the reaction forces of the water jet.

6.2.2 Monitors are to be so arranged as to allow an easy horizontal movement of at least 90° equally divided about the centreline of the vessel. The allowed vertical angular movement is to be such that the height of throw required in Tab 2 can be achieved.

6.2.3 The monitors are to be located such that the water jet is free from obstacles, including vessel's structure and equipment.

6.2.4 The monitors are to be capable of throwing a continuous full water jet without significant pulsations and compacted in such a way as to be concentrated on a limited surface.

6.2.5 At least two monitors are to be equipped with a device to make the dispersion of the water jet (spray jet) possible.

6.2.6 Piping

The maximum design water velocity is not normally to exceed 4 m/s in the piping between pumps and water monitors.

6.3 Monitor control

6.3.1 General

Water monitors and foam monitors are to be operated and controlled with a remote control system located in a common control station having adequate overall visibility.

6.3.2 Manual control

In addition to the remote control system, a local manual control is to be arranged for each monitor. It is to be possible to:

- disconnect the local manual control from the control station,
- disconnect the remote control system, from a position close to each monitor, to allow the operation with the local manual control.

6.3.3 Valve control

The valve control is to be designed so as to prevent pressure hammering.

6.3.4 Control system

a) The control system is to comply with the relevant provisions of Part C, Ch 3, Sec 1 and Part C, Ch 3, Sec 2.

b) The control system is to be designed with a redundancy level such that lost function can be restored within 10 minutes.

c) In the case of a hydraulic or pneumatic control system, the control power units are to be duplicated.

6.3.5 Marking

All control and shut-off devices are to be clearly marked, both locally and in the control station.

7 Water fire-fighting system

7.1 Characteristics

7.1.1 For the vessels having the additional class notation **FFQ 1**, **FFQ 2** and **FFQ 3**, the number of pumps and monitors and their characteristics are to be in accordance with the requirements given in Tab 2.

8 Fixed foam fire-extinguishing system

8.1 General

8.1.1 The vessels for which the additional class notation **FFQ 3** is requested are to be equipped with a fixed low expansion foam monitor system complying with the provisions of Part C, Ch 4, Sec 13, [6] of RINAMIL the requirements of this Article.

8.1.2 Where a fixed low expansion foam monitor system is fitted on a vessel having the additional class notations **FFQ 1** o **FFQ 2**, the arrangement and characteristics of the system will be considered by Tasneef on a case-by-case basis.

8.2 Characteristics

8.2.1 Foam expansion ratio

The foam expansion ratio is not to exceed 12.

8.2.2 Foam monitors

a) The vessel is to be fitted with two foam monitors, each having a foam solution capacity not less than 300 m^3/h.

b) The height of throw is to be at least 50 m above the sea level, when both monitors are in operation at the maximum foam production rate.

8.2.3 Foam concentrate capacity

Sufficient foam concentrate is to be available for at least 30 min of simultaneous operation of both monitors at maximum capacity.

Note 1: When determining the necessary quantity of foam concentrate, the concentration rate is assumed to be 5%.

8.3 Arrangement

8.3.1 Foam generating system

The foam generating system is to be of a fixed type with separate foam concentrate tank, foam-mixing units and piping to the monitors.

8.3.2 Pumps

The pumps of the water monitor system may be used for supplying water to the foam monitor system. In such case, it may be necessary to reduce the pump water delivery pressure to ensure correct water pressure for maximum foam generation.

9 Portable fire-fighting equipment

9.1 Portable high expansion foam generator

9.1.1 Vessels having the additional class notation **FFQ 2** and **FFQ 3** are to be equipped with a portable high expansion foam generator having a foam capacity not less than 100 m3/min for fighting of external fires.

9.1.2 The total capacity of foam concentrate is to be sufficient for 30 min of continuous foam production. The foam concentrate is to be stored in portable tanks of about 20 litres capacity.

9.2 Hydrants and fire hoses

9.2.1 Hydrants

a) Hydrants are to be provided in accordance with Tab 3.

b) At least half of the required hydrants are to be arranged on the main weather deck.

c) Where hydrants are fed by the pumps serving the monitor supply lines, provision is to be made to reduce the water pressure at the hydrants to a value permitting safe handling of the hose and the nozzle by one man.

9.2.2 Fire hose boxes

a) At least one box containing fire hoses is to be provided for every two hydrants.

b) Each box is to contain two fire hoses complete with dual-purpose (spray/jet) nozzles.

9.2.3 Fire hoses

a) Fire hoses and associated nozzles are to be of a type approved by Tasneef.

b) Fire hoses are to be of 45 to 70 mm in diameter and generally are to be 20 m in length.

10 Firemen's outfits

10.1 Number and characteristics

10.1.1 The vessel is to be fitted with firemen's outfits in accordance with Tab 4.

These outfits are not additional to those required in Part C.

10.1.2 The air breathing apparatuses, protective clothing and electric safety lamps constituting parts of firemen's outfits are to be of a type approved by Tasneef.

10.1.3 Breathing apparatuses are to be of the self-contained type. They are to have a capacity of at least 1200 litres of free air.

At least one spare air bottle is to be provided for each apparatus.

10.1.4 The firemen's outfits are to be stored in a safe position readily accessible from the open deck.

10.2 Compressed air system for breathing apparatuses

10.2.1 General

All vessels are to be equipped with a high pressure air compressor complete with all fittings necessary for refilling the bottles of air breathing apparatuses. The compressor is to be located in a suitable sheltered location.

10.2.2 Capacity

The capacity of the compressor is to be sufficient to allow the refilling of the bottles of air breathing apparatuses in no more than 30 min. This capacity is not to be less than 75 l/min.

10.2.3 Accessories

a) The compressor is to be fitted on the air suction with a suitable filter.

b) The compressor is to be fitted on the delivery with oil separators and filters capable of preventing passage of oil droplets or vapours to the air bottles.

Table 1 : Documents to be submitted

No.	A/I (1)	Document (2)
1	I	General arrangement showing the disposition of all fire-fighting equipment
2	A	Details of all fire-fighting equipment such as pumps and monitors, including their capacity, range and trajectory of delivery
3	A	Schematic diagram of the water fire-fighting system
4	A	Plan of the water monitor seating arrangements
5	A	Diagram of local control and remote control system for water monitors
6	A	Schematic diagram of the fixed foam fire-extinguishing system

7	A	Plan of the foam monitor seating arrangements (3)
8	A	Diagram of local control and remote control system for foam monitors (3)
9	A	Specification and plans showing the location of firemen's outfits
10	A	Particulars of the means of keeping the ship in position during fire-fighting operations
11	I	Calculation of the required fuel oil capacity according to [2.2.1]
12	I	Operating manual
13	A	Plan showing structural fire divisions, including doors and other closing devices of the openings in A and B class divisions
14	I	Reports of the fire tests of insulating material
15	A	Schematic diagram of the fixed self-protection water-spraying system

(1) A: to be submitted for approval in four copies
I: to be submitted for information in duplicate

(2) Diagrams are also to include, where applicable:
- the (local and remote) control and monitoring systems and automation systems,
- the instructions for the operation and maintenance of the piping system concerned (for information).

(3) For vessels having additional class notation **FFQ 3**

Table 2 : Minimum requirements for monitors

Required characteristics	Additional class notation				
	FFQ 1	FFQ 2			FFQ 3
minimum number of water monitors	2	2	3	4	4
minimum discharge rate per monitor (m3/h)	1200	3600	2400	1800	2400
minimum number of fire-fighting pumps	1	2			2
minimum total pump capacity (m3/h) (1)	2400	7200			9600
length of throw of each monitor (m) (2) (4)	120	150			150
height of throw of each monitor (m) (3) (4)	45	70			70

(1) Where the water monitor pumps are also used for the self-protection water-spraying system, their capacity is to be sufficient to ensure the simultaneous operation of both systems at the required performances.
(2) Measured horizontally from the monitor outlet to the mean impact area.
(3) Measured vertically from the sea level, the mean impact area being at a distance of at least 70 m from the nearest part of the vessel.
(4) The length and height of throw are to be capable of being achieved with the required number of monitors operating simultaneously in the same direction.

Table 3 : Minimum number of hydrants

FFQ 1	FFQ 2	FFQ 3
4 at each side	8 at each side	8 at each side **(1)**

(1) May be increased to 10 hydrants at each side, depending on the ship's length.

Table 4 : Number of firemen's outfits

FFQ 1	FFQ 2	FFQ 3
4	8	8

11 Fire protection of exposed surfaces

11.1 Structural fire protection

11.1.1 On vessels for which the additional class notation **FFQ 1** is requested all exterior boundaries above the lightest operating waterline, including superstructures and exposed decks, are to be of steel and are to be internally insulated so as to form A-60 class divisions unless they are self-protected with a water-spraying system having a capacity of not less than 10 l/min for each square metre (see also [12]).

11.1.2 On vessels for which the additional class notation **FFQ 2** or **FFQ 3** is requested, all exterior boundaries are to be of steel but they need not be insulated.

11.1.3 On all vessels, other boundaries may be constructed of materials other than steel, subject to special consideration by Tasneef.

11.2 Deadlights and shutters

11.2.1 On vessels where a fixed self-protection water spraying system is fitted, shutters are to be provided on all windows, sidescuttles and navigation lights, except for the windows of the navigating bridge.

12 Self-protection water-spraying system

12.1 General

12.1.1 The provisions of this Article apply to the self-protection water-spraying systems.

They are additional to those given in Part C, Ch 4, Sec 13, [7] of RINAMIL.

12.2 Capacity

12.2.1 The capacity of the self-protection water-spraying system is to be not less than 10 l/min for each square metre of protected area. In the case of surfaces which are internally insulated, such as to constitute A-60 class divisions, a lower capacity may be accepted, provided it is not less than 5 l/min for each square metre of protected area.

12.3 Arrangement

12.3.1 Areas to be protected

The fixed self-protection water-spraying system is to provide protection for all vertical areas of the hull and superstructures as well as monitor foundations and other fire-fighting arrangements, and is to be fitted in such a way as not to impair the necessary visibility from the wheelhouse and from the station for remote control of water monitors, also during operation of spray nozzles.

12.3.2 Sections

The fixed self-protection water-spraying system may be divided into sections so that it is possible to isolate sections covering surfaces which are not exposed to radiant heat.

12.3.3 Spray nozzles

The number and location of spray nozzles are to be suitable to spread the sprayed water uniformly on areas to be protected.

12.4 Pumps

12.4.1 Use of pumps serving other systems

The following pumps may be used for the self-protection water-spraying system:

- the fire pumps referred to in Part C, Ch 4, Sec 7, [1.3] of RINAMIL,
- the water monitor system pumps referred to in [7].

In this case, a shut-off valve is to be provided to segregate the systems concerned.

12.4.2 Capacity of pumps

a) The pumps of the self-protection water-spraying system are to have a capacity sufficient to spray water at the required pressure from all spray nozzles of the system.

b) Where the pumps serving the self-protection water-spraying systems are also used for another service, their capacity is to be sufficient to ensure the simultaneous operation of both systems at the required performances.

12.5 Piping system and spray nozzles

12.5.1 General

Pipes are to be designed and manufactured according to the requirements of Part C, Ch 1, Sec 9.

12.5.2 Protection against corrosion

Steel pipes are to be protected against corrosion, both internally and externally, by means of galvanising or equivalent method.

12.5.3 Drainage cocks

Suitable drainage cocks are to be arranged and precautions are to be taken in order to prevent clogging of spray nozzles by impurities contained in pipes, nozzles, valves and pumps.

SECTION 2 REMOVAL OF OILY PRODUCTS (REC-OIL)

1 General

1.1 Application

1.1.1 The additional class notation **REC-OIL**, as defined in Part A, Ch 1, Sec 4, [7.1.10] may be assigned to vessels complying with the requirements of this Section.

1.1.2 Vessels dealt with in this Section are to comply with the requirements stipulated in Parts A, B, C and D, as applicable, as well as with the requirements of this Section, which are specific for oil recovery vessels.

1.2 Documents to be submitted

1.2.1 The documents to be submitted are listed in Tab 1.

1.3 Oil removal methods

1.3.1 Oil removal is to be performed by conveying with suitable apparatuses the top layers of polluted water collected by the ship moving ahead into separation tanks and/or by skimming mobile belts or rotating disks acting on the oil film and/or by means of floating suction pumps operating on the sea surface.

Alternative methods, equivalent to those mentioned, are to be considered by Tasneef on a case-by-case basis.

1.4 Definitions

1.4.1 Accumulation tank

An accumulation tank is a tank intended for the retention of oil removed and separated from sea water.

1.4.2 Settling tank

A settling tank is a tank intended for the retention of polluted water and its subsequent separation from oil.

2 General arrangement

2.1 Segregation of spaces intended for retention of oil

2.1.1 Tanks

Accumulation tanks are to be separated from the engine room and service and accommodation spaces by means of a cofferdam or equivalent space.
Fuel tanks, settling tanks, tanks for ballast water, foam-forming liquid or anti-pollution liquid, storerooms for oil removal equipment and pump rooms are considered equivalent to a cofferdam.
This cofferdam may be omitted, however, between the above-mentioned spaces and settling tanks.
In the case of tanks containing foam-forming liquid having a bulkhead adjacent to accumulation tanks, fuel oil tanks or dispersing liquid tanks, the scantlings of such bulkhead and associated welds are to be adequately increased.

2.1.2 Openings in accumulation tank ceilings

All openings in accumulation tank ceilings are to lead to the open.

2.1.3 Accumulation tanks

Accumulation tanks are to be located abaft the collision bulkhead.

2.1.4 Movable tanks

In the case of oil collected in movable tanks fitted on the weather deck, the location of such tanks is to be such as to comply with the requirements in Sec 5, [2] relevant to gas vents.

2.2 Dangerous spaces

2.2.1 Dangerous spaces are those indicated in Tab 2.

2.3 Access to safe spaces

2.3.1 See the provisions given in [11.4.3].

3 Stability

3.1 Intact stability

3.1.1 General

The stability of the vessel for the loading conditions reported in the trim and stability booklet is to comply with the requirements in Part B, Ch 3, Sec 2.

4 Design loads

4.1 Oil removal and dispersant spraying

4.1.1 The still water and inertial loads transmitted by the operation of apparatuses and/or equipment for oil removal and spraying of any dispersant to the hull structure are to be taken into account.

5 Hull scantlings

5.1 Accumulation tanks

5.1.1 The net scantlings of any accumulation tanks consisting of movable tanks are considered by Tasneef on a case-by-case basis.

6 Other structures

6.1 Hull and superstructure openings

6.1.1 Windows in safe spaces located in front of dangerous spaces, where not of the fixed type, are to be such as to ensure an efficient gas-tight closure.

7 Construction and tests

7.1 Tests

7.1.1 Oil removal equipment

On completion of construction, a test is to be carried out on all equipment for oil removal in order to check:

- safeguards against fire and explosions during operations involving removal, retention on board, carriage and unloading of oil spilled on the sea surface,
- structural strength in relation to stresses caused by equipment used during oil removal operations.

8 Machinery installations and piping systems not intended for recovered oil

8.1 Bilge system

8.1.1 Arrangements are to be provided to drain the recovered oil from the pump room by means of power pumps or a bilge ejector.

Note 1: On oil recovery ships of less than 500 tons gross tonnage, the pump room may be drained by means of hand pumps with a suction diameter of not less than 50 mm.

8.2 Sea water cooling system

8.2.1 One of the suctions serving the sea water cooling system (see Part C, Ch 1, Sec 9, [9.6.1]) is to be located in the lower part of the hull.

8.3 Water fire-extinguishing system

8.3.1 Sea suctions serving the fire water pumps are to be located as low as possible.

8.4 Exhaust gas systems

8.4.1 Exhaust lines from engines and gas turbines are to be led to a gas-safe position as high as practicable above the deck and are to be fitted with a spark arrester.

8.4.2 Where the distance between the exhaust lines of engines and the dangerous zones is less than 3 m, the ducts are to be fitted in a position:

- near the waterline if cooled by water injection, or
- below the waterline in other cases.

8.5 Additional requirements for machinery installations in gas-dangerous areas

8.5.1 Attention is drawn to the risk of ignition in gas-dangerous spaces from sparking due to:

- formation of static electricity, or
- friction between moving parts.

8.5.2 No part having a surface temperature exceeding 220°C is permitted within the gas-dangerous areas.

8.5.3 Where precautions are taken against the risk of ignition, the installation of internal combustion engines may be permitted in zone 2 open gas-dangerous areas, subject to special consideration by Tasneef.

9 Pumping system, piping system and pump rooms intended for recovered oil

9.1 Design of pumping and piping systems

9.1.1 General

a) The relevant provisions of Part E, Ch 7, Sec 4, [3] of merchant Rules and Part C, Ch 1, Sec 9 are to be complied with.

b) Except where otherwise permitted by Tasneef, pumping and piping systems intended for recovered oil are to be independent from other pumping and piping systems of the vessel.

c) Piping is to be permanently installed. However, the use of portable pumps may be permitted, subject to special consideration by Tasneef.

9.1.2 Systems for oil recovery

Oil recovery may be performed:

- by conveying with suitable systems the top layers of polluted water collected by the ship moving ahead into separation tanks, and/or
- by skimming mobile belts or rotating disks acting on the oil film, and/or
- by means of floating suction pumps operating on the sea surface.

Alternative methods will be specially considered by Tasneef.

9.1.3 System for unloading oil residues

Vessels fitted with structural accumulation tanks are to be equipped with a system enabling the unloading of oil residues contained in accumulation tanks to shore facilities or to a supply vessel, simultaneously with oil recovery.

9.2 Arrangement of piping systems and pump rooms

9.2.1 Piping systems

a) Piping systems for handling of recovered oil are not to pass through:

- accommodation spaces,
- machinery spaces,
- service spaces,
- other enclosed gas-safe spaces.

However, parts of pipes of entirely welded construction, including the flanges and fittings, may be accepted in an enclosed gas-safe space other than accommodation spaces.

b) Where the transfer of recovered oil into accumulation tanks is carried out by means of flexible hoses or movable piping, only suitable connections are to be used. Small hatches are not permitted.

9.2.2 Pump rooms

a) Pump rooms containing the pumps for handling the recovered oil are to comply with the provisions given in Part E, Chapter 7 of Merchant Rules for pump rooms of ships having the service notation **oil tanker**.

b) For draining of pump rooms, see [8.1.1].

c) For ventilation of pump rooms, see [12].

10 Settling and accumulation tanks

10.1 General

10.1.1 The arrangement of settling and accumulation tanks is to comply with the provisions of [2.1.1].

10.2 Vent pipes

10.2.1 Settling tanks

Vent pipes of settling tanks are to be fitted with:

- adequate flameproof wire gauze, and
- closing appliances complying with the provisions of Part C, Ch 1, Sec 9, [8.1].

10.2.2 Accumulation tanks

a) Vent pipes of accumulation tanks are to lead to the open at least 2 m above the weather deck and are to be located at least 5 m from ignition sources, openings in accommodation spaces and other safe spaces, and air intakes of ventilation systems for accommodation spaces, engine rooms and other safe spaces in which ignition sources may be present.

b) Openings of vent pipes to the open are to be so arranged as to allow a direct flow upwards and fitted with:

- flameproof wire gauze made of corrosion resistant material easily removable for cleaning, and
- closing appliances complying with the provisions of Part C, Ch 1, Sec 9, [8.1].

10.3 Level gauging and overfilling control

10.3.1 Level gauging

a) Accumulation tanks are to be fitted with sounding pipes or other level gauging devices of a type approved by Tasneef.

b) Sounding pipes in accumulation tanks are to terminate in the open air.

10.3.2 Overfilling control

a) Accumulation tanks are to be fitted with a high level alarm, an overflow control system or equivalent means to prevent the liquid from rising in the vent pipes.

b) The high level alarm is to be of a type approved by Tasneef and is to give an audible and visual alarm at the control station.

10.4 Heating systems

10.4.1 Heating systems fitted to accumulation tanks are to comply with the provisions of Part E, Ch 7, Sec 4, [2.6] of Rules for Merchant Ships.

11 Electrical installations

11.1 Documents to be submitted

11.1.1 In addition to the documents requested in Part C, Ch 2, Sec 1, [2.1.1], the following is to be submitted for approval:

a) Plan of hazardous areas
b) Document giving details of types of cables and safety characteristics of the equipment installed in hazardous areas.

11.2 System of supply

11.2.1 The following systems of generation and distribution of electrical energy are acceptable:

a) Direct current:

- Two-wire insulated

b) Alternating current:

- single-phase, two-wire insulated
- three-phase, three-wire insulated.

11.2.2 Earthed systems with hull return are not permitted, with the following exceptions to the satisfaction of Tasneef:

a) impressed current cathodic protective systems

b) limited and locally earthed systems, such as starting and ignition systems of internal combustion engines, provided that any possible resulting current does not flow directly through any hazardous area

c) insulation level monitoring devices, provided that the circulation current of the device does not exceed 30 mA under the most unfavourable conditions.

11.2.3 Earthed systems without hull return are not permitted, with the following exceptions:

a) earthed intrinsically safe circuits and the following other systems to the satisfaction of Tasneef;

b) power supplies, control circuits and instrumentation circuits in non-hazardous areas where technical or safety reasons preclude the use of a system with no connection to earth, provided the current in the hull is limited to not more than 5 A in both normal and fault conditions; or

c) earthed systems, provided that any possible resulting hull current does not flow directly through any hazardous area; or

d) isolating transformers or other adequate means, to be provided if the distribution system is extended to areas remote from the machinery space.

11.2.4 In insulated distribution systems, no current carrying part is to be earthed, other than:

a) through an insulation level monitoring device

b) through components used for the suppression of interference in radio circuits.

11.3 Earth detection

The devices intended to continuously monitor the insulation level of all distribution systems are also to monitor all circuits, other than intrinsically safe circuits, connected to apparatus in hazardous areas or passing through such areas. An audible and visual alarm is to be given, at a manned position, in the event of an abnormally low level of insulation.

11.4 Electrical equipment permitted in hazardous areas

11.4.1 The electrical equipment specified in Tab 2 may be installed in the hazardous areas indicated therein.

11.4.2 The explosion group and temperature class of electrical equipment of a certified safe type are to be at least IIA and T3, respectively.

11.4.3 There are normally not to be access doors or other openings between a safe space, such as accommodation or service spaces, engine rooms and similar spaces, and a hazardous area.

Access doors may, however, be accepted between such spaces and hazardous areas, provided that:

a) safe spaces are fitted with forced ventilation in order to maintain an overpressure therein

b) access doors are:

- of a self-closing type and arranged to swing into the safer space, so that they are kept closed by the overpressure, with the self-closing device capable of shutting the doors against an inclination of 3,5° opposing closure, without hold-back hooks keeping them in an open position, or
- gas-tight, kept closed during oil recovery operation until gas freeing is carried out, and provided with a warning plate (suitable instructions are given in the oil recovery manual).

12 Fire protection, detection and extinction

12.1 Application

This Article provides specific requirements for:

- ventilation systems,
- gas detection systems,
- fire protection and extinguishing systems.

The application of the requirements of this Article to vessels of less than 500 gross tonnage and classed for restricted navigation will be specially considered by Tasneef on case-by-case basis.

12.2 Ventilation systems

12.2.1 Gas-dangerous spaces are to have a ventilation system independent from that serving gas-safe spaces.

12.2.2 Ventilation systems are to be so arranged as to avoid the formation of gas pockets.

12.2.3 Attention is drawn to the specific ventilation arrangements imposed on certain spaces in order to consider them as safe spaces. Refer to Tab 1.

12.3 Ventilation of recovered oil pump rooms

12.3.1 Recovered oil pump rooms are to be provided with a mechanical ventilation system of the extraction type capable of giving at least 20 air changes per hour.

Note 1: Where the pump room is not normally entered during oil handling, the mechanical ventilation may be omitted.

12.3.2 Ventilation intakes are to be so arranged as to minimise the possibility of recycling hazardous vapours from ventilation discharge openings.

12.3.3 Ventilation exhaust ducts are to discharge upwards to a gas-safe area on the weather deck in locations at least 3 m from any ventilation intake and opening to gas-safe spaces.

12.3.4 Protection screens of not more than 13 mm square mesh are to be fitted on ventilation duct intakes and outlets.

12.3.5 Ventilation fans are to be of non-sparking construction as per Part C, Ch 4, Sec 2.

12.3.6 The ventilation system is to be capable of being controlled from outside the pump room.

12.4 Ventilation of enclosed normally entered dangerous spaces other than cargo pump rooms

12.4.1 Enclosed normally entered dangerous spaces are to be provided with a mechanical ventilation system of the extraction type capable of giving at least 8 air changes per hour.

12.4.2 Ventilation intakes are to be located at a distance of not less than 3 m from the ventilation outlets of pump rooms.

12.5 Ventilation of enclosed safe spaces adjacent to dangerous areas

12.5.1 Safe spaces adjacent to dangerous areas are to be provided with a mechanical ventilation system capable of maintaining the space with a positive pressure.

12.5.2 Ventilation intakes are to be located in a gas-safe area on the weather deck as far as practicable from the ventilation outlets of gas-dangerous spaces.

12.6 Oil flashpoint and gas measurement systems

12.6.1 General

Where, due to fire or explosion hazards, the vessel is required to operate at a safe distance from the source of oil spill, a suitable equipment is to be provided to measure:

- the concentration of flammable gases,
- the oil flashpoint.

12.6.2 Gas measurement system

a) A fixed flammable gas detecting system is to be provided in order to check the hydrocarbon gas concentration in the following locations:

   - engine room
   - open deck (one forward, one astern).

   It is to be capable of giving an alarm in the wheelhouse (or other suitable location) and on the open deck when the vapour concentration of hydrocarbons and similar products in the atmosphere exceeds 30 % of the lower explosive limit of the mixture of such vapours and air.

b) In addition to the fixed system, at least one portable gas detection instrument is to be provided on board.

12.6.3 Oil flashpoint measurement

The equipment for oil flashpoint measurement may be portable.

12.7 Structural fire protection

12.7.1 Where cargo tanks are arranged forward of the superstructure or aft of the superstructure within 10 m of the nearest gas-dangerous zone, exterior boundaries of superstructures and deckhouses enclosing accommodation spaces and including any overhanging decks which support such accommodation spaces are to be insulated to A-60 standard for the whole of the portions which face the gas-dangerous areas and for a distance of 3 m aft or forward of such areas. This requirement is also applicable to access doors in such boundaries. Alternatively, insulation to A-0 standard with a permanently installed water-spraying system in compliance with [12.7.3] may be accepted. Aluminium bulkheads will not be accepted in these boundaries.

12.7.2 Portholes or windows in the area specified in [12.7.1] are to have the same fire rating as the bulkhead in which they are fitted. This requirement does not apply to wheelhouse windows. Portholes or windows which have a lower fire rating than that required, or that are to be protected by a water-spraying system in accordance with [12.7.3], are to be fitted with permanently installed inside deadlights of steel having a thickness equal to the steel in the bulkhead in which they are fitted.

12.7.3 If it is impractical to fit deadlights, windows in the area specified in [12.7.1] are to be protected by a sprinkler system having a capacity of at least 10 litres/minute/m2. The system is to be fully activated by opening of one valve on the bridge.

12.8 Fire-fighting

12.8.1 For the protection of the deck area in way of accumulation tanks, the following fire-fighting equipment is to be provided:

- two dry powder fire extinguishers, each with a capacity of at least 50 kg,
- at least one portable foam extinguishing installation.

12.8.2 The foam installation is to be capable of producing a foam blanket over the accumulation tanks in order to efficiently reduce the emission of flammable gases.

Table 1 : Documents to be submitted

No.	A/I (1)	Document (2)
1	I	General plan of the system for oil recovery and specification of all relevant apparatuses
2	A	Schematic arrangement of recovered oil piping and pumping systems
3	A	Tank venting arrangement
4	I	Procedure and limiting conditions for recovering oil, cargo transfer, tank cleaning, gas freeing and ballasting
5	A	Diagram of the ventilation systems serving: • dangerous spaces including pump room • machinery spaces • accommodation spaces
6	A	Specification of flammable gas detectors
7	A	Drawing and specification of the fixed and movable fire-fighting systems

(1) A: to be submitted for approval in four copies
I: to be submitted for information in duplicate

(2) Diagrams are also to include, where applicable, the (local and remote) control and monitoring systems and automation systems.

Table 2 : Electrical equipment permitted in hazardous areas for oil recovery vessels

Hazardous area	Spaces		Electrical equipment
	No.	Description	
Zone 0	1	Accumulation tanks, pipes and equipment containing the recovered oil.	a) certified intrinsically safe apparatus Ex(ia); b) simple electrical apparatus and components (e.g. thermocouples, photocells, strain gauges, switching devices), included in intrinsically safe circuits of category “ia” not capable of storing or generating electrical power or energy in excess of limits stated in the relevant rules; c) equipment specifically designed and certified by the appropriate authority for use in Zone 0.

Zone 1	2	Cofferdams and enclosed or semi-enclosed spaces adjacent to or immediately above accumulation tanks, unless fitted with forced ventilation capable of giving at least 20 air changes per hour and having characteristics such as to maintain the effectiveness of such ventilation.	a) a) any type considered for Zone 0;
			b) certified intrinsically safe apparatus Ex(ib);
			c) simple electrical apparatus and components (e.g. thermocouples, photocells, strain gauges, switching devices), included in intrinsically safe circuits of category “ib” not capable of storing or generating electrical power or energy in excess of limits stated in the relevant rules;
			d) certified flameproof Ex(d);
			e) certified pressurised Ex(p);
			f) certified increased safety Ex(e);
			g) certified encapsulated Ex(m);
			h) certified sand filled Ex(q);
			i) certified special protection Ex(s);
			j) hull fittings containing the terminals or shell plating penetrations for anodes or electrodes of an impressed current cathodic protection system, or transducers such as those for depth-sounding or log systems, provided that such fittings are of gas-tight construction or housed within a gas-tight enclosure, and are not located adjacent to an accumulation tank bulkhead. The design of such fittings or their enclosures and the means by which cables enter, and any testing to establish their gas-tightness, are to be to the satisfaction of Tasneef.
			k) electrical cables passing through the spaces.

Zone 1	3	Spaces containing pumps for the handling of recovered oil.	As allowed for spaces under item 2.
Zone 1	4	Double bottoms or duct keels located under accumulation tanks.	As allowed for spaces under item 2.

Table 2 : (continuation)

Hazardous area	Spaces		Electrical equipment
	No.	Description	

Zone 1	5	Enclosed or semi-enclosed spaces immediately above pump rooms for the handling of recovered oil or above vertical cofferdams adjacent to accumulation tanks unless separated by a gas-tight deck and fitted with forced ventilation capable of giving at least 20 air changes per hour having characteristics such as to maintain the effectiveness of such ventilation.	a) any type considered for Zone 0;
			b) certified intrinsically safe apparatus Ex(ib);
			c) simple electrical apparatus and components (e.g. thermocouples, photocells, strain gauges, switching devices), included in intrinsically safe circuits of category “ib” not capable of storing or generating electrical power or energy in excess of limits stated in the relevant rules;
			d) certified flameproof Ex(d);
			e) certified pressurised Ex(p);
			f) certified increased safety Ex(e);
			g) certified encapsulated Ex(m);
			h) certified sand filled Ex(q);
			i) certified special protection Ex(s);
			j) electrical cables passing through the spaces.

Zone 1	6	Enclosed or semi-enclosed spaces containing pipes, valves or other equipment for the handling of recovered oil unless fitted with forced ventilation capable of giving at least 20 air changes per hour and having characteristics such as to maintain the effectiveness of such ventilation.	As allowed for spaces under item 5.
Zone 1	7	Areas on open deck, or semi-enclosed spaces on open deck within 3 m from equipment for oil recovery, hatches or any other openings in accumulation tanks and any pump for the handling of recovered oil not fitted in a pump room.	As allowed for spaces under item 5.
Zone 1	8	Areas on open deck over all accumulation tanks up to a height of 2,4 m above the deck.	As allowed for spaces under item 5.
Zone 1	9	Enclosed or semi-enclosed spaces for floating pumps and associated hoses and other equipment which may similarly contain residues of recovered oil.	As allowed for spaces under item 5.