Rules for the Classification of Yachts

Effective from 1 January 2025

Part **F**

Additional Class Notations

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Tasneef® MARITIME

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 shipbuilder, 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 shipowner, 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, for example, rule variations or interpretations.

"Services" means the activities described in paragraph 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, for example, offshore structures, floating units and underwater craft.

"Society" or "TASNEEF" means TASNEEF Maritime

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

"**Force Majeure**" means damage to the ship; unforeseen inability of the Society to attend the ship due to government restrictions on right of access or movement of personnel; unforeseeable delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes or civil strife; acts of war; or other force majeure.

1. Society Roles

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 is regulated by these general conditions unless expressly excluded in the particular contract.

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2. Rule Development, Implementation and Selection of Surveyor

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 also committed 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 based on 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. 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 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.

3. Class Report & Interested Parties Obligation

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 authorized bodies and no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties based on 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 certification 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 about 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, shipbuilders, 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 about 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 concerning the services rendered by the Society are described in the Rules applicable to the specific service rendered.

4. Service Request & Contract Management

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.

4.3 The contractor for the classification of a ship or for the services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30/60/90 days' notice, to be given in writing. Failure to pay, even in part, the fees due for services carried out by the society will entitled the society to immediately terminate the contract and suspend the service.
For every termination of the contract, the fees for the activities performed until the time of the termination shall be owned 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 society will be withdrawn in those cases where provided for by agreements between the society and the flag state.

5. Service Accuracy

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 **Rule Development, Implementation and Selection of Surveyor** 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.

6. Confidentiality & Document sharing

6.1. 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.

6.2. Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 below, 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.
6.3. 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 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 about the provision of plans and drawings to the new Society, either by way of the 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.

7. Health, Safety & Environment

7.1. The clients such as the designers, shipbuilders, manufacturers, repairers, suppliers, contractors or sub-contractors, or other product or system surveyed who have a registered office in ABU Dhabi; should have an approved OSHAD as per Abu Dhabi OHS Centre, or, if they do not need to have an approved OSHAD, they shall comply with TASNEEF standards and have procedures in place to manage the risks from their undertakings.

7.2. For the survey, audit and inspection activities onboard the ship, the ship's owner, the owner representative or the shipyard must follow TASNEEF rules regarding the safety aspects.

8. Validity of General Conditions

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

9. Force Majeure

9.1 Neither Party shall be responsible to the other party for any delay or failure to carry out their respective obligations insofar as such delay and failure derives, directly or indirectly, and at any time, from force majeure of any type whatsoever that lies outside the control of either Party.

9.2 The Party that is unable to fulfil the agreement due to Force Majeure shall inform the other party without delay and in all cases within 7 days from when such force majeure arose.

9.3 It is understood that if such force majeure continues for more than 30 days, the Party not affected by the event may terminate this agreement by registered letter. The rights matured until the day in which the force majeure occurred remain unaffected.

10. Governing Law and Jurisdiction

This Agreement shall be governed by and construed in accordance with the laws of Abu Dhabi and the applicable Federal Laws of the UAE.
Any dispute arising out of or in accordance with this Agreement shall be subject to the exclusive jurisdiction of the Abu Dhabi courts.

11. Code of Business conduct

The **CLIENT** declares to be aware of the laws in force about the responsibility of the legal persons for crimes committed in their interest or to their own advantage by persons who act on their behalf or cooperate with them, such as directors, employees or agents.
In this respect, the **CLIENT** declares to have read and fully understood the "**Ethical Code**" published by **TASNEEF** and available in the **TASNEEF** Web site.
The **CLIENT**, in the relationships with **TASNEEF**, guarantees to refrain from any behaviour that may incur risk of entry in legal proceedings for crimes or offences, whose commission may lead to the enforcement of the laws above.
The **CLIENT** also acknowledges, in case of non-fulfilment of the previous, the right of **TASNEEF** to unilaterally withdraw from the contract/agreement even if there would be a work in progress situation or too early terminate the contract/agreement. It's up to **TASNEEF** to choose between the two above mentioned alternatives, and in both cases a registered letter will be sent with a brief sum-up of the circumstances or of the legal procedures proving the failure in following the requirements of the above-mentioned legislation.

In light of the above, it is forbidden to all employees and co-operators to:
- receive any commission, percentage or benefits of any possible kind;
- Start and maintaining any business relationship with **Clients** that could cause conflict of interests with their task and function covered on behalf of **TASNEEF.**
- Receive gifts, travel tickets or any other kind of benefits different from monetary compensation, that could exceed the ordinary business politeness.

Violation of the above-mentioned principles allows **TASNEEF** to early terminate the contract and to be entitled to claim compensation for losses if any.

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EXPLANATORY NOTE TO PART F

1. Reference edition

The reference edition for Part F is the Rules for Yachts 2024 edition, which is effective from 1 July 2024.

2. Amendments after the reference edition

2.1 Rules for Yachts 2024 has been completely rewritten and reorganised.

2.2 Except in particular cases, the Rules are updated and 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.

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.

3.2 Item 6 below provides a summary of the technical changes from the preceding edition. In general, this list does not include those items to which only editorial changes have been made not affecting the effective date of the requirements contained therein.

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.

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RULES FOR THE CLASSIFICATION OF YACHTS

Part F
Additional Class Notations

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Chapter 1
ADDITIONAL CLASS NOTATIONS

SECTION 1 GENERAL

1 General

1.1

1.1.1 In the following chapters are reported the additional class notations tailored for yachting sector. At the request of the Owner/Shipyard it is possible to assign to a yacht also additional class notation reported in Tasneef Rules for the Classification of Ships if the relevant requirements are satisfied.

1.1.2 The additional class notation may be assigned also to yacht not classified by Tasneef provided that the relevant requirements are satisfied. A document of compliance will be issued in this case.

Chapter 2

AUTOMATED MACHINERY SPACE (AUT-UMS(Y))

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **AUT-UMS (Y)** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.2.1] to yachts fitted with automated installations enabling periodically unattended operation of machinery spaces, and complying with the requirements of this Section.

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

1.2 Communication system

1.2.1 A reliable means of vocal communication is to be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigation bridge and the Engineer Officers' accommodation. This means of communication is to be foreseen in collective or individual accommodation for Engineer Officers.

1.2.2 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 Documents to be submitted

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

Table 1 : Documents to be submitted

No.	I/A **(1)**	Document
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
5	I	Automation test program
(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 Where fuel oil heating is necessary, it is to be arranged with automatic control. A high temperature alarm is to be fitted and the possibility of adjusting its threshold according to the fuel quality is to be provided. Such alarm may be omitted if it is demonstrated that the temperature in the tank cannot exceed the flashpoint under the following conditions: volume of liquid corresponding to the low level alarm and maximum continuous heating power during 24 hours.

3.2 Fire detection

3.2.1 For fire detection, the requirements given in Pt C, Ch 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 a particular case.

3.2.3 An automatic fire detection system is to be fitted in machinery spaces of category A 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, at the fire control station, or in another 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 and the accommodation area of the personnel responsible for the operation of the machinery space.

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. Consideration is to be given to avoiding 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 it is intended that a particular loop or detector is to be temporarily switched off, this state is to be clearly indicated. Reactivation of the loop or detector is to be performed automatically after a preset time.

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 an emergency source of power by a separate feeder if the main source of power fails.

3.2.14 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 space 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 are automatically controlled, they are not to be started when the oil pollution level is higher than accepted in Pt C, Ch 1, Sec 9.

3.4.4 The location of controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system is 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.

3.4.5 Bilge level alarms are to be given at the main control station, the engineers' accommodation area 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, pitch of the propeller are 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 yacht 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 are to 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 change-over devices are to be provided.

4.1.12 It is the responsibility of the Manufacturer to set the alarms and safeguards so that they activate when the controlled parameter deviates from normal values but before reaching hazardous conditionsWhere standby machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices are to be provided.

4.1.13 Control and monitoring functions tables are to be intended as requiring a separate sensor for each row of the table.

4.2 Diesel propulsion plants

4.2.1 When a diesel engine is used for the propulsion plant, monitoring and control of equipment are to be performed according to Tab 2 for slow speed engines or Tab 3 for medium or high speed engines as defined in Pt C, Ch 1, Sec 2, [1.5.7], [1.5.8] and [1.5.9] of the Tasneef Rules for the Classification of Ships.

Table 2 : Monitored parameter for main propulsion diesel engine

Symbol convention H = High, HH = High high, G = group alarm L = Low, LL = Low low, I = individual alarm X = function is required, R = remote					
Identification of system parameter	Alarm activation	Remote indication	Slow-down with alarm	Shut-down with alarm	Automatic start of stand by pump with alarm
Fuel oil system					
• Fuel oil pressure after filter (engine inlet)	L	R			
					X
• Fuel oil viscosity before injection pumps or fuel oil temperature before injection pumps (for engine running on heavy fuel)	H + L				
• Leakage from high pressure pipes where required	H				
• Common rail fuel oil pressure	L				
Lubricating oil system					
• Lubricating oil to main bearing and thrust bearing pressure	L	R			
				X	
					X
• Lubricating oil filter differential pressure	H	R			
• Lubricating oil inlet temperature	H	R			
• Activation of oil mist detection arrangements (or activation of the temperature monitoring systems or equivalent devices of: - the engine main and crank bearing oil outlet; or - the engine main and crank bearing) **(1)**	X			X	
• Flow rate cylinder lubricator (each apparatus)	L		X		
• Common rail servo oil pressure	L				
Turbocharger system					
• Lubricating oil to turbocharger inlet pressure **(2)**	L	R			
• Turbochanger lub oil temp. each bearing **(4)**	H	R			
• Speed of turbocharger **(5)**					
Sea water cooling system					
• Sea water cooling pressure	L	R			
					X
Cylinder fresh cooling water system					
• Cylinder water inlet pressure or flow	L	R	X		
					X

(1) When required by Pt C, Ch 1, Sec 2, [4.3.5] .
For each engine one oil mist detector (or engine bearing temperature monitoring system or equivalent device) having two independent outputs for initiating the alarm and shut-down would satisfy the requirement for independence between alarm and shut-down system.

(2) Unless provided with a self-contained lubrificating oil system integrated with the turbocharger.

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

(4) Where outlet temperature from each bearing cannot be monitored due to the engine/turbocharger design alternative arrangements may be accepted. Continuous monitoring of inlet pressure and inlet temperature in combination with specific intervals for bearing inspection in accordance with the turbocharger manufacturer's instructions may be accepted as an alternative.

(5) Only required for turbochargers of Categories B and C (see Pt C, Ch 1, Sec 14).

Symbol convention H = High, HH = High high, G = group alarm L = Low, LL = Low low, I = individual alarm X = function is required, R = remote					
Identification of system parameter	Alarm activation	Remote indication	Slow-down with alarm	Shut-down with alarm	Automatic start of stand by pump with alarm
• Cylinder water outlet temperature (general)	H	R			
			X		
• Level of cylinder cooling water in expansion tank	L				
Starting and control air system					
Starting air pressure before main shut-off valve	L	R			
Control air pressure	L	R			
Scavenge air system					
• Scavenging air receiver temperature	H				
Exhaust gas system					
• Exhaust gas temperature after each cylinder **(3)**	H	R	X		
• Exhaust gas temperature after each cylinder **(3)**, deviation from average	H				
Miscellaneous					
• Engine speed		R			
• Engine overspeed	H			X	
• Control, safety, alarm system power supply failure	X				

(1) When required by Pt C, Ch 1, Sec 2, [4.3.5] .
For each engine one oil mist detector (or engine bearing temperature monitoring system or equivalent device) having two independent outputs for initiating the alarm and shut-down would satisfy the requirement for independence between alarm and shut-down system.

(2) Unless provided with a self-contained lubrificating oil system integrated with the turbocharger.

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

(4) Where outlet temperature from each bearing cannot be monitored due to the engine/turbocharger design alternative arrangements may be accepted. Continuous monitoring of inlet pressure and inlet temperature in combination with specific intervals for bearing inspection in accordance with the turbocharger manufacturer's instructions may be accepted as an alternative.

(5) Only required for turbochargers of Categories B and C (see Pt C, Ch 1, Sec 14).

Table 3 : Main propulsion medium or high speed diesel engine

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Fuel oil system							
• Fuel oil pressure after filter (engine inlet)	L	R					
						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.

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
• Fuel oil viscosity before injection pumps or fuel oil temperature before injection pumps (for engine running on heavy fuel)	H + 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			
						X	
• Lubricating oil filter differential pressure	H	R					
• Lubricating oil inlet temperature	H	R					
					X		
• Oil mist concentration in crankcase **(1)**	H			X			
• Flow rate cylinder lubricator (each apparatus)	L		X				
• Lubricating oil to turbocharger inlet pressure **(2)**	L	R					
Sea water cooling system							
• Sea water cooling pressure	L	R					
						X	
Cylinder fresh cooling water system							
• Cylinder water inlet pressure or flow	L	R	X				
						X	
• Cylinder water outlet temperature	H	R					
			X				
• 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	X				
• Exhaust gas temperature after each cylinder **(3)**, deviation from average	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.

4.3 Electric propulsion plant

4.3.1 Documents to be submitted

The following additional documents are to be submitted to Tasneef:

- List of the alarms and shutdowns of the electric 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.

4.3.2 Alarm system

The following requirements are applicable to the alarm system for electric propulsion:

- Alarms circuits for electric 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 Pt 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 stations, and acknowledged individually.
- Shutdown activation is to be considered as an individual alarm.

4.3.3 Safety functions

The following requirements are applicable to the safety system for electric propulsion:

- As a general rule, safety stop using external sensors such as temperature, pressure, overspeed, main cooling failure and 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 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.

4.3.4 Transformers

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

4.3.5 Converters

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

4.3.6 Smoothing coil

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

4.3.7 Propulsion electric motor

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

4.3.8 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).

4.4 Shafting, clutches, CPP, gears

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

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

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

Table 4 : Transformers

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	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 converter

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	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 converter

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	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 switchover to the redundant speed sensor system.							

Table 7 : Converter cooling circuit

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	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 = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	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						

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
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 = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Motor			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	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 = High high, G = group alarm L = Low, LL = Low low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	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 lubricating oil temperature	H						
Clutch oil tank level	L						
Clutch control oil pressure	L						
	LL					X	

Table 11 : Controllable pitch propeller

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Control oil temperature	H						
Oil tank level	L						
Control oil pressure	L						
	LL					X	

Table 12 : Reduction gears/reversing gears

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Lubricating oil temperature	H	R **(1)**					
Lubricating oil pressure	L **(1)**	R				X	
	LL			X			
Oil tank level	L						
Plain bearing temperature	H						
	HH			X			
(1) May be omitted in the case of restricted navigation notation.							

4.5 Auxiliary systems

4.5.1 Where standby machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices are to 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
- sea water to main condenser (main turbines)
- hydraulic control of clutch, CPP or main thrust unit
- thermal fluid systems (thermal fluid heaters).

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

4.5.3 When the propulsion plant is divided into two or more separate units, the automatic standby auxiliary may be omitted when the subunits 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.

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

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

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

4.5.7 Where daily service fuel oil tanks or settling tanks are fitted with heating arrangements, a high temperature alarm is to be provided if the flashpoint of the fuel oil can be exceeded.

4.5.8 For auxiliary systems, the following parameters, according to Tab 13 to Tab 23, are to be monitored or controlled.

Table 13 : Control and monitoring of auxiliary electrical systems

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

Table 14 : Incinerators

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Incinerator			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Stand by start	Stop
Combustion air pressure	L			X			
Flame failure	X			X			
Furnace temperature	H			X			
Exhaust gas temperature	H						
Fuel oil pressure	L						
Fuel oil temperature or viscosity, where heavy fuel is used	H + L						

Table 15 : Auxiliary boilers

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Boiler			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Water level	L + H			X	X		
Fuel oil temperature	L + H			X	X		
Flame failure	X			X			
Combustion air supply fan low pressure				X			
Temperature in boiler casing (fire)	H						
Steam pressure	H **(1)**			X	X		
Steam temperature				X **(2)**			

(1) When the automatic control does not cover the entire load range from zero load.
(2) For superheated steam over 330°C.

Table 16 : Fuel oil system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	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 to Tasneef's satisfaction.
(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 17 : Lubricating oil system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Air pipe water trap level of lubricating oil tank	H						
Sludge tank level	H						

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Lubricating oil centrifugal purifier overflow (stop of oil supply)	H						
							X

Table 18 : Thermal oil system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Forced draft fan stopped				X			
Thermal fluid temperature	H						
				X			
Thermal fluid pressure							X
Flow through each element	L			X			
Heavy fuel oil temperature or viscosity	H + L				X		
Burner flame failure	X			X			
Flue gas temperature (when exhaust gas heater)	H			X			
Expansion tank level	L						X **(1)**
(1) Stop of burner and fluid flow.							

Table 19 : Hydraulic oil system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	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 20 : Boiler feed and condensate system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Sea water flow or equivalent	L					X	
Vacuum	L						
	LL			X			
Water level in main condenser (unless justified)	H + L						
					X		
	HH			X			
(1) In the case of forced circulation boiler.							

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Salinity of condensate	H						
Feed water pump delivery pressure	L					X	
Feed water tank level	L						
Deaerator inside temperature or pressure	L + H **(1)**						
Water level in deaerator	L + H						
Extraction pump pressure	L						
Drain tank level	L + H						
(1) In the case of forced circulation boiler.							

Table 21 : Compressed air system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	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)**	local + 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 22 : Cooling system

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indic	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 23 : Thrusters

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Thruster			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Control oil temperature (preferably before cooler)	H						
Oil tank level	L						

4.6 Control of electrical installation

4.6.1 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 yacht.

4.6.2 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 yacht with automatic restarting of the essential auxiliaries including, where necessary, sequential operations.

4.6.3 The standby electrical power is to be available in not more than 45 seconds.

4.6.4 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 yacht.

4.6.5 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.

4.6.6 Monitored parameters for which alarms and associated safeguards are required to identify machinery faults 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. For communication of alarms from the machinery space to the bridge area and accommodation for engineering personnel, detailed requirements are contained in [5].

5 Alarm system

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 the 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.

Table 24 : Auxiliary reciprocating I.C. engines driving generators

Symbol convention H = High HH = High high G = group alarm L = Low LL = Low low I = individual alarm X = function is required R = remote	Monitoring		Automatic control				
			Engine			Auxiliary	
Identification of system parameter	Alarm	Indic	Slow-down	Shut-down	Control	Standby start	Stop
Fuel oil viscosity or temperature before injection	L + H	local					
					X		
Fuel oil pressure		local					
Fuel oil leakage from pressure pipes	H						
Lubricating oil temperature	H						
Lubricating oil pressure	L	local				X	
	LL			X **(1)**			
Oil mist concentration in crankcase **(2)**	H			X			
Pressure or flow of cooling water, if not connected to main system	L	local					
Temperature of cooling water or cooling air	H	local					
Level in cooling water expansion tank, if not connected to main system	L						
Engine speed		local					
					X		
	H			X			
Fault in the electronic governor system	X						
Level in fuel oil daily service tank	L						
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.

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.

5.2.3 An engineers' alarm is to be activated when the machinery alarm has not been accepted in the machinery spaces or control room within 2 minutes.

5.2.4 The alarm system is to have a connection to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure connection to at least one of those cabins.

5.3 Machinery alarm system

5.3.1 The local silencing of the alarms on the bridge or in accommodation spaces is not to stop the audible machinery space alarm.

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

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 the 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, the 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 Testing

7.1 General

7.1.1 Tests of automated installations are to be carried out according to Pt 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 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 auxiliary steam generator
- 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 or from flexible boiler burner pipes.

7.1.3 Sea trials are used to demonstrate the proper operation of the automated machinery and systems. For this purpose, 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 away, the yacht sailing at its normal operation speed. The purpose of this check is not to verify the nautical performances of the yacht (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 watchkeeping personnel for the monitoring and/or running of the machinery for at least 4 h
  - The following procedure may be chosen, for instance: «underway» for 2 h, then increasing to «full ahead». Staying in that position for 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» position.

- 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 and boiler air duct
  - 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 h.

SECTION 2 CENTRALISED CONTROL STATION [AUT-CCS (Y)]

1 General

1.1 Application

1.1.1

The additional class notation **AUT-CCS(Y)** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.4.3] to yachts fitted with a machinery installation operated and monitored from a centralized control station, and complying with the requirements of this Section.

It applies to yachts which are intended to be operated with machinery spaces unattended, but with continuous supervision from a position where control and monitoring devices of machinery are centralized.

Note 1: Machinery spaces are defined in Pt C, Ch 4, Sec 1, [1.14].

1.1.2

Remote indications for continuous supervision of the machinery are to be located in a centralized control position, to allow a watch service of the machinery space.

1.2 Communication system

1.2.1

A means of communication is to be provided between the centralized control station, the navigation bridge, the engineers' accommodation and, where necessary, the machinery spaces.

1.2.2

Means of communication are to be operable even in the case of failure of the main source of electrical power supply.

1.2.3

The requirements mentioned in Sec 1, [1.3] are applicable.

2 Documentation

2.1 Documents to be submitted

2.1.1

In addition to those mentioned in Pt C, Ch 3, Sec 1, [2.2], documents according to Tab 1 are required.

Table 1 : Documents to be submitted

No.	I/A **(1)**	Document
1	A	Means of communication diagram
2	A	Central control position layout and location
3	A	System of protection against flooding
(1) A : to be submitted for approval		

3 Fire and flooding precautions

3.1 General

3.1.1

The requirements mentioned in Sec 1, [3] are applicable, except for Sec 1, [3.4.5].

3.1.2

The flooding alarms are to be transmitted to the centralized control position.

4 Control of machinery

4.1 Propulsion plant operation

4.1.1

The centralized control position is to be designed, equipped and installed so that machinery operation is as safe and effective as if it were under direct supervision.

4.1.2

Monitoring and control of main systems are to be designed according to the requirements mentioned in Sec 1, [4]. Additional indications in the centralized control position are required, and shown in Tables 2 to 24 of Sec 1 with the symbol R.

4.1.3

In the centralized control position, it is to be possible to restore the normal electrical power supply in the case of power failure (e.g. with remote control of the generating sets), unless an automatic restart is provided.

4.1.4

Automatic restart of essential auxiliaries for propulsion and steering may be replaced by remote control from the centralized control position.

4.1.5

The status of machinery (in operation or on standby) and all parameters crucial to the safe operation of essential machinery are to be shown at the centralized control position.

4.1.6

Under all sailing conditions including maneuvering, the speed, direction of thrust and, if applicable, the pitch of the propeller are also to be fully controllable from the centralized control position.

4.1.7

In addition to the requirements in Sec 1, [4.1.10], the device to prevent overload, when automatic or remote controlled from the centralized control position, is to be fitted with an alarm indicating the necessity to slow down.

4.2 Control position location

4.2.1

The centralized control position is to be located in the machinery space or adjacent to it.

4.2.2

If the centralized control position is an enclosed space located in the machinery spaces, it is to be provided with two safe fire escapes.

5 Alarm system

5.1 General

5.1.1

The alarm system is to be designed according to Sec 1, [5].

5.1.2

Every alarm is to be indicated visually and audibly at the centralized control position. If an alarm function has not received attention locally within a limited time, an alarm clearly audible in the engineers' accommodation is to be activated.

6 Testing

6.1 Tests after completion

6.1.1
Tests are to be carried out of all systems which are required to be in operation at the quay, such as the fuel oil purifier system, electrical power generation, auxiliary steam generator, etc.

6.2 Sea trials

6.2.1
The sea trials are to demonstrate the proper operation of automation systems.

As a minimum, the following are to be tested:

- the remote control system of propulsion machinery
- electrical production and distribution
- efficiency of the fire detection and fire alarm system
- protection against flooding
- continuous operation in all sailing conditions, including manoeuvring, for 2 hours with unattended machinery spaces and at least one person in CCS.

APPENDIX 1 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 500 GT

1 AUT UMS

1.1 Exemptions

1.1.1 For yachts whose gross tonnage is less than 500 and propulsive power less than 1 MW, the requirements laid down in Sec 1, [4] do not apply. An alarm signal is to be activated in the following circumstances:

a) for the 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.

1.1.2 For yachts whose gross tonnage is less than 500 and propulsive power less than 1 MW, 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.

2 AUT CCS

2.1 Exemptions

2.1.1 Exemptions mentioned in [1.1] may also be considered for the notation **AUT-CCS(Y)**.

2.1.2 With reference to Sec 2, [4.2.1] for yachts less than 500 GT, the centralized control position may be installed in the wheelhouse, or in other positions accepted by Tasneef.

APPENDIX 2 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 24M LLL

Chapter 3

GREEN PLUS (Y), GREEN PLUS (Y) (GOLD), GREEN PLUS (Y) (PLATINUM)

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The requirements of this Section apply to yachts of any propulsion type and length.

The additional class notations **GREEN PLUS (Y)**, **GREEN PLUS (Y)(GOLD)**, **GREEN PLUS (Y)(PLATINUM)** are assigned in accordance with Pt A, Ch 1, Sec 2, [6.3] to yachts designed and provided with systems, components and procedural means to control and prevent the emission of polluting substances in accordance with the requirements of [6].

2 Definitions

2.1

2.1.1 Definitions are those given in MARPOL 73/78 as amended and in App 1.

3 Documents to be submitted

3.1

3.1.1 For all the pollution sources to which is assigned a score greater than zero documentation is to be submitted to the submission of additional documents in the case of non-conventional design or if it is deemed necessary for the evaluation of the systems and components.

4 Requirements

4.1 General

4.1.1 A Yacht Environmental Manager, as defined in App 1, [1.2], is to be available on board in the case of yachts of 500 GT or more.

4.1.2 An Environmental Management Plan, specific to the yacht, is to be developed and made available on board. The Plan is to contain at least the procedures listed in App 2.

4.1.3 Adequate training on environmental issues is to be planned, carried out and documented for all the persons on board having influence on the environmental behaviour of the yacht.

4.2 Basic systems, components and procedural means

4.2.1 Basic systems, components and procedural means, which a yacht is to be equipped with, are those defined in the requirements of the IMO Conventions in force, as applicable to the yacht.

4.3 Additional systems, components and procedural means

4.3.1 The list of additional systems, components and procedural means which can be considered for the assignment of the notation and the values to be used for the calculation of the relevant environmental index as indicated in [5] are given in Tab 1.

Table 1 : Systems, components and procedural means

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
1	Oil from Machinery Space	Compliance with MARPOL Annex I	5	[1.1.1]
		Bilge Water Treatment (15 ppm with alarm and automatic stop)	2 (1)	[1.1.2]
		Bilge Water Treatment (5 ppm with alarm and automatic stop)	5 (1)	[1.1.3]
		Bilge Water Treatment (5 ppm with alarm, automatic stop and recorder)	7 (1)	[1.1.4]
		Bilge oil tank	2 (2)	[1.1.5]
		Retention on board	8 (2)	[1.1.6]
		Restrictions in the use of ship's fuel tanks for ballast	1	[1.1.7]
		Fuel Oil tank protection by means of tank boundary distance from the ship side and bottom	from 2 to 8 (3)	[1.1.8]
		Fuel oil tank protection by means of outflow	from 2 to 5 (3)	[1.1.9]
		Lubricating Oil and sludge tank protection by means of tank boundary distance from the ship side and bottom	from 2 to 6 (4)	[1.1.10]
		Lubricating oil and sludge tank protection by means of outflow calculation	from 2 to 5 (4)	[1.1.11]
		Oil tank overflow	1	[1.1.12]
		Gutters	1	[1.1.13]
		Dry bilge concept	3	[1.1.14]
		Sludge oil collection and handling facilities	2	[1.1.15]
		Water-lubricated stern-tube bearings	1	[1.1.16]
		Magnetic coupling on oil pumps	5	[1.1.17]
		Biodegradable lube oil	5	[1.1.18]
		Restriction in the use of hydraulic plants	7	[1.1.19]
		Electronic Oil Record Book	1 (16)	[1.1.20]
2	Sewage	Treatment plant: effluent quality as per IMO MEPC.2(VI)	2 (5)	[1.2.1]
		Treatment plant: effluent quality as per IMO MEPC.159(55)	3 (5)	[1.2.2]
		Treatment plant: effluent quality as per IMO MEPC.227(64) except for paragraph 4.2	5 (5)	[1.2.3]
		Sewage holding tank	3 (6)	[1.2.4]
		Retention on board	5 (6)	[1.2.5]
		Sewage record book	1 (16)	[1.2.6]
		Electronic Sewage Record Book	2 (16)	[1.2.7]

(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable
(14) Total score is to be calculated with the criteria given in [2.8.1] b).
(15) To be weighted.
(16) not valid for number of pollution sources calculation.

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
3	Grey Water	Grey waters led to a sewage treatment plan	3	[1.3.1]
		Holding tank	3 (8)	[1.3.2]
		Retention on board	5 (8)	[1.3.3]
		Grey water record book	1 (16)	[1.3.4]
		Electronic Grey Water Record Book	2 (16)	[1.3.5]
		Water saving	8	[1.3.6]
4	Garbage	Garbage Management Plan	2	[1.4.1]
		Recycling	2	[1.4.2]
		Advanced recycling	10	[1.4.3]
		Electronic Garbage Record Book	1 (16)	[1.4.4]
		Plastic litter	10	[1.4.5]
		Use of polyurethane hydrophobic and oleophilic absorbent materials for oil clean up, reusable at least 10 times.	5	[1.4.6]
5	Other Sources	Environmental Management Plan	2	[1.5.1]
		Ballast water treatment	5 (9)	[1.5.2]
		Ballast water treatment without chemical	10 (9)	[1.5.3]
		Marine growth prevention systems	3	[1.5.4]
		Collection of spillage/ leakage of environmental hazardous substances	3	[1.5.5]
		Biodegradable and low aquatic toxicity lubricants	3	[1.5.6]
		Electronic Ballast Water Record Book	1 (16)	[1.5.7]
		Bleed-off water from Exhaust Gas Recirculation	5	[1.5.8]
		Biofouling Management Plan	3	[1.5.9]
6	Ozone-Depleting Substances	Refrigerating facilities	5	[2.1.1]
		Restrictions in the use of GWP substances	10 (15)	[2.1.2]
		Refrigerating system without fluorinated greenhouse gases	10	[2.1.3]
		Electronic Ozone-depleting Substances Record Book	2 (16)	[2.1.4]

(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable
(14) Total score is to be calculated with the criteria given in [2.8.1] b).
(15) To be weighted.
(16) not valid for number of pollution sources calculation.

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
7	Greenhouse Gases and Pollutants	Non-fossil fuels (use of electric power generators and/or propulsion systems that do not use prime movers generating GHGs and pollutants (e.g. sails, fuel cells, etc.))	30(15)	[2.2.1]
		Second generation of bio-fuels	20(15)	[2.2.2]
		Cold ironing	2 (10)	[2.2.3]
		Tool to manage handling and consumption of fuels	2	[2.2.4]
		Ship Energy Efficiency Operational Manual	2	[2.2.5]
		Computerised system to monitor fuel consumption	3	[2.2.6]
		Fuel consumption Decision Support Solution	10 (11)	[2.2.7]
		Optimisation of Air Conditioning (AC) plant (including passive means to decrease AC demand, e.g. reflective glazing)	5	[2.2.8]
		Low energy consumption lights	4	[2.2.9]
		Hull transom design (adoption of means capable of increasing propulsion efficiency by minimum 0,5% at design speed)	5	[2.2.10]
		Stabiliser openings	3	[2.2.11]
		Silicone-based antifouling paint	10	[2.2.12]
		Fluoropolymer antifouling paint	15	[2.2.13]
		Fins on propeller boss cups	3	[2.2.14]
		High performance propellers (capable of increasing propulsion efficiency by minimum 1%)	5	[2.2.15]
		Support tool to assist the Master in keeping most efficient sailing draft and trim	10 (11)	[2.2.16]
		Methods to ensure low or zero emissions in restricted areas for a limited time period	5 (10)	[2.2.17]
		Offsetting of the GHG emissions	30	[2.2.18]
		High-efficiency (IE2) and premimum efficiency (IE3) motors	3 (15)	[2.2.19]
		Air lubricating system	3	[2.2.20]
		Variable speed drives	3	[2.2.21]
		Zero emissions in port	6(10)	[2.2.22]

(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable
(14) Total score is to be calculated with the criteria given in [2.8.1] b).
(15) To be weighted.
(16) not valid for number of pollution sources calculation.

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
8	NOx	NOx emission according to Reg. 13 MARPOL Annex VI (the contribution to the yacht environmental index is "0" where Reg. 13 MARPOL Annex VI is mandatory for the yacht)	5(15)	[2.3.1]
		Gas to liquid (GTL) fuels (NOx emission from prime movers and auxiliary boilers lower than the limits as per Annex VI to MARPOL 73/78 as amended)	15(15)	[2.3.2]
		Fossil fuel pre-treatment (e.g. water emulsion), or water injection into combustion chamber, or scavenging air, or combination of these (NOx emissions from prime movers and auxiliary boilers lower than the limits as per Annex VI to MARPOL 73/78 as amended)	5 **(1)**	[2.3.3]
		Dual-fuel engines running with LNG or CNG (NOx emissions from prime movers lower than the limits as per Annex VI to MARPOL 73/78 as amended)	15	[2.3.4]
		Exhaust gas treatment (abatement of not less than 85% of total NOx generated by prime movers)	20	[2.3.5]
		NOx emission monitoring and recording	3	[2.3.6]
		Electronic Record Book of Engine Parameters	1 (16)	[2.3.7]
		Electronic tier and on/off status of marine diesel engines Record Book	1 (16)	[2.3.8]
9	SOx	SOx limits (0,1%)	10	[2.4.1]
		Gas to liquid (GTL) fuels	510 (15)	[2.4.2]
		Blending fossil fuel with second-generation bio-fuels	510 (15)	[2.4.3]
		Dual-fuel engines running with LNG (gasoil only used as backup in an emergency)	10	[2.4.4]
		Exhaust gas treatment (abatement of not less than 85% of total SOx generated by prime movers)	20	[2.4.5]
		SOx emission monitoring and recording	3	[2.4.6]
		Electronic Fuel Oil Changeover Record Book	1 (16)	[2.4.7]

(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable

(14) Total score is to be calculated with the criteria given in [2.8.1] b).

(15) To be weighted.

(16) not valid for number of pollution sources calculation.

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
10	Particulates	Gas to liquids (GTL) fuels (lower PM emissions)	20(15)	[2.5.1]
		Fuel treatment (lower PM emissions achieved by fossil fuel pre-treatment (e.g. water emulsion), or blending of pre-treated fossil fuel with second-generation bio-fuels, or combination of these)	15(15)	[2.5.2]
		Lower PM emission achieved by modifications in prime movers (e.g. common rail) that do not increase other pollutants and GHG emissions	5(15)	[2.5.3]
		Dual-fuel engines running with LNG (gasoil only used as backup in emergency)	20	[2.5.4]
		Exhaust gas treatment (abatement of not less than 85% of total PM generated by prime movers)	10	[2.5.5]
11	CO_2	Gas to liquid (GTL) fuels (reduction in CO_2 emission)	10 (15)	[2.6.1]
		Blending fossil fuel with second-generation bio-fuels (reduction in CO_2 emission)	10 (15)	[2.6.2]
		Dual-fuel engines running with LNG (gasoil only used as backup in emergency)	5	[2.6.3]
		CO_2 monitoring and recording	3	[2.6.4]
		Attained Energy Efficiency Design Index (EEDI) <= Required EEDI (Phase 2)	2 (12)	[2.6.5]
		Attained Energy Efficiency Design Index (EEDI) <= Required EEDI (Phase 3)	4 (12)	[2.6.6]
12	Noise	Noise level assessment and implementation of the noise mitigation measures	10	[2.7.1]
(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable (14) Total score is to be calculated with the criteria given in [2.8.1] b). (15) To be weighted. (16) not valid for number of pollution sources calculation.				

No.	Pollution Source	Item	Environmental Index	Ref.(App 2)
13	Yacht materials and building procedures	Eco-compatible and recyclable materials	5(15)	[2.8.1] a)
		Wooden yachts having the total rigging weight (furniture, linings, ceilings, etc.) made with at least 40% of wood coming from sustainably managed forests. Wooden yachts having the relevant hull structures made of wood coming from sustainably managed forests and for which the relevant weight is at least equal to 30 % of the total structural weight.	3(14) 4(14)	[2.8.1] b)
		Low emission manufacturing processes of fibreglass structures or metallic hull and structures	5(15)	[2.8.2]
		Low VOC emission painting processes	8(15)	[2.8.3]
		Yacht construction carried out in conformity with the Tasneef Rules for the certification of the Quality Control System of Manufacturers of Yachts or other Products built in Composite Material	10	
14	Operative consumption	Tonnage Vs Power installed on board	From 1 to 30	[2.9]
15	Yacht at scrab	Yacht recycling - HK Inventory of Hazardous Material	5 (13)	[2.10.1]
		Ship recycling - HK Inventory of Hazardous Material	7 (13)	[2.10.2]
(1) to (13) with reference to the item where a note from (1) to (13) appears only one corresponding environmental index is assignable (14) Total score is to be calculated with the criteria given in [2.8.1] b). (15) To be weighted. (16) not valid for number of pollution sources calculation.				

4.4 Applicable Requirements

4.4.1 The applicable requirements for each basic and additional system, component installed and procedural means adopted are given in App 2.

5 Environmental Index

5.1 Index calculation

5.1.1 The environmental index is obtained by adding up the values of the contributions for each additional system, component and procedural means (items) the yacht is equipped with, according to Tab 2.

No contribution to the yacht's environmental index or to coverage of the relevant pollution sources (see [6.1] b) will be given by the implementation of those items for which mandatory requirements are in force for the ship according to IMO Conventions due to its specific characteristics such as tonnage, navigation, etc.

Provided that the date of entry into force of IMO requirements, becoming mandatory before the delivery of the yacht, is not yet known when the yacht is contracted for construction, the implementation of the relevant items contributes to the ship environmental index or to coverage of the relevant pollution sources.

6 Assignment

6.1 Criteria

6.1.1 The additional class notations **GREEN PLUS (Y), GREEN PLUS (Y) (GOLD), GREEN PLUS (Y) (PLATINUM)**, are assigned to a yacht:

a) complying with [4.1] and [4.2]

b) having additional systems, components and procedural means selected from items of Tab 2, pertaining to:
- at least nine different pollution sources (as listed in the second column of Tab 2) for yachts of 500 GT or more
- at least eight different pollution sources (as listed in the second column of Tab 2) for yachts of less than 500 GT.

c) having an environmental index calculated in accordance with [5.1] at least equal to:
- 60 for yachts eligible for additional class notation **GREEN PLUS (Y)**
- 80 for yachts eligible for additional class notation **GREEN PLUS (Y) (GOLD)**
- 100 for yachts eligible for additional class notation **GREEN PLUS (Y) (PLATINUM)**.

7 Novel Features

7.1 General

7.1.1 For the assignment of the notation Tasneef may consider systems, components and procedural means not listed in Tab 2 based on novel principles and features and according to calculations or other supporting information.

7.2 Examples

7.2.1 Equipment to maximise the recovery of waste heat, electric propulsion systems designed to have the maximum efficiency under the different operational conditions of the yacht and any other fuel-saving techniques may be considered by Tasneef, on the basis of comparative studies to be submitted, for the calculation of the yacht's environmental index.

8 Systems and Components

8.1 System and component certification

8.1.1 When systems and components are recognised as being capable of improving the yacht's environmental behaviour, Tasneef may, at the request of the applicant (Manufacturer or authorised vendor) issue a certificate stating the environmental properties of the system or component.

The certificate may be issued in accordance with applicable national or international standards or, in the absence of such standards, on the basis of the Manufacturer's standards or specifications.

The compliance to the reference document is ascertained by means of:
- execution of tests; or
- review of test documentation; or
- evidence of positive results during in-service operation; or
- any combination of the above criteria.

9 Annual and class renewal survey

9.1

9.1.1 The survey is, as far as practicable, to include the verification and checks required in Pt A, Ch 4, Sec 3 and, in addition, the following:

- verification that all the additional systems and components involved in the yacht's environmental index calculation (see Tab 2 and [7] if any) and listed in the Green Plus Record of Equipment are well maintained and in good working condition
- verification that all the additional procedural means involved in the yacht's environmental index calculation (see Tab 2 and [7] if any) and listed in the Green Plus Record of Equipment are followed and documented by appropriate recording
- in the case of yachts of 500 GT or more, verification that adequate training on environmental issues is planned, carried out and documented for all the persons on board having influence on the environmental behavior of the yacht.

APPENDIX 1 ALTERNATIVE, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 500 GT

1 Alternatives

1.1 Alternatives to Sec 1

1.1.1 With reference to Sec 1, [4.1.2].

An Environmental Management Plan is highly suggested but not mandatory.

1.1.2 With reference to Sec 1, [6.1.1], Criteria:

at least eight different pollution sources (as listed in the second column of Tab 2) have to be considered.

1.2 Alternatives to App 4

1.2.1 With reference to App 4 [1.1.5], Bilge Oil Tank:

the formula for the calculation of the volume of the bilge oil tank may be:

$$V = 1 + 3,5P \cdot 10^{-4}$$

and the volume may be not more than 5 m^3.

1.2.2 With reference to App 4, [1.1.8], Fuel oil tank protection by means of tank boundary distance from the yacht side and bottom:

20 m3 may be replaced by 10 m^3.

1.2.3 With reference to App 4, [1.1.8], Lubricating oil and sludge oil tank protection by means of tank boundary distance from the yacht side and bottom:

5 m3 may be replaced by 3 m^3.

1.2.4 With reference to App 4, [1.1.13], gutters:

Scantling of the gutter may be 50 litres if the gross tonnage of the yacht is less than 300.

1.2.5 With reference to App 4, [1.1.13], sewage holding tank:

4 days may be replaced by 2 days.

APPENDIX 2 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 24M LLL

1 Alternatives

1.1 Alternatives to Sec 1

1.1.1 With reference to Sec 1, [4.4.3] Additional systems, components and procedural means

In addition to the pollution sources mentioned in Sec 1, Tab 1, also the additional pollution sources mentioned in the following Tab 1 may be considered.

Table 1 : Additional systems, component and procedural means

No.	Pollution Source	Item	Environmental Index	Ref.(App 4)
1	NOx	NOx emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive 2013/53/EU) reduced by 20% or more	15	
		NOx emission limits according to Tab 2 or 3 (Sec B.2, Annex I of 2013/53/EU Directive) reduced from 20% to 10%	10	
		NOx emission limits according to Tab 2 or 3 (Sec B.2, Annex I of 2013/53/EU Directive) reduced of less than 10%	5	
		Engines running with GPL (NOx emissions lower than the limits as per Sec B.2, Annex I Tab 2 or 3 of Directive 2013/53/EU of at least 5%)	15	
2	HC (Hydrocarbons)	HC emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive 2013/53/EU) reduced by 20% or more	15	
		HC emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive2013/53/EU) reducedfrom 20% to 10%	10	
		HC emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive2013/53/EU) reduced of less than 10%)	5	
		Engines running with GPL (HC emissions lower than the limits as per Sec B.2, Annex I of Directive 2013/53/EU of at least 5%)	15	
3	PT (Particulates)	PT emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive 2013/53/EU) reduced by 20% or more	20	
		PT emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive 2013/53/EU) reduced from 20% to 10%	15	
		PT emission limits according to Tab 2 or 3 (Sec B.2, Annex I of Directive 2013/53/EU) reduced of less than 10%	5	

1.1.2 With reference to Sec 1, [6.1.1], Criteria:
at least six different pollution sources (as listed in the second column of Tab 1 and Se 1, Tab.1) have to be considered

APPENDIX 3 DEFINITIONS RELEVANT TO THE GREEN PLUS NOTATION

1 General

1.1 MARPOL 73/78

1.1.1

MARPOL 73/78 is the IMO "International Convention for the Prevention of Pollution from Ships, 1973/78, including the Annexes from I to VI as amended.

1.2 Yacht Environmental Manager

1.2.1

The Yacht Environmental Manager is the person on board in charge of the management and control of the procedures and activities relevant to the requirements of this Section.

1.3 Yacht recycling

1.3.1

The terms regarding ship recycling used in this Chapter have the meaning provided in the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships 2009 and in IMO Resolution MEPC.269(68) (Guidelines for the development of the inventory of hazardous materials) and EU Ship Recycling Regulation n° 1257/2013.

2 Definitions in connection with prevention of sea pollution

2.1 Discharge

2.1.1

Discharge, in relation to harmful substances or effluents containing such substances, means any release, howsoever caused, from a yacht and includes any escape, disposal, spillage, leakage, pumping, emitting or emptying.

Discharge does not include:

- dumping, within the meaning of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, London 13 November 1972, or
- release of harmful substances directly arising from the exploration, exploitation and associated offshore processing of seabed mineral resources, or
- release of harmful substances for purposes of legitimate scientific research into pollution abatement or control.

2.2 Grey water

2.2.1

Grey water means drainage from dishwasher, galley, shower, laundry, bath, washbasin drains and toilette scuppers.

2.3 Grey water - Maximum number of persons

2.3.1

Maximum number of persons on board, for the purpose of calculating grey water retention capacity, means the maximum number of persons that can be accommodated in cabins plus the crew.

2.4 Harmful aquatic organisms and pathogens

2.4.1

Harmful aquatic organisms and pathogens means bacteria, plants and animals which can survive in a viable form in the ballast water and sediments carried in yachts.

2.5 Harmful substance

2.5.1

Harmful substance means any substance which, if introduced into the sea, is liable to create hazards to human health, harm living resources and marine life, damage amenities or interfere with other legitimate uses of the sea, and includes any substance subject to control by MARPOL 73/78.

2.6 Oily wastes

2.6.1

Oily wastes means the water removed from machinery space bilges, used lube and hydraulic oils and sludge from fuel oil and from lube oil treatment systems.

2.7 Sludge oil

2.7.1

Sludge oil means sludge from fuel and lubricating oil separators, waste lubricating oil from main and auxiliary machinery and waste oil from bilge water separators, drip trays, etc.

2.8 Treated sewage holding tank

2.8.1

Treated sewage holding tank means a tank used for the collection and storage of the effluent of the sewage treatment plant.

2.9 AFS Certificate

2.9.1

AFS Certificate means "International Antifouling System Certificate" or statement of compliance, issued in accordance with IMO Resolution MEPC.195(61) (2010 Guidelines for survey and certification of anti-fouling systems on ships), as amended.

3 Definitions in connection with prevention of air pollution

3.1 Cold Ironing

3.1.1

Cold Ironing is the process of providing shore-side electrical power by means of a shore connection system designed to supply the yacht when operational and lying in port while its main and auxiliary engines are turned off.

3.2 Gas to liquid fuels (GTL)

3.2.1

Gas to liquid fuels are those fuels obtained according to a refinery process which converts natural gas or other gaseous hydrocarbons into longer-chain hydrocarbons.

3.3 Global Warming Potential (GWP)

3.3.1

Global Warming Potential is the potential global warming effect of a gas compared with CO_2 on a time horizon of 100 years.

3.4 Green House Gases (GHGs)

3.4.1
A Green House Gas is any gas such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and chloro fluoro carbon compounds (CFCs) that contribute to the greenhouse effect when released into the atmosphere.

3.5 Liquefied Natural Gas (LNG)

3.5.1
Liquefied natural gas or LNG is natural gas (primarily methane, CH_4) that has been converted to liquid form for ease of storage or transport.

3.6 Compressed Natural Gas (CGN)

3.6.1
Compressed natural gas or CNG is natural gas (primarily methane, CH_4) that is stored in a compressed state.

3.7 Low energy consumption lights

3.7.1
Low energy consumption lights are lights other than incandescent light bulbs, halogen lamps and those having similar lum/W ratio, recognised by appropriate national or international standards.

3.8 Ozone Depleting Potential (ODP)

3.8.1
Ozone Depleting Potential is the potential of ozone depletion compared to CFC 11. Values of ODP for ozone depleting gases are provided in the "Montreal Protocol on Substances that Deplete the Ozone Layer".

3.9 Particulates (PM)

3.9.1
Particulates, alternatively referred to as particulate matter (PM) or fine particles, are tiny particles of solid or liquid suspended in a gas.

3.10 Second generation bio-fuels

3.10.1
Second generation bio-fuels are those produced sustainably by using biomass comprised of the residual non-food parts of current crops, such as stems, leaves and husks that are left behind once the food crop has been extracted, as well as other crops that are not used for food purposes, such as switch grass and cereals that bear little grain, and also industry waste such as wood chips, skins and pulp from fruit pressing etc., whereby the complete cycle from production to consumption, allows the attainment, with equal total power generated, of a reduction in CO_2 emissions of over 85% compared to fossil fuels.

APPENDIX 4 BASIC AND ADDITIONAL SYSTEMS, COMPONENTS AND PROCEDURAL MEANS TO EVALUATE THE SHIP'S ENVIRONMENTAL INDEX AS PER THE GREEN PLUS NOTATION

1 Prevention of sea pollution

1.1 Oil from machinery spaces

1.1.1 Compliance with Annex I to MARPOL 73/78 as amended

For all yachts not subject to Annex I to MARPOL 73/78 as amended that comply to the above mentioned Annex of MARPOL the 5 points may be assigned.

1.1.2 Bilge Water Treatment (15 ppm with alarm and automatic stop)

The oil filtering equipment is to allow maximum oil content in the effluent up to 15 ppm, and be provided with an oil content meter and a 15 ppm alarm in a manned position, combined with automatic stopping device.

The effluent from the 15 ppm filtering equipment is to be capable of being re-circulated to the bilge water holding tank, see [1.1.5].

1.1.3 Bilge Water Treatment (5 ppm with alarm and automatic stop)

The oil filtering equipment is to grant maximum oil content in the effluent up to 5 ppm, be provided with an oil content meter and with a 5 ppm alarm in a manned position, combined with automatic stopping device.

If additional equipment is installed to ensure the above performance, it is to be approved by Tasneef.

If the performance of 5 ppm is ensured by a system type approved according to applicable MARPOL regulations, such performance is to be verified by Tasneef.

The effluent from the 5 ppm filtering equipment is to be capable of being re-circulated to the bilge water holding tank, see [1.1.5].

1.1.4 Bilge Water Treatment (5 ppm with alarm, automatic stop and recorder)

In addition to [1.1.3] the following is to be provided with:

a) a monitoring and control system, supervising the overboard discharge of the treated bilge water and including a fuel oil grease monitor, a flow meter, control means, valves and fittings, capable of:
   1) providing a fail-safe system for discharging treated bilge water overboard including immediate shutdown of Bilge Water Separator in the event of:
      - high oil content
      - insufficient flow of sampling water through the oil monitor
      - the rinse/sampling valves (inlet and outlet) of the oil monitor are not closed
   2) measuring the flow of the water and the oil content value
   3) giving alarm signals
   4) controlling the position of the overboard discharge three-way valve

   The open command of remote controlled overboard discharge valve is to be authorised from the bridge and indication of the status of manually operated overboard discharge valves is to be available on the bridge.

b) a recorder capable of recording
   1) yacht's time
   2) run stop time of bilge water separator
   3) all the data from the monitoring and control system as described in a).

1.1.5 Bilge oil tank

All machinery space bilges are to be drained into a holding tank for pre-separation upstream of the oil separation and filtering equipment.

Alternative installations may be considered on a case-by-case basis.

The volume V of the holding tank, in m^3, is to be at least:

$V = 1 + 3,5\ P \cdot 10^{-4}$

for yacht of less than 500 GT and

$V = 1 + 5,5\ P \cdot 10^{-4}$

for yacht of 500 GT or more,

where P is the power of the propulsion engine plant, in kW.

In any event, it is not required that the volume V is greater than:

- 5 m^3 for yachts of less than 500 GT
- 15 m^3 for yachts of 500 GT or more.

Taking into account the yacht service, navigation and installed power, a smaller volume V may be accepted on a case-by-case basis.

The tank is to be so arranged as to allow periodical removal of sediments.

The holding tank is to be connected to the standard dis- charge connection referred to in regulation 13, Annex I to MARPOL 73/78 as amended.

No interconnections between the sludge tank discharge piping and bilge-water piping is to be present, other than possible common piping leading to the standard discharge connection referred to in regulation 13, Annex I to MARPOL 73/78 as amended.

A high level alarm is to be given in a manned position.

1.1.6 Retention on board

An oil bilge water holding tank is to be arranged to collect all machinery space oily bilge waters for their subsequent discharge ashore to dedicated reception facilities through the standard discharge connection referred to in regulation 13, Annex I to MARPOL 73/78 as amended, or any other approved means of disposal. The retention tank(s) is (are) to be separated and independent from the sludge tank.

The minimum total capacity of the holding tank(s) is (are) to be evaluated on the basis of the type of yacht and its machinery considering 30 days of voyage duration.

The tank is to be so arranged as to allow periodical removal of sediments.

A high level alarm is to be given in a manned position.

1.1.7 Restrictions in the use of yacht's tanks for ballast

The use of tanks intended for fuel oil as ballast tanks is not allowed, irrespective of their volume.

1.1.8 Fuel oil tank protection by means of tank boundary distance from the yacht side and bottom

The protection of the tanks (having a capacity of 20 m^3 and above for yacht of more than 500GT and 10 m^3 for yacht of less than 500GT) is to be achieved applying the criteria of MARPOL Annex I Reg. 12A based on the distance of the fuel oil tank boundary from the yacht side and bottom.

1.1.9 Fuel oil tank protection by means of outflow calculation by means of outflow calculation

The protection of the tanks is to be achieved applying the criteria of MARPOL Annex I Reg. 12A based upon outflow calculation.

1.1.10 Lubricating oil and sludge oil tank protection by means of tank boundary distance from the yacht side and bottom

No lubricating oil is to be stored in tanks forward of the collision bulkhead.

The protection of the tanks (having a capacity of 5 m^3 and above for yacht of more than 500GT and 3m^3 for yacht of less than 500GT) is to be achieved applying the criteria of MARPOL, Annex I, Reg. 12A (independently from their total aggregate capacity) based upon the distance of the fuel oil tanks boundary from the yacht side and bottom.

The requirement is not applicable to the double bottom for lubricating oil located under the main engine.

1.1.11 Lubricating oil and sludge tank protection by means of outflow calculation

The protection of the tanks is to be achieved applying the criteria of MARPOL Annex I Reg. 12A (independently from their total aggregate capacity) based upon outflow calculation.

The requirement is not applicable to the double bottom for lubricating oil located under the main engine.

1.1.12 Oil tank overflow

a) All fuel oil and lubricating oil tanks of capacity greater than 10 m^3 are to be fitted with an overflow system and a high level alarm.

Acceptable alternatives are:

- an overflow system and a flow alarm in the overflow main
- no overflow system and two high level alarms (for instance at 90% and 95% of filling).

b) The alarm signals are to be given in a suitable position from which bunkering or transfer operations are controlled.

1.1.13 Gutters

On the weather and/or superstructure decks each fuel or lubricating oil tank vent, overflow and fill pipe connection is to be fitted with a fixed container or enclosed deck area with a capacity of:

- 80 litres, if the gross tonnage of the yacht is less than 1600
- 160 litres, if the gross tonnage of the yacht is greater than 1600.

1.1.14 Dry bilge concept

An adequate number of tanks is to be installed to collect drainage water from one or more items of equipment (e.g. diesel engine scavenging air coolers, potable water analysers, low temperature heat exchangers) within the same compartment which have drainage water with similar characteristics. Such tanks have the function to drastically reduce water drainage to bilge spaces and so reduce the oily water, emulsified bilge water and other contaminated water collecting in bilge wells.

Each tank is to be equipped with automatic transfer means, level indicator for local control and high level alarm given in a manned position.

1.1.15 Sludge oil collection and handling facilities

An adequate number of tanks of 100 l approximate capacity each are to be installed to collect oily liquids from drains, vents, seals and glands of all equipment in machinery spaces and bunker stations connected to a fuel oil and lubricating oil system.

The tanks are to be installed outside the double bottom.

Drain lines must not pass through watertight bulkheads or tank tops. The tanks are to be in addition to the drain tanks dedicated to each purifier module for the collection of generated sludge.

The tanks are to be equipped with automatic transfer means, level indicator for local control and high level alarm given in a manned position connected to the automation system.

A hand pump is to be additionally provided which levers are to be located at floor level to facilitate operations; where this is not possible, a platform with a vertical ladder is provided for access to the pump.

Drain tanks of purifier modules are to be provided for each purifier skid, equipped with a high level alarm given to a manned position, connected to the control and monitoring panel of each purifier.

Drain tanks are to be discharged to the sludge tank in [1.1.6] by means of a power operated pump. All discharge lines are sized to allow pumping without the need to heat the sludge.

1.1.16 Water-lubricated stern tube bearings

Stern tube bearings are to be water lubricated according to Pt C, Ch 1, Sec 6, [2.4.3] and [2.4.4]and [2.4.7].

1.1.17 Magnetic coupling on oil pumps

Magnetic couplings are to be used to connect fuel oil and lubricating oil pumps and associated drivers. These couplings are to be approved by Tasneef.

1.1.18 Biodegradable lube oil

Biodegradable oils are to be used for the lubrication of machinery, apart from diesel engines, and for hydraulic systems. The oil biodegradability characteristic is to be according to a recognised standard from a laboratory certified in accordance to ISO 17025 "General requirements for the competence of testing and calibration laboratories".

Products labelled by Blue Angel, European Ecolabel or Nordic Swan labelling programs, will be automatically recognized as biodegradable and low aquatic toxicity oils.

1.1.19 Restrictions in the use of hydraulic plants

Apart from controllable pitch propeller actuating systems, no manoeuvring systems (steering gear, watertight doors, hatches, valves, etc) are to be of hydraulic type.

1.1.20 Electronic Oil Record Book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Oil Record Book part I as required by MARPOL Annex I Regulation 17, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

1.2 Sewage

1.2.1 Treatment plant: effluent quality as per IMO MEPC.2(VI)

A sewage treatment plant, meeting operational requirements based on the standards and test methods as detailed in Resolution MEPC.2(VI), as amended, is to be installed on board (for plants installed before 1 January 2010).

1.2.2 Treatment plant: effluent quality as per IMO MEPC.159(55)

A sewage treatment plant, meeting operational requirements based on the standards and test methods as detailed in Resolution MEPC.159(55) is to be installed on board (for plants installed on or after 1 January 2010).

The system performance is to be certified.

1.2.3 Treatment plant: effluent quality as per IMO MEPC.227(64)

A sewage treatment plant, meeting operational requirements based on the standards and test methods as detailed in Resolution MEPC.227(64) as amended is to be installed on board

The system performance is to be certified.

1.2.4 Holding tank

The yacht is to be equipped with holding tank(s) for treated sewage with sufficient capacity to allow storage of treated sewage when in port or in no discharge areas.

The minimum total capacity of such tank(s) is to be 4 days based on the maximum number of persons on board and 96 litres/person/day if a conventional (flush-meter) system is used and 11 litres/person/day if a vacuum system is used.

A reduced retention capacity of 1 day is accepted provided that an advanced sewage treatment system complying with [1.2.3] is installed on board.

A high level alarm is to be given in a manned position.

1.2.5 Retention on board

The yacht is to be equipped with holding tank(s) for treated sewage having a minimum total capacity evaluated on the maximum possible duration of voyage, the maximum number of persons on board and 96 litres/ person/ day if a conventional (flush-meter) system is used and 11 litres/ person/ day if a vacuum system is used.

The treated sewage is to be stored in the holding tank(s) for subsequent disposal ashore to dedicated reception facilities through the standard discharge connection referred to in regulation 10, Annex IV to MARPOL 73/78 as amended, or any other approved means of disposal.

A high level alarm is to be given in a manned position.

1.2.6 Sewage Record Book

All sewage discharges whether to sea or shore-based facilities are to be recorded in a Sewage Record Book with indication of the date, location and quantity of sewage discharged and are to comply with Annex IV to MARPOL 73/78 as amended.

1.2.7 Electronic Sewage record book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the sewage record book is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

1.3 Grey water

1.3.1

Grey waters led to a sewage treatment plan.

The grey water are led through a sewage treatment plan and are treated before being discharged on board.

1.3.2 Holding tank

Yachts are to be equipped with holding tank(s) for grey water with sufficient capacity to allow storage of grey water when in port for at least 2 days.

The total capacity of grey water holding tanks is to be based on the maximum number of persons on board and 200 litres/person/day.

A high level alarm is to be given in a manned position.

If the same tanks are used to hold treated sewage and grey water, their capacity is to be at least the sum of the capacities for the treated sewage holding tanks in [1.2.4] and the tanks for grey water.

A smaller volume, in any case not lower than 50% of the above capacity, may be accepted provided that:

- the yacht is equipped with a system for treating grey water, able to reduce the volume of the effluent (e.g. by reusing part of the treated grey water for on board use);
- 2 days' retention is ensured;
- technical documentation, including results of onboard tests, of the system's efficiency and of effluent volume reduction is documented to the satisfaction of the Society.

Grey water is always to be discharged at a distance of more than 4 nautical miles from the nearest land or to a reception facility.

The discharging criteria do not apply when the discharge of grey water is necessary for securing the safety of the yacht and those on board, or saving life at sea, or when the dis- charge results from damage to the yacht or its equipment.

1.3.3 Retention on board

The yacht is to be equipped with holding tank(s) for all grey waters that are to be drained and stored in the holding tank(s) for subsequent discharge ashore to dedicated reception facilities.

The holding tank is to have a minimum total capacity based on the maximum possible duration of the voyage, the maximum number of persons on board and 200 litres/ person/ day.

A high level alarm is to be given in a manned position.

If the same tanks are used to hold treated sewage and grey water, their capacity is to be at least the sum of the capacities for the treated sewage holding tanks in [1.2.4] and the tanks for grey water.

1.3.4 Grey Water Record Book

All grey water discharges whether to sea or shore-based facilities are to be recorded in a Grey Water Record Book with indication of the date, location and quantity of grey waters discharged.

If the grey waters are discharged at sea, the records are to include information on the yacht speed and distance to the nearest land.

1.3.5 Electronic Grey water record book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the sewage record book is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint).

1.3.6 Water saving

The yacht is equipped with a system allowing the use of grey waters from sinks and showers to be used to flush the wc on board.

1.4 Garbage

1.4.1 Garbage Management Plan

The Garbage Management Plan is to be submitted for approval.

Special consideration is to be given in the Garbage Management Plan to potentially hazardous wastes, which are to be disposed of ashore, such as:

- photographic and x-ray development wastes
- dry-cleaning solvent wastes
- print shop wastes
- photocopying and printer cartridges
- unused pharmaceuticals
- batteries
- lamp bulbs.

1.4.2 Recycling

The following is to be complied with:

a) a strategy of waste recycling is to be foreseen, adopted and documented;

b) the minimum total quantity of wastes landed for recycling (Wr) is to be 50% of recyclable wastes produced on board (Wb), where Wb = 40 Kg/person/year based on the number of persons on board.

The amount of waste landed for recycling is to be recorded in the garbage record book, and different wastes are to be collected and landed separately.

For the purpose of these Rules, recyclable wastes include but are not limited to:

- plastic
- aluminium
- glass
- paper-cardboard.

1.4.3 Advanced recycling

The garbage collection systems are to be designed and installed to facilitate the efficient collection of all wet waste and dry waste generated onboard and to treat such waste in the most effective and environmentally-friendly manner. All recyclable wastes are to be separated by type and treated to reduce volume and allow offloading ashore for recycling. As far as the technology allows, all processes are to be fully automatic and continuous.

1.4.4 Electronic Garbage Record Book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Garbage Record Book as required by MARPOL Annex V Regulation 10, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

1.4.5 Plastic litter

In order to prevent marine plastic pollution form yachts, best practise about the use of plastic on board are to be implemented, e.g. single-use plastics ban onboard KPIs are to be identified and verified.

1.4.6 Use of polyurethane hydrophobic and oleophilic absorbent materials for oil clean up

The absorbent material used to retain oil discharged accidentally or for other use on board are to be reusable at least 10 times.

1.5 Other sources

1.5.1

When on yacht of less than 500GT an Environmental management Plan is available on board the relevant points set in the Tab 1 may be assigned.

1.5.2 Ballast water treatment

A ballast water treatment plant complying with Reg. D-2 of the IMO "International Convention for the control and management of ship's ballast water and sediments, 2004" is to be installed onboard.

The system performance is to be certified including the System Design Limitations (SDL) according to BWM.2/Circ.69 "Guidance on System Design Limitations of ballast water management systems and their monitoring".

1.5.3 Ballast water treatment without chemical

A ballast water treatment, plant complying with Reg. D-2 of the IMO "International Convention for the control and management of ship's ballast water and sediments, 2004", with filtration unit and without active chemicals (sodium chlorite, sodium hypochlorite, chlorine dioxide, peracetic acid, etc) is to be installed onboard.

The system performance is to be certified, including the System Design Limitations (SDL) according to BWM.2/Circ.69 "Guidance on System Design Limitations of ballast water management systems and their monitoring".

1.5.4 Marine growth prevention systems

Antifouling systems for piping are to be based on environmentally friendly technologies that do not discharge harmful products and are approved by Tasneef. Marine growth prevention systems are to be without biocides release, e.g systems based on ultrasonics, low level pulsed laser, etc. or with a release of minimum biocide, e.g. in case of copper ions, maximum release in to be less than 2 ppb.

1.5.5 Collection of spillage/ leakage of environmentally hazardous substances

Drip trays or coamings having sufficient height are to be provided on weather decks under equipment, systems and devices to collect spillage and or leakage of environmentally hazardous substances.

1.5.6 Biodegradable and low aquatic toxicity lubricants

Biodegradable and low aquatic toxicity oils are to be used for the lubrication of machineries and for hydraulic systems installed on open decks. The oil biodegradability characteristic and low aquatic toxicity are to be demonstrated by means of tests carried out according to a recognized standard from a laboratory certified in accordance to ISO 17025 "General requirements for the competence of testing and calibration laboratories".

Products labeled by Blue Angel, European Ecolabel or Nordic Swan labeling programs, will be automatically recognized as biodegradable and low aquatic toxicity oils.

1.5.7 Electronic Ballast Water Record Book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Ballast Water Record Book as required by BWMC, Regulation B-2, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

1.5.8 Bleed-off water from Exhaust Gas Recirculation

In case an Exhaust Gas Recirculation (EGR) systems is installed, the management of bleed-off water from Exhaust Gas Recirculation (EGR) systems is to be in accordance with Resolution MEPC 307(73) "2018 GUIDELINES FOR THE DISCHARGE OF EXHAUST GAS RECIRCULATION (EGR) BLEED-OFF WATER" as amended.

1.5.9 Biofouling Management Plan

A Biofouling Management Plan and Biofouling Record Book are to be implemented and maintained according to Resolution MEPC.207(62) "2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species"

2 Prevention of air pollution

2.1 Ozone depleting substances

2.1.1 Refrigerating facilities

The following requirements apply to yachts with centralised refrigeration systems such as:

- centralised refrigeration systems for provision stores
- centralised air conditioning plants.

They do not apply to domestic type stand-alone refrigerators and air conditioning units.

Means are to be provided to limit leaks to the atmosphere of refrigerants or their vapours in the event of failure of the plant, as well as in the case of discharge of refrigerant to an onshore reception facility.

Annual refrigerant leakage is to be less than 10% of the total refrigerant charge of each system.

The system is be fitted with evacuation (e.g. compressors) and retention facilities having the capacity to retain all the refrigerants, should the need to evacuate the whole plant arise in an emergency.

The plant is to be designed in such a way as to minimise the risk of medium release in the case of maintenance, repair or servicing; i.e. it is to be designed considering the possibility of isolating those sections which are to be serviced by a

system of valves and bypasses, in such a way as not to stop the operation of the plant while in service, preventing the risk of release of the medium outside of the plant.

Materials for piping and equipment specifically designed to limit the emission of refrigerants are to be tested in accordance with the applicable requirements for testing materials intended to be used for the construction of similar types of piping and equipment and their classes and/or design conditions.

Piping and equipment specifically designed to limit the emission of refrigerants are to be inspected and tested during fabrication in accordance with the requirements applicable to similar types of piping or equipment and their classes and/or design conditions.

After installation on board, the plant acceptance trials are to include the operation of the evacuation of the entire refrigerant from the plant to the reception facilities without any release of refrigerant and/or refrigerant vapours. The control, monitoring and alarm systems are also to be tested in the presence of the Surveyor, or their functioning is to be simulated by a procedure agreed with Tasneef.

2.1.2 Restrictions in the use of GWP substances

Two alternatives may be chosen:

a) avoid the use of refrigerants having GWP > 150 in refrigeration or air conditioning plant systems

b) design refrigeration or air conditioning plant systems minimising piping systems carrying the refrigerant (e.g. systems that utilise an intermediate cooling medium for refrigerated spaces/provision plants/AC Ventilation Units).

The requirements do not apply to domestic type, standalone, refrigerators and air conditioning units.

The environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = (P_{TOT} - PGWP>150) / P_{TOT}$

Where

$P_{GWP>150}$ = Refrigerating capacity at - 10 °C evaporating temperature and + 25°C condensing temperature of refrigerating plant utilizing refrigerants with GWP > 150 excluding those complying with (b)

P_{TOT} = Refrigerating capacity at - 10 °C evaporating temperature and + 25°C condensing temperature of any refrigerating plant independently from the utilized medium [kcal/h].

2.1.3 Refrigerating system without fluorinated greenhouse gases

Refrigerating system without fluorinated greenhouse gases is to be installed on board (i.e. CO_2 as refrigerant). Energy efficiency is to be comparable (± 20%) to the traditional refrigerants systems.

2.1.4 Electronic Ozone-depleting Substances Record Book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Ozone-depleting Substances Record Book as required by MARPOL Annex VI Regulation 12, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

2.2 Green House Gases and Pollutants

2.2.1 Non fossil fuels

Where power on board is partially or totally produced with systems which do not use fossil fuels (e.g. sails, fuel cells, etc.), the environmental index in Table 2 is weighted multiplying by R, defined as follows:

$R = S\ P_{non\ fossil}$ fuels / $S\ P_{TOT}$

where:

$P_{non\ fossil\ fuels}$ = Nominal power of each power source not using fossil fuel [kW]

P_{TOT} = Nominal power of each power source independently from the utilized fuel [kW].

2.2.2 Second generation of bio-fuelss

Where partial or total use is made on board of second generation bio-fuels, the environmental index in Table 2 is weighted multiplying by R, defined as follows:

$R = S\ P_{sgbf} / S\ P_{TOT}$

where:

P_{sgbf} = Nominal power of each user of second generation bio-fuel [kW]

P_{TOT} = Nominal power of each user irrespective of the fuel utilised [kW].

2.2.3 Cold ironing

The yacht is to be provided with an installation allowing the yacht to be electrically supplied from shore.

2.2.4 Tool to manage handling and consumption of fuels

The yacht is to be provided with a system to monitor and record:

a) fuel supplies to the yacht

b) fuel consumption of the yacht.

Data may be inserted manually.

2.2.5 Yacht Energy Efficiency operational manual

The yacht is to be provided with an operational manual, acceptable to Tasneef, indicating the procedures used on board to comply with energy-saving and energy conservation criteria.

At least the following areas are to be considered in the plan:

- propulsion
- electric production
- electric users for propulsion
- electric users for hull services (steering, thrusters, bilge, ballast)
- electric users for navigation
- electric users for hotel/accommodation services (galley, laundries, lighting and A/C etc)
- steam production and users.

2.2.6 Computerized system to monitor fuel consumption

The engine room automation system or an independent computerised tool is to include means for continuous monitoring of the fuel consumption for at least the following users:

- propulsion engines
- diesel generators
- oil fired boilers
- other oil fired users(e.g. inert gas generators).

2.2.7 Fuel consumption Decision Support Solution

The yacht is to be provided with a correlation study, acceptable to the Society, among the parameters listed in [2.2.6] or other identified as key parameters for the reduction of fuel oil consumption of the particular yacht.

The yacht is to be provided with all the necessary devices for the data collection including those relevant to: draft, trim, power RPM, speed, weather conditions (wind, waves, cur rents, etc).

The monitoring of these parameters affecting the consumption performance is to be carried out for a time period significant in respect of the yacht's trade.

Collected data are to be analysed to identify the best setting in terms of optimal fuel consumption, route by route.

2.2.8 Optimization of Air Conditioning (AC) plant

Means are to be provided to optimise the AC plant, including the use of passive means to decrease AC demand (e.g. reflective glazing)or variable speed drives for electrical machines).

2.2.9 Low energy consumption lights

At least 80% in power of the lighting fittings is to be of low consumption type.

2.2.10 Hull transom design

Means are to be adopted to increase propulsion efficiency by minimum 0.5% at design speed and relevant calculations or evidence are to be submitted.

2.2.11 Stabiliser openings

Openings in way of fin stabilisers are to be fitted with suitable means to restore the hull boundary continuity when fins are not in operation.

2.2.12 Silicone-based antifouling paint

A silicone-based paint which decreases the hull frictional resistance is to be used as a hull antifouling system.

2.2.13 Fluor-polymer antifouling paint

A fluor-polymer-based paint, which decreases the frictional resistance, is to be used as hull antifouling system.

2.2.14 Fins on propeller boss cups

Suitable propeller boss fins are to be fitted on the propeller to guide the water stream in order to reduce vortex and increase the propeller efficiency.

2.2.15 High-performing propellers

The yacht is to be fitted with high performing propellers (capable to increase propulsion efficiency by minimum 1% at design speed) characterized by a double-side or a single- side arc brim provided at the tip of each blade. Relevant calculations or evidence are to be submitted.

2.2.16 Support tool to assist the Master in keeping the most efficient sailing draft and trim

The yacht is to be fitted with means capable of supporting the Master in keeping the most efficient sailing draft and trim; the tool is normally a computer with software capable, for a given loading condition, of evaluating trim and draft maximising propulsion efficiency. This item is applicable when the layout of the boat is such as to allow variation of trim and draught.

2.2.17 Methods to ensure low or zero emissions in restricted areas for a limited time period

The yacht is to be fitted with a battery installation capable of supporting navigation (with a speed sufficient to ensure yacht manoeuvrability) for at least 1 hour or of supplying normal electric users at anchorage for at least 3 hours.

2.2.18 Offsetting of the GHG emissions

The yacht is to be equipped with a technical specification, approved by Tasneef, for the evaluation of the consumption of each fuel used on board and the conversion into equivalent quantities of CO2 emissions. The Owner shall provide a record of the fuel consumption and copies of the certificates showing the offset of the CO2 emissions through Approved Carbon Credits, issued by a service company recognised by Tasneef.

2.2.19 High-efficiency motors

The yacht is to be fitted with high efficiency (IE2) or premium efficiency (IE3) motors, according to IEC 60034-30.

For motors having a rated power of 100 kW and above, the tests to determine the rated efficiency are to be carried out under survey, and are to be part of the motor testing documentation.

The environmental index will be assigned as per Tab 1.

Table 1 : Environmental indexes

Installation	Environmental index
High and premium efficiency motors are installed, with an aggregate power of more than 80% of the yacht aggregate electric motor power	3
High and premium efficiency motors are installed, with an aggregate power of more than 50% but less than 80% of the yacht aggregate electric motor power	2
High and premium efficiency motors are installed, with an aggregate power of more than 20% but less than 50% of the yacht aggregate electric motor power	1

2.2.20 Air lubrication system

An air lubrication system distributing air bubbles under the hull is to be installed onbard according to Pt F, Ch 13, Sec 31 of Tasneef Rules for the Classification of Ships.

2.2.21 Variable speed drives

Variable speed drives are installed for pumps and ventilators for at least 80% in power.

2.2.22 Zero emissions in port

The yacht is equipped with systems installed on board (e.g. batteries) designed to grant zero emissions in port (time of layout in port and electric load according to yacht typical operating profile).

2.3 Nitrogen Oxides

2.3.1 Compliance with limits as per Annex VI to MARPOL 73/78 as amended

Compliance with limits as per Annex VI to MARPOL 73/78 as amended is to be assured.

The contribution to the yacht environmental index is "0" where Reg. 13 of MARPOL, Annex VI is mandatory for the yacht.

2.3.2 Gas to liquids (GTL) fuels

Where partial or total use is made on board of GTL fuels, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{GTL} / S P_{TOT}$

where

P_{sgbf} = Nominal power of each user of GTL fuel [kW]

P_{TOT} = Nominal power of each user irrespective of the fuel utilised [kW]

Diesel engines, which are not subject to Reg. 13 of MARPOL, Annex VI are not to be taken into account.

2.3.3 Fossil fuel pre-treatment (e.g. water emulsion), or water injection into combustion chamber, or scavenging air, or combination of these

Where fossil fuel pre-treatment (e.g. water emulsion), or water injection into the combustion chamber, or scavenging air, or a combination of these is partially used on board, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{FT} / S P_{TOT}$

where

P_{FT} = Nominal power of each user of GTL fuel [kW]

P_{TOT} = Nominal power of each user irrespective of the fuel utilised [kW]

Diesel engines which are not subject to Reg. 13 of MARPOL, Annex VI are not to be taken into account.

2.3.4 Dual-fuel engines running with LNG

The fuel used on board is to be LNG or CNG (gasoil only used as a backup in an emergency).

Diesel engines which are not subject to Reg.13 of MARPOL, Annex VI are not to be taken into account.

Depending on the installation, a weighted index may be necessary.

2.3.5 Exhaust gas treatment

Each diesel engine subject to Reg. 13 of MARPOL, Annex VI is to be fitted with an exhaust gas treatment system which abates not less than 85% of the total generated NOx and which does not increase total fuel consumption at the engine maximum continuous rating by more than an average of 2%.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

Depending on installation, a weighted index may be necessary.

2.3.6 NOx emissions monitoring and recording

The yacht is to be fitted with a system for monitoring and recording the NOx emissions from diesel engines and boilers.

Diesel engines, which are not subject to Reg.13 of MARPOL, Annex VI are not to be taken into account.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

2.3.7 Electronic Record Book of Engine Parameters

IIn order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Record Book of Engine Parameters as required by NOX Technical Code, paragraph 6.2.2.7, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

2.3.8 Electronic tier and on/off status of marine diesel engines Record Book

In order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Record Book of tier and on/off status of marine diesel engines, as required by MARPOL Annex VI, regulation 13.5.3, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

2.4 Sulphur Oxides

2.4.1 SOx limits (0,1 %)

The sulphur content of any fuel oil used on board yachts is not to exceed 0,1 % by mass.

2.4.2 Gas to liquids (GTL) fuels

Where GTL fuels are partially or totally used on board, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S\ P_{GTL} / S\ P_{TOT}$

where

P_{GTL} = nominal power of each user of GTL fuel [kW]]

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW]

2.4.3 Blending fossil fuel with second-generation bio-fuels

Where partial or total use is made on board of blending (of fossil fuel with second generation bio-fuels), ensuring a sulphur content not exceeding 1,5% by mass, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S\ P_{sgbf} / S\ P_{TOT}$

where

P_{sgbf} = nominal power of each user of blending [kW]

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW].

2.4.4 Dual-fuel engines running with LNG or CNG

The fuel used on board is to be LNG or CNG (gasoil only used as a backup in emergency).

Diesel engines which are not subject to Reg.13 of MARPOL Annex VI are not to be taken into account.

Depending on installation, a weighted index may be necessary.

2.4.5 Exhaust gas treatment

Each diesel engine subject to Reg. 13 of MARPOL Annex VI is to be fitted with an exhaust gas treatment system which abates not less than 85% of the total generated SOx and which does not increase total fuel consumption at the engine maximum continuous rating by more than an average of 2%.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

Depending on the installation, a weighted index may be necessary.

2.4.6 SOx emissions monitoring and recording

The yacht is to be fitted with system for monitoring and recording the SOx emissions from diesel engines and boilers.

Diesel engines, which are not subject to Regulation 13 of MARPOL, Annex VI, are not to be taken into account.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

2.4.7 Electronic Fuel Oil Changeover Record Book

IIn order to avoid any data oversight due to manual input errors and to increase data integrity and accuracy, the Electronic Fuel Oil Changeover Record Book as required by MARPOL Annex VI, regulation 14.6, is to be replaced by an electronic record book. An anti-tampering mechanism is to be implemented in the system and each action is to be confirmed by a signature based on user's credentials and biometric details (i.e. fingerprint). The system is to be approved by Flag Administration.

The electronic record book is to be in compliance with Resolution MEPC.312(74) Guidelines for the use of electronic record books under MARPOL.

2.5 Particulates

2.5.1 Gas to liquids (GTL) fuels

Where partial or total use is made on board of GTL fuels, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{GTL} / S P_{TOT}$

where:

P_{GTL} = nominal power of each user of GTL fuel [kW]

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW].

Diesel engines, which are not subject to Reg.13 of MARPOL, Annex VI are not to be taken into account.

2.5.2 Fuel treatment

Where fossil fuel pre-treatment (e.g. water emulsion), or water injection into the combustion chamber, or scavenging air, or blending of pre-treated fossil fuel with second-generation bio-fuels or a combination of these is partially used on board, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{FT} / S P_{TOT}$

where:

P_{FT} = nominal power of each user of fuel treatment [kW]

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW].

Diesel engines, which are not subject to Regulation 13 of MARPOL, Annex VI are not to be taken into account.

2.5.3 Lower PM emission achieved by modifications of prime movers (e.g. common rail) that do not increase other pollutants and GHGs emissions

Where modification of prime movers is carried out, to achieve lower PM emission without increasing other pollutant and GHG emissions, only partially, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{mpm} / S P_{TOT}$

where:

P_{mpm} = nominal power of modified prime movers [kW]

P_{TOT} = nominal power of each prime mover independently if modified or not [kW].

Diesel engines, which are not subject to Regulation 13 of MARPOL, Annex VI are not to be taken into account.

2.5.4 Dual-fuel engines running with LNG

The fuel used on board is to be LNG (gasoil only used as a backup in an emergency).

Diesel engines, which are not subject to Regulation 13 of MARPOL, Annex VI are not to be taken into account.

Depending on installation a weighted index may be necessary.

2.5.5 Exhaust gas treatment

Each diesel engine subject to Reg. 13 of MARPOL Annex VI is to be fitted with an exhaust gas treatment system which abates not less than 85% of the total generated PM and which does not increase total fuel consumption at the engine maximum continuous rating by more than an average of 2%.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

Depending on installation a weighted index may be necessary.

2.6 Carbon Dioxide (CO_2)

2.6.1 Gas to liquids (GTL) fuels

Where partial or total use is made on board of GTL fuels for CO_2 reduction, the environmental index in Sec 1, Tab 2 is weighted multiplying by R, defined as follows:

$R = S P_{GTL} / S P_{TOT}$

where:

P_{GTL} = nominal power of each user of GTL fuel [kW]

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW].

Diesel engines, which are not subject to Regulation 13 of MARPOL, Annex VI are not to be taken into account.

2.6.2 Blending fossil fuel with second-generation bio-fuels

Where partial or total use is made on board of blending (of fossil fuel and second generation bio-fuels) for CO_2 reduction, the environmental index in Table 2 is weighted multiplying by R, defined as follows:

$R = S\ P_{sgbf} / S\ P_{TOT}$

where:

Psgbf = nominal power of each user of blending [kW].

P_{TOT} = nominal power of each user irrespective of the fuel utilised [kW].

2.6.3 Dual-fuel engines running with LNG or CNG

The fuel used on board is to be LNG or CNG (gas oil only used as a backup in an emergency).

Diesel engines which are not subject to Reg.13 of MARPOL Annex VI are not to be taken into account.

Depending on the installation, a weighted index may be necessary.

2.6.4 CO_2 emissions monitoring and recording

The yacht is to be fitted with a system for monitoring and recording the CO_2 emissions from diesel engines and boilers.

Diesel engines which are not subject to Reg.13 of MARPOL Annex VI, are not to be taken into account.

The system is to be acceptable to Tasneef in compliance with [8] of this Section as applicable.

2.6.5 Energy Efficiency Design Index (EEDI)

The yacht is to be provided with an index measuring yacht's CO2 efficiency at the design stage, expressed in the form of CO2 emitted per unit of transport work ("attained EEDI").

Taking into account the need to substantiate all data used in the EEDI formula, these requirements are mainly applicable to new buildings.

The "attained EEDI" is to be not greater than a "required EEDI" as described in Table 1, Regulation 21 of Resolution MEPC.203(62).

The "attained EEDI" is to be calculated according to the "2018 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships" as per Resolution MEPC.308(73) as amended.

The "required EEDI" is to be calculated according to Regulation 21 of Marpol Annex VI.

Reference lines to be used for the calculation of the "required EEDI" are those contained in in Table 2, Regulation 21 of Marpol Annex VI.

The "attained EEDI" is to be calculated only for the types of yachts which fall into one or more of the categories in Marpol Annex VI.

2.7 Noise

2.7.1 Noise level assessment and implementation of noise mitigation measures

An underwater noise assessment is to be carried out identifying the appropriate measures to minimize impact and disturbance to marine species in general.

The measures may affect:

- propeller design and propulsion system for example reducing cavitation and/ or turbulence in the wake field
- hull form optimization for example reducing hull resistance.

Countermeasures are to be adopted for mitigating noise levels identified as significant.

Noise measurements assessing the effectiveness of the implemented measures are to be carried out annually.

The ambient and underwater noise measurements are to be conducted in accordance with international standards.

The noise assessment and the measurements are to be submitted to the Society for information.

Score will be automatically recognized to yachts with the additional class notation **DOLPHIN YACHT**.

2.8 Yacht materials and building procedures

2.8.1

a) Eco-compatible and recyclable materials

The lining (e.g. deck covering), composite bulkheads and furniture used in yacht building are to be made of materials having low impact on forest depletion (e.g. use of synthetic wood) and capable of being recycled.

b) For the hull structure, a minimum score equal to 4 may be assigned when the structure is made with timber coming from sustainably managed forests and for which the relevant weight is equal to at least 30% of the total weight of the structures.

When the percentage of wood coming from sustainably managed forests is greater than 30%, the relevant score is to be calculated in a proportional manner with respect to the minimum value equal to 30%, with a maximum value not greater than 8.

Similarly, a minimum score equal to 3 may be assigned to the rigging (furniture, linings, ceilings, etc.) when the weight percentage of wood coming from sustainably managed forests is equal to at least 40% of the total rigging weight.

When the percentage of wood coming from sustainably managed forests is greater than 40%, the relevant score is to be calculated in a proportional manner with respect to the minimum value equal to 40%, with a maximum value not greater than 7.

The total score will be assigned as the sum of the two partial scores above.

The relevant quality monitoring system has to be found acceptable by a Tasneef Recognised Organisation. In this way, the procedures adopted by the Wood Forever Pact for their members are considered satisfactory by Tasneef.

2.8.2 Low emission manufacturing processes of fibreglass structures or metallic hull and structure

The yacht's hull and superstructures are built with metallic material or its building process is to be assessed and recognised capable of limiting the emission in the atmosphere of Volatile Organic Compounds (VOCs) (e.g. infusion moulding processes which cut styrene emissions, resulting from gel coating and lamination, acetone or some other solvent used during clean-up).

2.8.3 Low VOC emission painting processes

The yacht painting processes are to be assessed and recognised capable of limiting the emission in the atmosphere of VOCs.

2.9 Operative consumption

2.9.1

The value of the operative consumption is to be calculated as below indicated:

2.10 Yacht at scrap

2.10.1 HK Inventory of hazardous Material

The yacht is to comply with the requirements of Pt F, Ch.7, Sec 4, [2.7] of the Rules for the Classification of Ships and is to be provided with a Green Passport Plus.

The HK Inventory of hazardous Material is to be developed according to IMO Resolution MEPC.269(68) - 2015 Guidelines for the development of the inventory of hazardous materials.

In application of the requirements of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009, the Green Passport Plus provides detailed information with regard to potentially hazardous materials utilized in the construction of the yacht, its equipment and systems.

This document accompanies the yacht throughout its operating life and incorporates all relevant design and equipment changes, with the final Owner delivering the document, with the yacht, to the recycling facility.

2.10.2 EU Inventory of hazardous Material

The value of the operative consumption is to be calculated as below indicated:

$$Q = 0,001 \sum c_i P_i$$

where:

Q is the operative consumption for 1 hour at the speed corresponding to the maximum continuous rating, in kg; for yachts with high powered engines designed for short sprint speeds, on a case by case basis Tasneef may accept the use of the yacht's cruising speed instead of the speed at the maximum continuous rating.

c_i is the specific consumption rate of each engine in g/kWh installed on board for propulsion and electric generation

P_i is the power in kW/h of each engine installed on board for propulsion and electric generation.

If Q is 600 kg 1 point may be assigned, if Q is 200 kg or less 30 points may be assigned, in between the number of point assignable may be calculated by interpolation.

3 Procedures

3.1

3.1.1

The Yacht Environmental Management Plan, is to include procedures covering the following:

- oily waste management including discharge criteria;
- preparation, filling in and maintenance of the oil record book;
- periodical calibration of the oil content meters, when required by the Manufacturer's instructions or, in the absence of specific indications, at least every six months; documentation is to be kept on board for examination during periodical surveys;
- periodical cleaning of the oil bilge water retention tank, bilge holding tank and of the sludge tank;
- spillage during bunkering;
- preparation, filling in and maintenance of the cargo record book (for yachts carrying noxious liquid sub- stances in bulk);
- sewage management including discharge criteria and use of holding tanks in port and no discharge areas;
- preparation, filling in and maintenance of the sewage record book;
- disposal of sewage treatment plant residues. If the yacht is not in a condition to dispose at sea of sewage treatment plant residues in accordance with international or national regulations, such residues are to be disposed ashore or by incineration;
- grey water discharge criteria and use of holding tanks in ports and in no discharge areas;
- garbage management and waste recycling;
- procedures to be followed to minimise the risk of depleting the refrigerant or the refrigerant vapours in all operative and emergency conditions;
- corrective actions in the event the annual refrigerant leakage exceeds 10%;
- preparing, filling in and updating the refrigerant log- book. The leakage is to be documented by consumption figures recorded in a refrigerant log-book to be kept on board and made available during periodical surveys;
- the procedures required by MARPOL 73/78 as amended or the reference to the company document containing them.

The lube oil consumption of all systems having an oil to sea interface, such as main and auxiliary engines cooled by sea water, controlled pitch propellers, sterntubes, bow and stern thrusters, stabilisers, PODs etc, is to be recorded at least once a week in an "Oil Systems record book" aimed at detecting, through unusually high consumption, oil leakage through sealings.

The log-book is to contain the list of all systems concerned, the consumption of each system recorded at least every week and corrective actions when carried out.

Chapter 4

COMF (Y) AND COMF (LY)

SECTION 1 COMFORT YACHT ON BOARD (COMF (Y))

1 General

1.1

1.1.1
The application of the requirements of this Section aims at the assessment and improvement of passenger and crew comfort on board yachts classed by Tasneef as defined in Pt A, Ch 1, Sec 2, [6.4.1].

1.2

1.2.1
The criteria considered for the assessment of personal comfort are based on the evaluation of airborne noise and structural vibration levels during normal navigation. These requirements do not consider the effects of yacht motions.

1.3

1.3.1
The requirements of this Section are based on the most recent international standards and requirements relevant to the measurement and control of noise and vibration, in particular the standards issued by ISO.

1.4

1.4.1
Compliance with these requirements is verified by means of measurements to be carried out on board in the conditions and locations indicated.

1.5

1.5.1
Measurements are to be carried out either by a Tasneef Surveyor or by a technician from a company recognised by Tasneef. In the latter case, measurements are to be carried out under surveillance of a Tasneef Surveyor.

1.6

1.6.1
These requirements define the limits and criteria of acceptability of noise and vibration levels on board. They indicate the international reference standards, the procedure and the instrumentation necessary to carry out measurements.

2 Field of application and special notation

2.1 Field of application

2.1.1
This Section apply to yachts classed in compliance with these Rules.

2.1.2
The requirements of this Section apply to spaces in the passenger and crew living and transfer areas. They do not apply to machinery spaces.

2.2 Additional class notation

2.2.1

COMF (Y) notation is assigned, in accordance with Pt A, Ch 1, Sec 2, [6.4] to yachts compying with the requirements of this Sec 3.

The notation is completed by the noise and vibration parameters of merit X and Y, respectively. They are calculated, according to the provisions in [4], on the basis of the average results of measurements in relation to the bounds given in Tables 1 and 2, respectively, for noise and vibrations.

2.2.2

The additional class notation is assigned if both of the parameters of merit are larger than 30.

2.2.3

In order to maintain the additional class notation, whenever the yacht is subject to repairs, modifications or refitting which, at the discretion of Tasneef, can affect its comfort characteristics, compliance with these Rules is to be confirmed.

2.2.4

On the occasion of class renewal surveys, the maintenance of comfort characteristics may be subject to verification at the discretion of Tasneef.

3 Definitions

3.1 Yachts

3.1.1 Displacement yacht

A yacht that is supported by the buoyancy of the water it displaces. In general, for the purposes of these requirements, a displacement vessel is a yacht having $V / L^{0,5} £ 4$

where:

V : maximum design speed, in knots, of the vessel at full load displacement

L : length, in metres, on the full load waterline.

3.1.2 Semi-planing yacht

A yacht that is supported partially by the buoyancy of the water it displaces and partially by the dynamic pressure generated by the bottom surface running over the water.

3.1.3 Planing yacht

A yacht in which the dynamic lift generated by the bottom surface running over the water supports the total weight of the vessel.

3.2 Public spaces

3.2.1 All passenger living areas including saloons, recreation rooms, dining rooms, game rooms and similar spaces.

3.3 Operation compartment

3.3.1

All operation areas to which the passengers can have access including wheelhouse, galley and similar spaces.

3.3.2 Wheelhouse

The enclosed area from which navigation and control of the yacht is exercised.

3.3.3 Galley

The enclosed operation space close to the dining area with kitchen and cooking features.

3.4 Noise

3.4.1 Audible sound wave level, generally of a random nature, in the 20 to 18000 Hz frequency range.

3.5 Noise level (or A-weighted sound pressure level)

3.5.1 The quantity measured by a sound level meter in which the response in frequency is considered according to the A-weighting curve (cf. publication IEC 651).

3.6 Sound pressure level

3.6.1 Measure of noise level L, in dB units, given by:

$$L = 20 \cdot \log_{10} \frac{p}{p_0}$$

where:

p : effective value (rms) of the measured sound pressure, in Pa

p_0 : 20×10^{-6} Pa (reference level).

3.7 Vibration

3.7.1 Time variation of the value of a physical quantity described by either the motion or the position of a mechanical system when this value is alternatively larger or smaller than a mean reference value.

As far as these requirements are concerned, the physical quantity is the structural velocity, measured in mm/s, in the frequency range from 1 to 100 Hz.

4 Criteria

4.1 Measurement conditions

4.1.1 Measurements are to be carried out both during navigation and with the yacht at berth.

4.2 Navigation - Transit conditions

4.2.1 Measurements are to be carried out with the yacht under full load conditions. Different conditions may be considered if accepted as equivalent for the purposes of these requirements at the discretion of Tasneef.

4.2.2 Measurements are to be carried out at the normal cruising speed of the yacht with propulsion plants working at the normal service speed.

4.2.3 During measurements, all auxiliary systems, navigational equipment, radio systems and radars etc are to be operating in normal service conditions.

4.2.4 Forced ventilation and air conditioning systems (HVAC plants) are to be operating in normal service conditions.

4.2.5 Whenever possible, doors and windows are to be closed.

4.2.6 Rooms and spaces are to be completely furnished and fitted.

4.2.7

In open spaces in the aft area in order to compensate the noise generated from the wake, additional measurements can be taken with:

- the vessel at 0 speed and
- the main engines operating at minimum and
- all others necessary equipment running for transit condition,

the minimum sound pressure level between the value at 0 speed and in cruising condition is to be taken into account in the calculation of the merit parameter.

4.3 Navigation - environmental conditions

4.3.1 Water depth is to be sufficiently high so that the measurements are not affected by reflections on the seabed.

4.3.2 Meteorological conditions are generally to be within the following limits:

- wind: non stronger than Beaufort 3 - strong breeze (speed 7 to 10 knots),
- waves: non stronger than force 3 - rough (significant wave height 0,5 to 1,25 m).

4.4 At berth trials

4.4.1 Measurements are to be carried out under full load conditions. Different conditions may be considered if accepted as equivalent for the purposes of these requirements at the discretion of Tasneef.

4.4.2 During measurements, all auxiliary systems, navigational equipment, radio systems and radars etc are to be operating in normal service conditions.

4.4.3 Forced ventilation and air conditioning systems (HVAC plants) are to be operating in normal service conditions at berth.

4.4.4 Whenever possible, doors and windows are to be closed.

4.4.5 Rooms and spaces are to be completely furnished and fitted.

4.5 Noise

4.5.1 Measurement positions

Measurements at berth are to be carried out in the wheelhouse and in all living or transit passenger areas according to the indications in Tab 1.

Measurements during navigation are be carried out in all the locations considered for the yacht at berth, with the exception for semi-planning or planning yachts, of open public spaces and of passenger cabins, for which no measurements are foreseen during navigation (see Tab 1).

Measuring positions are to be uniformly distributed according to the indications provided in [5.1.3]; their number and location are to be previously agreed with Tasneef.

At the discretion of Tasneef, additional measurements are to be carried out in particular locations within the measurement area.

4.5.2 Bounds

Noise levels are to be measured in dB units with A-weighting filter, [dB(A)]. For each space typology, bounds for the calculation of the noise merit parameter, X, are given in Table 1.

4.5.3 Acceptance criteria

In general, in each measurement point the noise level is not to exceed the upper bound, L_{max}, given in Table 1. At the discretion of Tasneef, higher values may be accepted provided they are localised and limited to no more than 5% of the total number of measuring positions.

4.5.4 Noise merit parameter

For the purposes of these requirements, the noise merit parameter, X, defined in [1.1.2], is calculated by the following procedure:

a) for each measurement point, the noise merit coefficient, Cmr, is calculated by linear interpolation as follows:

$$Cmr = 0 \qquad \text{if} \quad (L_{mis} > L_{max})$$

$$Cmr = \left(1 - \frac{L_{mis} - L_{min}}{L_{max} - L_{min}}\right) \qquad \text{if} \quad (L_{mis} \leq L_{max})$$

where:

L_{mis} : recorded noise level

L_{min} : lower bound for the noise level (Table 1)

L_{max} : upper bound for the noise level (Table 1).

b) the noise merit parameter, X, is the average value of the merit coefficients, Cmr, times 100.

4.6 Airborne noise insulation index

4.6.1 For yacht having length overall larger than 24 m, the walls of the passenger cabins are to comply with the following airborne noise insulation limits, (Ia) as per ISO 717 and ISO 140:

- walls between two passenger cabins or between a passenger cabin and a room not containing machinery or auxiliaries: Ia = 30 dB,
- walls between a passenger cabin and a room containing either machinery or auxiliaries: Ia = 45 dB.

In special cases different limits may be established at the discretion of Tasneef.

4.6.2 The noise insulation characteristics of the walls are to be verified on board and in accordance with the ISO standards mentioned in [4.6.1].

4.7 Vibrations

4.7.1 Measurement positions

Measurements in navigation and at berth are to be carried out in operative compartments and in all passengers living or transit areas as specified in Table 2.

In navigation, measurements are to be carried out in all locations considered for the yacht at berth, with the exception, for non-displacement yacht, of open public spaces and passenger cabins, for which no measurements are foreseen in navigation (see Tab 2).

Measuring positions are to be uniformly distributed according to the indications provided in [5.2.3]; their number and location are to be previously agreed with Tasneef.

At the discretion of Tasneef, additional measurements are to be carried out in particular locations within the measurement area.

4.7.2 Bounds

The vibration level is equal to the peak structural velocity, measured in mm/s, recorded in the frequency range from 0 to 100 Hz, as per ISO 6954. For each space typology, bounds for the calculation of the vibration merit parameter, Y, are given in Table 2.

4.7.3 Acceptance criteria

In general, in each measurement point the vibration level is not to exceed the upper bound, $V_{max,}$ given in Table 2. At the discretion of Tasneef, higher values may be accepted provided they are localised and limited to no more than 5% of the total number of measuring positions.

4.7.4 Vibration merit parameter

For the purposes of these requirements, the noise merit parameter, Y, defined in [1.1.2], is calculated by the following procedure:

a) for each measurement point, the vibration merit coefficient, Cmv, is calculated by linear interpolation as follows:

$$Cmv = 0 \qquad \text{if} \quad (V_{mis} > V_{max})$$

$$Cmv = \left(1 - \frac{V_{mis} - V_{min}}{V_{max} - V_{min}}\right) \qquad \text{if} \quad (V_{mis} \leq V_{max})$$

$$Cmv = 1 \qquad \text{if} \quad (V_{mis} < V_{min})$$

where:

V_{mis} : recorded noise level

V_{min} : lower bound for the vibration level (Table 2)

V_{max} : upper bound for the vibration level (Table 2).

b) the vibration merit parameter, Y, is the average value of the merit coefficients, Cmv, times 100.

5 Measurement procedure

5.1 Noise

5.1.1 Initial conditions

The following data and conditions are to be recorded and included in the report:

- yacht loading condition;
- test conditions (navigation/at berth);
- propulsion machinery, main auxiliaries, navigational aids, radio and radar sets;
- door and window status (open or closed);
- water depth;
- environmental conditions (wind and waves);
- noise sources due to external factors such as presence of additional personnel, ongoing repair or fitting work, etc.

5.1.2 Instrumentation

Noise level measurements are to be carried out by means of precision grade sound level meters. These sound level meters are to comply with either IEC 651 type 1 requirements or a standard accepted as equivalent by Tasneef.

A suitable acoustic calibrator, approved by the producer of the sound level meter, is to be used.

When an octave band filter is used, jointly or separately from a sound level meter, it is to comply with either IEC 225 or a standard accepted as equivalent by Tasneef.

Microphones are to be of the random incidence type and are to comply with either IEC 179 class 1 or a standard accepted as equivalent by Tasneef.

Both the instrumentation for noise level measurement and the acoustic calibrator are to be properly calibrated according to a recognised standard.

5.1.3 Measurements

Noise levels are to be recorded in dB using the A-weighting filter [dB(A).

The sound level meter is to be set for slow response and calibrated with an acoustic calibrator before and after the measurement campaign.

Measurements are to be carried out keeping the microphone approximately 1,5 m from the floor and at least 1,0 m from the walls.

The distance between two measuring positions is generally to be between 2,0 and 4,0 m. At least two measurement positions are to be considered in each space.

When carrying out measurements in open spaces, a suitable wind screen is to be used to protect the microphone against the action of the wind. The effect of this wind screen when used in the absence of wind is to be such that the difference between the measured noise level with and without the wind screen is less than 0,5 dB.

5.1.4 Reporting of results

Results are to be submitted in a report which includes:

- the main characteristics of the yacht and of the measurement instrumentation;
- the noise measurement plan;
- a summary table showing, for each measurement carried out either in navigation or at berth, the recorded noise levels and the corresponding noise merit coefficient, Cmr;
- the noise merit parameter, X;

5.2 Vibrations

5.2.1 Initial conditions

The following data and conditions are to be recorded and included in the report:

- yacht loading condition;
- test conditions (navigation/at berth);
- propulsion machinery, main auxiliaries, navigational aids, radio and radar sets;
- door and windows status (open or closed);
- water depth;
- environmental conditions (wind and waves);
- vibrations sources due to external factors such as ongoing repair or fitting work.

5.2.2 Instrumentation

Vibration levels are to be recorded by means of a portable analyser (vibrometer).

Accelerometers are to be able to properly operate in the frequency range of investigations, namely 0 to 100 Hz, according to ISO 6954.

A suitable calibrator, recommended by the producer of the vibrometer, is to be used.

Both the instruments for vibration recording and the calibrator are to be calibrated according to a recognised standard.

5.2.3 Measurements

Vibration levels measurements are to be carried out recording the spectral peak of structural velocity, in mm/s, in the frequency range from 0 to 100 Hz, by means of a portable analyser connected to an accelerometer.

The accelerometer is to be in contact with the floor of the room and is to be in a vertical position. Contact with the floor is, in general, realised by means of a magnet to which the accelerometer is fixed. In the presence of carpets or other material which could dump vibrations, the accelerometer is to be fixed to a metallic plate placed above the measuring point.

The distance between two measuring positions is generally to be between 2,0 and 4,0 m. At least two measurement positions are to be considered in each space.

5.2.4 Reporting of results

Results are to be submitted in a report which includes, in addition to the details specified under [5.1.4], the following:

- for each vibration measuring point, the spectrum of the structural velocity in the frequency range of investigation as produced by the portable analyser complete with an indication of the frequency and value of main peaks;
- a summary table showing the recorded frequency and maximum spectral value (vibration level) in each measuring point and the corresponding vibration merit coefficient, Cmv;
- the vibration merit parameter, Y.

Table 1 : Noise limits

LOCAL	YACHT	Navigation		At berth	
		L_{min} [dB(A)]	L_{max} [dB(A)]	L_{min} [dB(A)]	L_{max} [dB(A)]
Operation compartment	All	55	65	40	50
Public spaces (closed)	All	60	75	40	50
Public spaces (open recreational areas)	Semi-planning or planning	-	-	50	60
	Displacing	65	75	50	60
Passengers' cabins	Semi-planning or planning	-	-	40	50
	Displacing	50	60	40	50

Table 2 : Vibration limits

LOCAL	YACHT	Navigation		At berth	
		V_{min} [mm/s]	V_{max} [mm/s]	V_{min} [mm/s]	V_{max} [mm/s]
Operation compartment	All	2	5	2	4
Public spaces (closed)	All	2	5	1	3
Public spaces (open recreational areas)	Semi-planning or planning	-	-	2	4
	Displacing	2	5	2	4
Passengers' cabins	Semi-planning or planning	-	-	1	3
	Displacing	1	4	1	3

SECTION 2 COMFORT LARGE YACHT (COMF (LY))

1 General

1.1 Scope

1.1.1

The application of the requirements of this Section aims at the assessment and improvement of guest and crew comfort on board yachts classed by Tasneef as defined in Pt A, Ch 1, Sec 2, [6.4.2].

1.2 Basic principles

1.2.1

These Rules define limits of acceptability of noise and vibration on board, methods for verification of compliance and criteria for acceptance. They are based, as appropriate, on international standards and are deemed to preserve the general principles of such standards.

Verification of compliance is based on the measurements of noise and vibration levels in ship spaces. These measurements are to be carried out either by a Surveyor of the Society or by a technician from a company recognised as qualified by the Society. In the latter case, measurements are to be performed under the surveillance of a Surveyor of the Society.

1.3 Class notation

1.3.1

The class notations described in [1.3] provide standards for noise and vibration levels in different spaces at the time of delivery and during the ship's life if substantial changes to the machinery installation, structures or interior arrangements are made.

The **COMF LY PAX** (guest spaces), **COMF LY CREW** (crew spaces) and **COMF LY PACR** (guest and crew spaces) notations are optional and are primarily intended to apply to large yacht with Lpp > 40 m (length between perpendiculars). If requested, however, any ship can be assessed for compliance, using these requirements as basis for the assessment and for the issue of a Tasneef Certificate of Compliance.

The **COMF LY PAX** notation indicates that the guest accommodation meets the acceptance criteria whilst the **COMF LY CREW** notation indicates that the crew accommodation and work areas meet the acceptance criteria. The **COMF LY PACR** notation indicates that the guest and crew spaces both meet the acceptance criteria.

For ships which achieve the noise and vibration comfort standards specified in these Rules, the notation **COMF LY PAX**, **COMF LY CREW** or **COMF LY PACR** will be assigned.

In the event that the ship undergoes modifications, refitting or repairs that may affect her level of comfort, maintaining the notation is subjected to the results of new measurements as deemed appropriate by Tasneef.

The notation is completed by a letter A or B, which represents the merit level achieved for the assignment of the notation; merit A corresponding to the lowest level of noise and vibration.

In the case of **COMF LY PACR** notation, two letters will be assigned. The first will indicate the acceptance criteria for guest accommodation, whilst the second will indicate the crew comfort criteria.

2 Definitions

2.1 Categories of spaces

2.1.1 General

For the purposes of this Section, a specific, comfort-related categorisation of the yacht spaces is used. Special consideration may be made for particular spaces where agreed between the Owner, Builder and Tasneef.

2.1.2 Guest spaces

Guest spaces are defined as all areas intended for guest use, and include the following:

a) owner and guests cabins

b) public spaces (e.g. lounges, reading and games rooms, gymnasiums, saloons, dining areas)

c) open deck recreation areas (e.g. aft cockpit, beach areas, dining areas, lounges, pool areas, sun areas).

2.1.3 Crew spaces

Crew spaces are defined according to Resolution MSC. 337. Such spaces are defined as all areas intended for crew use only, and include the following:

a) accommodation spaces (e.g. cabins, offices, mess rooms, recreation rooms)

b) work spaces

c) navigation spaces.

2.2 Ship operating condition

2.2.1 Loading conditions

As far as practicable the ship load is to be with a displacement and trim as close as possible to a normal operating condition.

2.2.2 Environmental condition

Measurements are to be taken in a depth of water not less than five times the draught of the ship to avoid the noise reflections on the sea bed; for other appropriate water depth is to be agreed with Tasneef prior to the trials.

Trials are to be carried out in sea conditions not greater than sea state 2 on the WMO sea state code (significant height 0,1 to 0,5 m). In addition, noise measurements should not be taken when the wind force exceeds 2 on the Beaufort scale - strong breeze (speed 4 to 6 knots). If agreed between the shipyard and the owner Tasneef could accept worst sea conditions.

2.2.3 Equipment running during the tests

During measurements, all auxiliary systems, navigational equipment, radio systems and radars etc. are to be operating in normal service conditions.

Auxiliary machinery essential for the yacht's operating conditions together with HVAC systems are to be running in manual mode at minimum fan speed (speed 2 on 5 or 3 on 10).

Combinations of auxiliary machinery operation equipment may be necessary to be operating during measurements such as thrusters, stabilizing, fins etc., subject to the acceptance of the Society and to the agreement of the interested party.

With the above-mentioned equipment operating, special consideration may be given by the Society concerning the acceptable noise and vibration levels.

2.2.4 Navigation

During navigation noise and vibration measurements are to be carried out in two different conditions:

- contractual cruising speed of the yacht during Noise and Vibration Measurements with propulsion plants working at the normal service speed (defined as N&V Contractual Speed)
- quiet speed defined as a comfort velocity (maximum 11 knots if not specified in the specification) at which the yacht could navigate with all plants normally working (only for guest spaces)

If the quiet speed corresponds to the N&V Contractual Speed the Comfort Class Notation during Navigation will be assigned only to the quiet speed measurements compared with the quiet speed limits.

Controllable pitch, Z-drive, Voith-Schneider and Azipods are to be in normal seagoing position.

Rudder angle variation are to be limited to 2 degrees to each side of the neutral position and rudder movements are to be kept to a minimum throughout the measurement periods.

Where unavoidable, any barred condition within the range above set for investigating the trial operating condition may be excluded on agreement between Owner and Builder subject to approval by Tasneef.

2.2.5

In open spaces in order to compensate the noise generated from the wake, additional measurements can be taken with:

- the vessel at minimum speed and
- the main engines operating at minimum and
- all others necessary equipment running for navigation.

The minimum sound pressure level between the value at 0 speed and in contractual cruising condition or in quiet speed condition is to be taken into account.

2.2.6 At berth

The vessel at rest in open sea or harbor with anchor with the propulsion engines switched off and only the minimum number of necessary auxiliary systems running.

Stabilizer fins and/or Gyroscope should be operating at the normal condition.

Engine room ventilation is to be running in harbor mode.

Different conditions may be considered if accepted as equivalent for the purposes of these requirements at the discretion of Tasneef.

2.3 Noise

2.3.1

Noise is the audible sound pressure level (referenced to 20 microPascals), generally of a random nature, in the 20 to 20000 Hz frequency range.

For the purposes of this Section, A-weighted noise levels are considered, measured in dB (A) by a precision sound level meter with an accuracy grade of about ± 1 dB.

2.4 Sound index

2.4.1 Sound reduction index (R_w)

According to EN ISO 717-1:2021 and EN ISO 10140-2:2021, R_w is the laboratory measurement of the individual airborne sound insulation index of building elements.

2.4.2 Apparent sound reduction index

According to EN ISO 717-1:2021 and EN ISO 140- 4:2000, R'_w is the value of field measurements of total air-borne sound insulation index between adjacent spaces.

Field measurements should be performed according to ISO 140-4:2000. When the area of the division tested is < 10 m^2, the following formula should be used:

A = minimum (S; V/7,5)

Where:

A is the area of the division to be used for the calculation of R'w

S is the area of the division onboard

V is the volume, in m3, of the receiving room.

2.5 Impact sound index

2.5.1

According to EN ISO 717-2:2021 and EN ISO 140-7:1998, $L'_{n,w}$ is the value of field measurements of the impact sound index of floors and ceiling assemblies.

2.6 Vibration

2.6.1

A Vibration may be defined as the oscillation around a mean reference of the value of a physical quantity corresponding to either the motion or the position of a mechanical system.

As far as these Rules are concerned, the physical quantities to be considered are: in the frequency range from 1 to 80 Hz, the point structural acceleration measured in mm/s^2 r.m.s and the point structural velocity measured in mm/s r.m.s..

3 Noise

3.1 Assessment criteria

3.1.1
In case a space is occupied by both guest and crew, the more stringent of the relevant requirements applies, unless agreed between the Builder and Owner and advised to Tasneef.

3.2 Design requirements

3.2.1
Acceptance of noise insulation index for divisions, R'w, and impact sound index for floors, L'n,w, different from those specified in Table 1 and Table 2 may be considered for assignment of the applicable class notation where agreed between the Owner, Builder and Tasneef.

3.2.2 Noise insulation characteristics of divisions
For the purpose of the requirements of this Section, the noise insulation characteristic of the divisions formed by walls, ceilings and floors is represented by the R'_w, which is measured in dB.

Depending on the types of spaces separated by divisions (vertical and horizontal), the R'w is to be at least as given in Table 1.

The individual noise insulation characteristic (R_w) of cabin divisions is to be selected as appropriate. It is recommended that the R'_w of all surfaces be considered during design, e.g. when carrying out the noise prognosis [3.2.4].

3.2.3 Impact sound index characteristics of floor and ceiling combinations
For the purpose of the requirements of this Section, the impact sound insulation characteristic of a floor/ceiling combination is represented by the $L'_{n,w}$, which is measured in dB.

The impact sound index valuation is applied only to yacht with length overall larger than 60 m.

Depending on the types of floors above cabins, the minimum values of $L'_{n,w}$ are provided in Table 2.

For the purposes of Table 2:

- A soft floor is realized with carpet, moquette and similar.
- A hard floor is made of marble, tiles, wood, resins and similar.

3.2.4 Acoustic insulation plan
The acoustic insulation plan is a general arrangement plan of the spaces considered in this Section, where the following information are provided:

a) types of space according to the categories given in [2.1];

b) values of the noise insulation index (R_w) of cabin walls and floors;

c) values of the impact sound index ($L'_{n,w}$) of the divisions above cabins, if applicable;

d) any type of acoustic insulation, even if integrated with the fire and thermal insulation plan.

3.3 Guest accommodation and public spaces

3.3.1
Limits for the assessment of the noise comfort level are given in Table 3, Table 4 and Table 5, for each category of space.

For cabins adjacent to discotheques and similar entertainment areas, the deck and bulkhead sound insulation is to be sufficient to ensure that the maximum cabin noise levels are not exceeded even when high external noise levels prevail.

For each measured space, the time-space averaged noise level, LAeq, calculated according to [3.7.4] is compared with the limits in Table 3, Table 4 and Table 5.

Acoustic insulation of bulkheads and decks between guest spaces is to be generally in accordance with the values of the weighted apparent sound reduction index, R'w, as given in Table 1, calculated using ISO 717/1.

Acoustic insulation of floors between guest spaces is to be generally in accordance with the values of the impact sound index, L'n,w, as given in Table 2.

3.4 Crew accommodation and work area

3.4.1

Under the applicable test conditions specified in [3.7], the noise levels specified in Table 6 and Table 7 are not to be exceeded.

3.5 Construction requirements

3.5.1 Noise measurement plan

A plan is to be prepared describing the proposed noise measurement campaign.

The plan must include, for the various ship spaces: extension and classification, noise limit level with reference to the expected COMFORT level in compliance with [5.1.2] and proposed minimum number of measurements to be carried out in each ship space. The aim is to obtain a rational distribution of measurement points throughout the ship.

3.5.2 Noise measurement report

The report is to contain:

- position of measurement points
- measured noise levels according to [3.7]
- values of measurements of R'w and L'n,w,if applicable.
- resulting global comfort level according to [6].

Furthermore, the following general data are to be recorded and included in the report:

- ship loading condition
- propulsion machinery details
- estimated water depth
- estimated environmental conditions (wind and waves)
- presence of noise sources due to external factors such as additional personnel, ongoing repairs or fitting work, etc..

3.6 Documentation to be submitted

3.6.1 Measurement plan

The proposed measurement plan, developed according to [3.5.1], is to be submitted for information well in advance of the measurement campaign.

3.6.2 Noise measurement result

A duly signed detailed report is to be submitted for approval.

The noise measurement report is to be witnessed by a representative of the Builder, the Owner, a representative of the company which carried out the measurements and the Society's Surveyor in charge of surveillance of the measurements.

3.7 Noise level: testing conditions and acceptance criteria

3.7.1 Testing condition

Noise levels are to be measured according to ISO 2923 in the navigation and at berth conditions defined in [2.2].

Doors and windows are to be closed.

The rooms are to be fully equipped with furniture, furnishings, ceiling and actual deck covering (e.g. carpet, etc.). As noise arising from every kind of unnecessary human activity is to be avoided, in general only the personnel needed for carrying out the measurements are to be present.

The rooms are to be fully equipped with furniture, furnishings, ceiling and actual deck covering (e.g. carpet, etc.).

During measurements all guest entertainment systems are to be switched off.

Different conditions may be accepted as equivalent at the discretion of the Society.

3.7.2 Other equipment

In addition to [2.2.3], the following equipment is to be running if appropriate: waste treatment equipment and, only if agreed by Owner, Builder and Tasneef, swimming pool and Jacuzzi equipment.

With the above-mentioned equipment operating, special consideration may be given by the Society concerning the acceptable noise level as per [5.1.2].

Not necessary equipment such as hoods in galley and pantries and washing machines in laundries, should be switched off.

3.7.3 Measurement position

Measurements during navigation are to be carried out in the most representative spaces defined in [2.1] close to the potential noise sources (engine casing, ventilation trunk, HVAC station, machinery room, outlet fan, etc.) according to the following principles.

At the discretion of the Society, additional measurements are to be performed to establish the extent of area with excessive noise levels.

In the assessment of the noise distribution, for all types of enclosed spaces, only one point representative of an area of 50 m^2 will be considered.

If a noise level difference larger than 5 dB (A) exists in the same enclosed space, additional measurements in that space are to be considered.

When measuring noise levels close to intake and exhaust openings, the microphone should, where possible, not be placed within a 30° angle from the direction of the gas stream and not less than a distance of 1 m from the edge of the intake or exhaust opening of engines, ventilation, air conditioning and cooler systems, and, as far as possible, from reflecting surfaces according to ISO 2923.

Owner and Guest spaces:

a) Enclosed spaces

   More measurements are to be carried out in all such spaces with an extension larger than 100 m^2. One measuring point is to be placed (approximately) every 50 m^2 of area of the space under examination.

b) Open spaces

   Measurements are to be carried out in all such spaces.

   In open recreational spaces, if designed for a prolonged stay of guests, a measurement point is to be placed every 100 m^2. For other types of spaces a measurement point is to be placed every 200 m^2. If the open space can be closed by means of mobile elements, such space is to be considered an enclosed space and subject to the relevant requirements.

Crew and work spaces

Measurements are to be carried out as follows:

a) in one point of the wheelhouse

b) in four cabins positioned in the extremities of the crew area, two portside and two starboard side. In addition, the captain cabin has to be measured if positioned on a different deck. If one of the assessed cabins overcomes the limits all crew cabins have to be measured

c) in one point in manned workspaces.

   The microphone position is to be located at a height of between 1,2 m to 1,6 m from the deck, platform or walkway and at least 0,5 m form bulkheads and other reflecting surfaces.

3.7.4 Instrumentation

Noise level measurements are to be carried out by means of integrating-averaging sound precision level meters. These sound level meters are to comply with IEC 60942 (2003-01) class 1 or a standard accepted as equivalent by the Society.

This compliance is to be verified according to ISO/IEC 17025:2018 at least every two years by an organization recognized by the Society.

The date of last verification and confirmation of compliance with relevant IEC standards is to be recorded. Calibration certificates are to be provided.

3.7.5 Measurement procedure

Measurements are to be carried out to estimate the sound pressure levels LP by averaging the noise level during at least 15 s. If the sound is irregular with fluctuations exceeding ± 3 dB(A), the measuring time is to be extended to at least 30 s. The measured value is to be rounded to the nearest integer.

Noise levels are to be measured in dB (A) (referenced to 20 microPascals) units derived by means of the A-weighting curve.

The space averaged noise level, LAeq, representative of the COMFORT level of the space type is calculated on an energy basis according to the following equation:

- Large spaces, L_{Aeq_ave} is the average of the measured noise levels set for this space:

where:

$$L_{Aeq\_ave} = 10 \cdot Log_{10}\left(\frac{\sum_{i=1}^{N} 10^{\left(\frac{1}{10}L_{Aeq,i}\right)}}{N}\right)$$

$L_{Aeq,i}$: noise level of i-th point

N : number of measurements

3.8 Acoustic insulation characteristics

3.8.1 Testing condition

Measurements of the acoustic insulation properties are to be carried out in owner, guest and crew cabins according to the following indications. At the discretion of the Society, additional measurements are to be carried out in particular locations within the measurement area.

The noise insulation characteristics of division (R'_w) and the impact noise characteristics of floors and ceilings ($L'_{n,w}$) are to be measured with the yacht at berth only in cabin areas, once the installation of walls, floors, ceilings and furnishings is complete.

3.8.2 Measurement position

For each type of wall and deck division, measurements are to be taken for the cabin with the largest area separating surveyed spaces.

a) for each type of vertical and horizontal division, measurements are to be taken of acoustic insulation from airborne noise index $R'_{W,measured}$.

   $R'_{W,measured}$ values are to be compared with the limits in Tab 1.

b) for each kind of guest space [2.1.2], in particular for cabins located below decks covered with different type of floor, measurements are to be taken of the acoustic insulation from impact sound $L'_{n,W,measured}$, if applicable.

   Two types of floor are to be considered:

   - hard: marble, wood, tiles
   - soft: moquette, synthetic green, carpet.

For each kind of floor, measured values are to be compared with the limits in Table 2.

3.8.3 Measurement procedure

Measurements of acoustic insulation indexes from airborne noise and from impact noise are to be taken according to ISO Standards in [2.4] and [2.5].

4 Vibrations

4.1 Assessment criteria

4.1.1

Where a space is occupied by both guests and crew, the more stringent of the relevant requirements applies, unless agreed between the Builder and Owner and advised to Tasneef.

The limits apply to vibrations in the vertical, longitudinal and athwartship directions, to be assessed separately. Under test conditions specified in [4.4.1], the vibration level, defined by the application of the ISO 20283-5:2016 as specified in Table 8, should not be exceeded.

4.1.2 Guest accommodation and public spaces

Guest spaces are to comply with the overall vibration levels specified in Table 8.

4.1.3 Crew accommodation and work spaces

Crew spaces are to comply with the overall vibration levels specified in Table 8.

4.2 Construction requirements

4.2.1 Vibration measurement plan

A plan describing the proposed vibration measurement campaign, in compliance with [4.4.2], is to be developed.

The plan is to include the extent and classification of ship zones and the proposed minimum number of measurements to be taken in each ship space. The aim is to obtain a rational distribution of measurement points throughout the ship.

4.2.2 Vibration measurement report

A duly signed detailed report is to be submitted.

The report is to contain:

- position of measurement points
- measured vibration levels
- for each vibration measuring point, the spectrum of the structural velocity (in all three directions) in the frequency range of investigation together with an indication of the frequency and value of the main peaks
- resulting comfort level

The following general data and conditions are to be recorded and included in the report:

- ship loading condition
- propulsion machinery, main auxiliaries, navigational aids, radio and radar sets
- water depth
- environmental conditions (wind and waves).

4.3 Documentation to be submitted

4.3.1 Measurement plan

The proposed detailed measurement plan, developed according to [4.2.1], is to be submitted for approval well in advance of the measurement campaign.

4.3.2 Vibration measurement results

A duly signed detailed report is to be submitted for approval.

The vibration measurement report is to be witnessed by a representative of the Builder, the Owner, a representative of the company which carried out the measurements and the Surveyor in charge of surveillance of the measurements.

4.4 Measurement of vibration level

4.4.1 Testing condition

Vibration levels are to be measured in the navigating condition defined above in [2.2] with the ship proceeding ahead, at a constant speed on a straight course as far as possible, at the operational condition defined in [2.2.4] as N&V Contractual Speed.

If additional measurements are to be carried out at x% MCR, the different propulsion power with respect to CSR is subject to the acceptance of the Society and to the agreement of the Owner and shipyard.

Different conditions may be accepted as equivalent at the discretion of the Society.

4.4.2 Measurement position

Measurements are to be carried out in the spaces defined in [2.1] according to the general principles of ISO 4867-1984 and ISO 4868-1984. At the discretion of the Society, additional measurements are to be carried out where evidence of local vibration occurs.

4.5 Instrumentation

4.5.1

Vibration levels ($V_{measured}$) are to be recorded in the frequency domain (spectrum).

Instrumentation is to comply with the requirements of ISO 8041 for whole body vibration. This compliance is to be verified at least every two years by an organization recognised by the Society.

The date of last verification and confirmation of compliance with relevant standards is to be recorded. Calibration certificates are to be provided.

It is acceptable to use instruments manufactured in accordance with ISO 8041 that have frequency indications above 80 Hz provided that the filter characteristics comply with ISO 2631-2.

Different instrumentation settings will be considered by the Society on a case-by-case basis.

4.5.2 Measurement procedure

Vibration measurements are to be conducted in accordance with ISO 20283-5:2016.

The frequency range to be evaluated is 1 Hz to 80 Hz. The measurement duration shall be at least 1 min. If significant frequency components below 2 Hz are obvious or suspected, measurement duration of at least 2 min is recommended.

The result of each measurement shall be the overall frequency-weighted r.m.s. value as defined in ISO 2631-2. In the comfort level assessment, for each measurement position only the maximum vibration among the vertical, transversal or longitudinal components will be considered.

5 Acceptance criteria

5.1 Noise

5.1.1 Acoustic insulation characteristics acceptance criteria

For each floor or wall measured according to [2.5] and with reference to the characteristic value of R'_w in Table 1 and $L'_{n,w}$ in Table 2, the resulting comfort score is:

A if:

- Acoustic insulation of vertical division $R'_{W,measured}$ greater than or equal to R'_w at A score, and
- Acoustic insulation of horizontal division $R'_{W,measured}$ between guest cabin and enclosed spaces for guest recreation (e.g. discos, gymnasium floor), greater than or equal to R'_w at A score, and
- Impact noise $L'_{n,W,measured}$ lower than or equal to $L'_{n,w}$

B if:

- Acoustic insulation of vertical division $R'_{W,measured}$ greater than or equal to R'_w at B score, and
- Acoustic insulation of horizontal division $R'_{W,measured}$ between guest cabin and enclosed spaces for guest recreation (e.g. discos, stages gymnasium floor), greater than or equal to R'_w at B score.

5.1.2 Noise acceptance levels

Limits for the calculation of the noise comfort level in navigation and at berth are given in Table 3 to Table 7, for each category of space.

For crew spaces on all types of ships the Society may accept different values depending on the national requirements of the State whose flag the ship is flying, provided that such values are not higher than LB in Table 6 and Table 7.

For each measured space, the time-space averaged noise level, L_{Aeq}, calculated according to [3.7.5], is compared with the limit.

a) Comfort noise score: guest cabins and public spaces:

   Comfort noise score is A if:

   - all L_{Aeq} values are less than or equal to L_A, except for less than or equal to 20% of the total number of spaces of that type with L_{Aeq} values exceeding L_A less than or equal to L_B

   Comfort noise score is B if:

   - all L_{Aeq} values are less than or equal to L_B

b) Comfort noise score: crew spaces

   Comfort noise score is A if:

   - all L_{Aeq} values are less than or equal to L_A,

   Comfort noise score is B if:

   - all L_{Aeq} values are less than or equal to L_B.

5.2 Vibration

5.2.1 Acceptance vibration levels

For each type of space, limit values (Vlim) depending on the vibration comfort level are given in Table 8. Values of vibration levels above Vlim may be neglected provided that:

- they do not concern more than 10 % of the total area within the measurement space and they are below:
- $V_{measured}$ £ V_{lim} + 0,3 mm/s for crew and guest spaces
- $a_{measured}$ £ a_{lim} + 11 mm/s^2 for crew and guest spaces.

Each measured level according to [4.4], is compared with the limit and both for guest and crew spaces.

Comfort vibration score is A if:

- all $V_{measured}$ values are less than or equal to V_A,

Comfort vibration score is B if:

- all $V_{measured}$ values are less than or equal to V_B.

6 Global noise and vibration comfort level of the ship

6.1

6.1.1

The comfort level is rated on the basis of the actual rating reached by noise and vibration levels and acoustic insulation indexes.

For the purposes of these Rules, the global noise and vibration comfort level is assigned as follows.

6.2 COMF LY PAX

6.2.1

- **COMF LY PAX A**

  the notation applies to guest spaces if:

  - Noise levels are A score see [5.1.2]
  - Acoustic insulation indexes are A score see [5.1.1]
  - Vibration levels are A score see [5.2.1]
- **COMF LY PAX B**

  the notation applies to guest spaces if one of the following is B score (the others are to be A or B)

  - Noise levels see [5.1.2]
  - Acoustic insulation indexes see [5.1.1]
  - Vibration levels see [5.2.1].

In other conditions **COMF LY PAX** is not applicable.

6.3 COMF LY CREW

6.3.1

- **COMF LY CREW A**

  the notation applies to crew spaces if:

  - Noise levels are A score see [5.1.2]
  - Acoustic insulation indexes are A score see [5.1.1]
  - Vibration levels are A score see [5.2.1]
- **COMF LY CREW B**

  the notation applies to crew spaces if one of the following is B score (the others are to be A or B):

  - Noise levels see [5.1.2]
  - Acoustic insulation indexes see [5.1.1]
  - Vibration levels see [5.2.1].

In other conditions **COMF LY CREW** is not applicable.

6.4 COMF LY PACR

6.4.1

- **COMF LY PACR AA**

  the notation applies if:

  - guest spaces are A score, see [6.2]
  - crew spaces are A score, see [6.3]
- **COMF LY PACR AB**

  the notation applies:

  - guest spaces are A score, see [6.2]
  - crew spaces are B score, see [6.3]
- **COMF LY PACR BA**

the notation applies if:

- guest spaces are B score, see [6.2]
- crew spaces are A score, see [6.3]

- **COMF LY PACR BB**

  the notation applies:

  - guest spaces are B score, see [6.2]
  - crew spaces are B score, see [6.3]

In other conditions **COMF LY PACR** is not applicable.

Table 1 : Noise insulation characteristics of the divisions

Division between	R'_w (dB)	
	A score	B score
Guest cabins/cabin **(1)**	43	35
cabin/corridor	40	35
cabin/stairway	48	45
cabin/public spaces (exclud-ing corridors, stairway and discotheque)	53	48
cabin/galley	40	35
disco/cabin	65	55
cabin/machinery room	55	50
crew cabin/crew cabin	35	35
crew cabin to mess	35	30
crew cabin/corridor	33	27
(1) Except for Cabin suite / cabin with communicating door where the R'_w limits are reduced by 3 dB		

Table 2 : Impact noise insulation characteristics of floor

Floor above cabin	$L'_{n,w}$ (dB)
Soft floor	50
Hard floor	60
Dance floor, stages, gymnasium floor	45
Note 1: See [3.2.3] for floor type definition	

Table 3 : Noise limits levels in dB(A) - owner/guest spaces - navigation N&V cruising speed

Type of space	Navigation	
	L_A	L_B
Owner/Guest spaces		
Owner cabin	50	55
Guest cabins	53	60
Enclosed Public spaces	55	60
Open recreation areas main deck	75	79
Open recreation areas on deck above	65	70

Table 4 : Noise limits levels in dB(A) - owner/guest spaces - navigation quiet speed

Type of space	Navigation	
	L_A	L_B
Owner/Guest spaces		
Owner cabin	45 (1)	50
Guest cabins	48 (1)	53
Enclosed Public spaces	52 (1)	55
Open recreation areas main deck	65	75
Open recreation areas on deck above	60	65
(1) +2dB if the Owner/Guest space is positioned at Lower Deck near Engine Room (valid also for cabins with bathroom in between)		

Table 5 : Noise limits levels in dB(A) - guest spaces - At berth

Type of space	At berth	
	L_A	L_B
Owner/Guest spaces		
Owner cabin	40	50
Guest cabins	45	53
Enclosed Public spaces	50	55
Beach Area, aft	50	60
Open recreation areas main deck, aft	50	60
Open recreation areas on deck above, aft	50	60

Table 6 : Noise limits levels in dB(A) - crew spaces - navigation

Type of space	Navigation	
	L_A	L_B
Crew accommodation		
Owner cabin	55	60
Senior officer cabins	52	55
Wheelhouse	60	65
Radio room	55	60
Crew recreational areas (mess rooms,…)	60	65
Work spaces without equipment operating (galley, laundry,..)	70	75
Workshop other those forming part of machinery (manned workshops)	85	85
Offices	60	65

Type of space	Navigation	
	L_A	L_B
Engine control room	75	75
Crew open recreational deck	75	75

Table 7 : Noise limits levels in dB(A) - crew spaces - At berth

Type of space	At berth	
	L_A	L_B
Crew accommodation		
Crew cabins	50	55
Senior officer cabins	50	55
Mess room/recreation room	55	60
Engine control room	70	75

Table 8 : Vibration limit levels - ISO 20283-5:2016 - navigation N&V contractual speed

Type of space	V_A		V_B	
Owner/Guest spaces	1< f < 80 Hz Frequency weighted Acceleration mm/s^2 r.m.s.	1£ f £ 80 Hz Frequency weighted Velocity mm/s r.m.s.	1< f < 80 Hz Frequency weighted Acceleration mm/s^2 r.m.s.	1 £ f £ 80 Hz Frequency weighted Velocity mm/s r.m.s.
Owner Cabin	64	1,8	72	2
Guest Cabins	64	1,8	89	2,5
Enclosed Public spaces	72	2	107	3
Open recreation areas	89	2,5	136	3,8
Crew spaces	Frequency weighted Acceleration mm/s^2 r.m.s.	1£ f £ 80 Hz Frequency weighted Velocity mm/s r.m.s.	1< f < 80 Hz Frequency weighted Acceleration mm/s^2 r.m.s.	1 £ f £ 80 Hz Frequency weighted Velocity mm/s r.m.s.
Crew accomodation	89	2,5	136	3,8
Wheelhouse	71	2,0	136	3,8
Workspaces and Offices **(1)**	107	3,0	136	3,8
Engine Control Room (1)	107	3,0	161	4,5
(1) Acceptance of vibration levels greater than those specified may be considered for assignment of the applicable class notation where agreed between the Owner, Builder and advised to Tasneef.				

Chapter 5
MON SHAFT

SECTION 1 GENERAL

1 General

1.1 Applicability of MON-SHAFT (Y) notation

1.1.1 The additional class notation **MON-SHAFT (Y)** is assigned, in accordance with Pt A, Ch 1, Sec 2, [6.5], to yachts complying with the requirements of this Section.

1.1.2 This notation is assigned only to yachts having tailshafts arranged with oil lubricated stern bearing and with approved oil sealing glands.

1.1.3 The assignment of this notation allows a reduced scope for complete tailshaft surveys; see Pt A, Ch 2, Sec 2, [8].

2 Requirements for the issuance of the notation

2.1 Arrangement

2.1.1 In order for the notation **MON-SHAFT (Y)** to be granted, the stern bearing is to be arranged with facilities for measurement of bearing wear down.

2.2 Lubricating oil analysis

2.2.1 Item to be monitored

In order for the notation **MON-SHAFT (Y)** to be granted, the lubricating oil of the stern bearing is to be analysed as indicated in this Section.

2.2.2 Timing

Stern bearing lubricating oil is to be analysed regularly; in any event, the interval between two subsequent analyses is not to exceed six months.

2.2.3 Records

The lubricating oil analysis documentation is to be available on board, showing in particular the trend of the parameters measured according to [2.2.4].

2.2.4 Content of analysis

Each analysis is to include the following parameters:

- water content
- chloride content
- bearing material and metal particle content
- oil ageing (resistance to oxidation).

The oil samples are to be taken under service conditions and are to be representative of the oil within the sterntube.

2.2.5 Additional data to be recorded

In addition to the results of the oil sample analysis, the following data are to be regularly recorded:

- oil consumption
- bearing temperatures (a temperature sensor for each bearing or other approved arrangement is to be provided).

Chapter 6
DAMAGE STABILITY

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **DMS** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.6] to yachts for which damage stability is in compliance with the requirements given in this Section.

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

2 Damage stability requirements

2.1

2.1.1 The watertight bulkheads of the vessel are to be so arranged that minor hull damage that results in the free flooding of any one compartment will cause the vessel to float at a waterline which, at any point, is not less than 75 mm below the weather deck, or bulkhead deck if not concurrent.

2.1.2 Minor damage is to be assumed to occur anywhere in the length of the vessel, but not on a watertight bulkhead.

2.1.3 Standard permeabilities are to be used in this assessment, as follows:

Table 1

Space	Percentage Permeability
Stores	60
Stores but not a substantial quantity thereof	95
Accommodation	95
Machinery	85

2.1.4 In the damaged condition the residual stability is to be such that any angle of equilibrium does not exceed 7º from the upright, the resulting righting lever curve has a range to the downflooding angle of at least 15º beyond any angle of equilibrium, the maximum righting lever within that range is not less than 100 mm and the area under the curve is not less than 0,015 metre radians.

2.1.5 A vessel of 85 metres and above is to meet a SOLAS 1- compartment standard of subdivision, calculated using the deterministic damage stability methodology.

Chapter 7
INWATERSURVEY

SECTION 1 GENERAL

1 General

1.1

1.1.1 The additional class notation **INWATERSURVEY (Y)** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.7].

1.2 Documentation to be submitted

1.2.1 Plans

Detailed plans of the hull and hull attachments below the waterline are to be submitted to Tasneef in triplicate for approval. These plans are to indicate the location and/or the general arrangement of:

- all shell openings
- the stem
- the rudder and fittings
- the sternpost
- the propeller, including the means used for identifying each blade
- anodes, including securing arrangements
- bilge keels
- welded seams and butts.

The plans are also to include the necessary instructions to facilitate the divers' work, especially for taking clearance measurements.

Moreover, a specific detailed plan showing the systems to be adopted in order to assess the slack between pintles and gudgeons when the yacht is floating is to be submitted to Tasneef in triplicate for approval.

1.2.2 Photographs

As far as practicable, photographic documentation used as reference during the in-water surveys of the following hull parts is to be submitted to Tasneef:

- the propeller boss
- rudder pintles, where slack is measured
- typical connections to the sea
- directional propellers, if any
- other details, as deemed necessary by Tasneef on a case-by-case basis.

1.2.3 Documentation to be keep on board

The Owner is to keep on board the yacht the plans and documents given in [1.2.1] and [1.2.2], and they are to be made available to the Surveyor and the divers when an inwatersurvey is carried out.

2 Structure design principles

2.1

2.1.1 Marking

Identification marks and an identification system are to be supplied to facilitate the in-water survey. In particular, the positions of transverse watertight bulkheads are to be marked on the hull.

2.1.2 Rudder arrangements

Rudder arrangements are to be such that rudder pintle clearances and fastening arrangements can be checked.

2.1.3 Tailshaft arrangements

Tailshaft arrangements are to be such that clearances (or wear down by poker gauge) can be checked.

Chapter 8

SECURE YACHT

SECTION 1 GENERAL

1 General

1.1 General and application

1.1.1

The additional class notation **SECURE YACHT DESIGN** is assigned, in accordance with Pt A, Ch1, Sec 2, [6.8], to yachts having security equipment according with the requirements of this Section.

In this Section also the content of the International Ship and Port Facility Security Code (ISPS) Part B concerning monitoring and communication has been taken into account.

The class notation is independent of the management, being assigned to the yacht itself, and can easily be maintained also in the case of change of ownership.

1.2 Definitions

1.2.1 Security Equipment

Security equipment is equipment used in the implementation of the security measures specified in the Ship Security Plan.

1.2.2 Ship Security Alert System (SSAS)

Ship Security Alert System means a system installed on board, either interfaced with another on-board radio installation, or self-contained (abbreviated to SSAS-SC in this PR), fully complying with the functional requirements of SOLAS XI-2/6.2-6.4 and the performance criterion of IMO MSC.147(77).

1.3 Documentation to be submitted

1.3.1

The following plans and documents are to be sent for review:

a) Ship layout showing the position of the telecameras and pertinent cover guaranteed. A technical specification is to be included with the layout containing the type of telecamera foreseen and the characteristics of the video recording system.

b) Ship layout indicating the additional lighting points.

c) Key plan indicating the type of lock foreseen; if electronic, a copy of the technical specification is to be provided.

d) Technical specification of the AIS.

e) Plan of restricted areas.

f) Plan of openings in the plating and related system to indicate their status (open/closed).

g) Technical specification of the SSAS system installed.

If the design includes the arrangement on board of additional plants and/or equipment, the pertinent plans and technical specifications, as appropriate, are to be provided.

2 Design requirements

2.1 General

2.1.1

The yacht is to be designed, taking into account the installation of the equipment as per the following items [2.2] to [2.8]. The installation of the equipment as per items [2.2] to [2.7] are compulsory as the installation of the equipment as per item [2.8] (AIS) is not compulsory.

2.2 CCTV (Closed-circuit television)

2.2.1

The system is to guarantee coverage of the following areas:

- engine room;
- garage (if foreseen);
- any other sensitive areas;
- external areas and related access points;
- surrounding sea area.

It must be ensured that the images can be seen from the bridge and from any other location which may be used to continuously monitor security.

2.3 Additional lighting

2.3.1

An additional lighting system is to be provided. This system must ensure that, if the yacht's security is threatened, an additional lighting system is available to cover the on-board and surrounding areas as well as the access points.

2.4 Master key system

2.4.1

The master key system is to ensure that all the access doors to the "Restricted areas" have a mechanical and/or electronic lock. The system is to ensure that, in the case of conflict between safety and security, priority is given to safety.

2.5 Shell openings

2.5.1

It must be possible to control the status of the shell openings from the bridge and/or other location which may be used to continuously monitor security.

2.6 SSAS (Ship Security Alert System)

2.6.1

The system is to guarantee that, if the yacht is threatened, it can be activated automatically transmitting a security alarm containing the yacht's identification, position and a communication that it is under threat.

2.6.2

The alarm signal is not to be sent to other ships, it is to be of the silent type and to continue until it is deactivated.

2.6.3

The SSAS is to fully comply with the functional requirements of SOLAS, Regulation XI-2/6.2-6.4 and the performance criterion of IMO Resolution MSC.147(77).

2.7 Crew passenger embarkation

2.7.1

Equipment to control embarkation of persons and their effects is to be provided (for this purpose, one or more of the following can be considered: portable metal detectors, archways, x-ray baggage screening system).

2.8 AIS (Automatic Identification System)

2.8.1

The system is to guarantee information concerning vessel traffic in the vicinity of the yacht, by sending out and receiving ship information, such as: identification, route and speed within a radius of 10 nautical miles.

3 Tests and surveys

3.1 Tests and surveys during construction

3.1.1
Systems or equipment, which are installed on board in order to comply with the requirements of this Section, are to be surveyed and tested according to the applicable requirements of this item [3].

3.1.2
Before the initial Survey is carried out, a “Record of Security Equipment” is issued by the Tasneef Surveyor; this Record is always to be available on board under the responsibility of the Master.

3.2 Initial survey

3.2.1
Following the satisfactory review of the plans and other documentation requested in [1.3], an initial survey is carried out on board in order to:

- verify that security system arrangements, included in the list of security equipment, are in accordance with the reviewed documentation;
- test, in the presence of the surveyor and under working conditions, the equipment and systems covered by the requirements of this Section including their control, monitoring and alarm.

4 Confidentiality

4.1

4.1.1
The security plans, records and reports are to be protected from unauthorized access or disclosure.

APPENDIX 1 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 500 GT

1 General

1.1

1.1.1 With reference to Sec 1, [1.3] **Documentation to be submitted**:
[1.3.1] g) is not mandatory.

1.1.2 With reference to Sec 1, [2.6] **SSAS**:
[2.6.3] is not mandatory.

APPENDIX 2 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 24M LLL

1 General

1.1

1.1.1 No specific relaxations are foreseen.

Chapter 9

ICE CLASS

SECTION 1 GENERAL

1 General

1.1

1.1.1 *(1/1/2025)*
The requirements for the assignment of the ICE Class contained in Pt F of Rules for the Classification of Ships are in principle applicable.

1.1.2 *(1/1/2025)*
Where other parts of the Rules for the Classification of Ships are recalled in Pt F of Rules for the Classification of Ships, they have to be intended as the relevant part of the present Rules.

1.1.3 *(1/1/2025)*
Structural arrangement deeply different from the one adopted in Pt F of Rules for the Classification of Ships will be subject to special considerations.In particular the extension of the fore region for Ice Class ID may be specially considered and in any case should not to be taken less than 0.25L

1.1.4 *(1/1/2025)*
For materials of the hull different from steel the relevant strength its resistance to the abrasion due to the ice will be evaluated.

1.1.5 *(1/1/2025)*
Underwater lights may be installed in the reinforced thickness ice belt provided that they do not interrupt reinforced structures and are located inside a watertight box with thickness at least 2mm higher than those of the surrounding structures. Relevant details to be sent for approval

1.1.6 *(1/1/2025)*
Portlights shall not be installed in the reinforced thickness ice belt and they shall not interrupt reinforced structures Relevant details to be sent for approval. The portlights located in the area of reinforced beams are to be welded to the hull and have a metallic deadlight.

Chapter 10
ENHANCED ANCHORING EQUIPMENT

SECTION 1 SECTION 1 ENHANCED ANCORING EQUIPMENT

1 General

1.1 ENHANCED Anchoring Equipment (y) GOLD

1.1.1

The additional class notation **ENHANCED Anchoring Equipment (y) GOLD** may be assigned to yachts provided with anchoring equipment according to what below:

- Anchor weight equal to 90% of the values required by Tab 1
- Chain length equal to the values required by Tab 1
- Chain diameter equal to the values required by Tab 1

1.2 ENHANCED Anchoring Equipment (y) PLATINUM

1.2.1

The additional class notation **ENHANCED Anchoring Equipment (y) PLATINUM** may be assigned to yachts provided with anchoring equipment according to what below:

- Anchor weight equal to the values required by Tab 1
- Chain length equal to the values required by Tab 1
- Chain diameter equal to the values required by Tab 1

Table 1 : Equipment

Equipment number EN A < EN ≤ B		Stockless anchors		Stud link chain cables for anchors			
		N	Mass per anchor, in kg	Total length, in m	Diameter, in mm		
A	B				Q1	Q2	Q3
50	70	2	180	220,0	14,0	12,5	
70	90	2	240	220,0	16,0	14,0	
90	110	2	300	247,5	17,5	16,0	
110	130	2	360	247,5	19,0	17,5	
130	150	2	420	275,0	20,5	17,5	
150	175	2	480	275,0	22,0	19,0	
175	205	2	570	302,5	24,0	20,5	
205	240	2	660	302,5	26,0	22,0	20,5
240	280	2	780	330,0	28,0	24,0	22,0
280	320	2	900	357,5	30,0	26,0	24,0
320	360	2	1020	357,5	32,0	28,0	24,0
360	400	2	1140	385,0	34,0	30,0	26,0
400	450	2	1290	385,0	36,0	32,0	28,0
450	500	2	1440	412,5	38,0	34,0	30,0
500	550	2	1590	412,5	40,0	34,0	30,0
550	600	2	1740	440,0	42,0	36,0	32,0
600	660	2	1920	440,0	44,0	38,0	34,0
660	720	2	2100	440,0	46,0	40,0	36,0
720	780	2	2280	467,5	48,0	42,0	36,0
780	840	2	2460	467,5	50,0	44,0	38,0
840	910	2	2640	467,5	52,0	46,0	40,0
910	980	2	2850	495,0	54,0	48,0	42,0
980	1060	2	3060	495,0	56,0	50,0	44,0
1060	1140	2	3300	495,0	58,0	50,0	46,0

Equipment number EN A < EN ≤ B		Stockless anchors		Stud link chain cables for anchors			
		N	Mass per anchor, in kg	Total length, in m	Diameter, in mm		
A	B				Q1	Q2	Q3
1140	1220	2	3540	522,5	60,0	52,0	46,0
1220	1300	2	3780	522,5	62,0	54,0	48,0
1300	1390	2	4050	522,5	64,0	56,0	50,0
1390	1480	2	4320	550,0	66,0	58,0	50,0
1480	1570	2	4590	550,0	68,0	60,0	52,0
1570	1670	2	4890	550,0	70,0	62,0	54,0
1670	1790	2	5250	577,5	73,0	64,0	56,0
1790	1930	2	5610	577,5	76,0	66,0	58,0
1930	2080	2	6000	577,5	78,0	68,0	60,0
2080	2230	2	6450	605,0	81,0	70,0	62,0
2230	2380	2	6900	605,0	84,0	73,0	64,0
2380	2530	2	7350	605,0	87,0	76,0	66,0
2530	2700	2	7800	632,5	90,0	78,0	68,0
2700	2870	2	8300	632,5	92,0	81,0	70,0
2870	3040	2	8700	632,5	95,0	84,0	73,0
3040	3210	2	9300	660,0	97,0	84,0	76,0
3210	3400	2	9900	660,0	100,0	87,0	78,0
3400	3600	2	10500	660,0	102,0	90,0	78,0
3600	3800	2	11100	687,5	105,0	92,0	81,0
3800	4000	2	11700	687,5	107,0	95,0	84,0
4000	4200	2	12300	687,5	111,0	97,0	87,0
4200	4400	2	12900	715,0	114,0	100,0	87,0
4400	4600	2	13500	715,0	117,0	102,0	90,0
4600	4800	2	14100	715,0	120,0	105,0	92,0
4800	5000	2	14700	742,5	122,0	107,0	95,0
5000	5200	2	15400	742,5	124,0	111,0	97,0
5200	5500	2	16100	742,5	127,0	111,0	97,0
5500	5800	2	16900	742,5	130,0	114,0	100,0
5800	6100	2	17800	742,5	132,0	117,0	102,0
6100	6500	2	18800	742,5		120,0	107,0
6500	6900	2	20000	770,0		124,0	111,0
6900	7400	2	21500	770,0		127,0	114,0
7400	7900	2	23000	770,0		132,0	117,0
7900	8400	2	24500	770,0		137,0	122,0
8400	8900	2	26000	770,0		142,0	127,0
8900	9400	2	27500	770,0		147,0	132,0
9400	10000	2	29000	770,0		152,0	132,0
10000	10700	2	31000	770,0			137,0
10700	11500	2	33000	770,0			142,0
11500	12400	2	35500	770,0			147,0
12400	13400	2	38500	770,0			152,0
13400	14600	2	42000	770,0			157,0
14600	16000	2	46000	770,0			162,0

APPENDIX 1 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 500 GT

1 General

1.1 ENHANCED Anchoring Equipment (y)

1.1.1

In addition to the additional notations reported in Sec 1 **ENHANCED Anchoring Equipment (y)** may be assigned to yachts provided with anchoring equipment according to what below:

- Anchor weight equal to 80% of the values required by Sec 1, Tab 1
- Chain length equal to the values required by Sec 1, Tab 1
- Chain diameter equal to the values required by Sec 1, Tab 1.

APPENDIX 2 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 24M LLL

Chapter 11
DOLPHIN YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1

The rules in this Section apply to underwater noise radiation from yachts to ensure a low environmental impact.

The additional class notation **DOLPHIN YACHT** is assigned to yachts complying with the requirements in this Section.

A Certificate of Compliance may be issued to yachts not classed with Tasneef, fulfilling the requirements of this Section.

1.2 Terms and Definitions

1.2.1

For terms and definitions, reference is made to ISO PAS 17208-1 “Quantities and procedures for description and measurement of underwater sound from ships - Part 1: General requirements for measurements in deep water".

1.2.2 Acoustic Centre

Noise from all acoustical and non-acoustical sources when the source under test is not present.

For the purposes of this section, the position is on a yacht.

1.2.3 Background Noise

Noise from all acoustical and non-acoustical sources when the source under test is not present.

For the purposes of this section, the source under test is a yacht.

1.2.4 Beam Aspect

Direction to either side of the yacht under test.

Beam aspect is in reference to the location of the hydrophones.

Another approach for hydrophone measurement (not applied in this section) is bottom aspect, where the hydrophone(s) are mounted at or near the sea floor.

1.2.5 Closest Point of Approach (CPA)

Point at which the horizontal distance (during a test run) from the acoustic center of yacht under test is the closest to the hydrophone(s).

The distance at the closest point of approach is defined by the symbol d_{CPA}.

1.2.6 Commence Exercise (COMEX)

Start test range location, position of the yacht under test when twice (2x) the "start data" distance ahead of the CPA.

1.2.7 Data Window Angle

Angle subtended at the hydrophone, between the start data location and the end data location.

1.2.8 Data Window Length (DWL)

Distance between the start data location and end data location.

The DWL is defined as 1,5x yacht length (see [4.1]) and shown in Fig 3.

1.2.9 Data Window Period (DWP)

Time taken by the yacht under test to travel the data window length at a certain speed.

1.2.10 End Data Location

Position of the acoustic center of the yacht under test where data recording is ended.

End data location is one data window length after the start data location. See Fig 3.

1.2.11 Finish exercise (FINEX)

End test range location, position of the yacht under test when twice (2x) the "start data" distance past the CPA.

1.2.12 Field Calibration

Method of using known inputs, if possible using physical stimuli (such as a known and calibrated/traceable acoustic or vibration source) or electrical input (charge or voltage signal injection) at the input (or other stage) of a measurement system in order to ascertain that the system is responding properly (i.e. within its stated uncertainty) to the known stimulus.

1.2.13 Frequency Response

Frequency range a system is able to measure, for a given uncertainty and repeatability, from the lowest frequency to the highest stated frequency.

1.2.14 Geometric far field

Horizontal distance from the yacht under test at which the assumption of source co-location causes less than 1 dB of error when adjusting to the reference distance.

1.2.15 Hydrophone cable drift angle

Angle between the vertical axis and the line created between the fixed support of the hydrophone cable and the hydrophone.

1.2.16 Insert voltage calibration

Known, calibrated and traceable input stimulus in the form of an electrical input injected at the input (or other stage) of a measurement system in order to ascertain that the system is, in fact, responding properly (i.e. within the system's stated uncertainty and repeatability) to a known stimulus.

1.2.17 Lloyd's mirror surface image coherence effects

Alteration of radiated-noise levels caused by the presence of a free (pressure release) surface.

Radiation from the “surface image” constructively and destructively influences the source's direct radiation. For the purposes of this section, these effects are considered as part of the source's radiation, causing it to exhibit a vertical directivity.

1.2.18 Measurement uncertainty

Maximum difference between the measured resulting signature radiated noise level and the true signature radiated noise level stated in decibels for a given measurement system, for one-third-octave bands using a given measurement method (averaging time, bandwidth-time product, etc.).

Reference can be made to ISO/IEC Guide 98-3:2008.

1.2.19 Measurement repeatability

Expected difference between signature-radiated noise levels resulting from successive measurements on the same yacht at the same operating condition, carried out under the same conditions of measurement with the same equipment at the same location, stated in decibels and in one-third-octave bands.

Reference can be made to ISO 3534-1.

1.2.20 Measurement system

Data acquisition system consisting of, but not limited to, one or more transducer(s), conditioning amplifier(s), analogue-to-digital converter(s), digital signal processing computer and ancillary peripherals.

1.2.21 Omni-directional hydrophone

Underwater sound pressure transducer that responds equally to sound from all directions.

1.2.22 Slant range

Distance from the acoustic center of the yacht under test to each hydrophone.

1.2.23 Overall yacht length

Longitudinal distance between the forward-most and aft-most perpendicular of a yacht.

1.2.24 Radiated noise level

Measure of the underwater noise radiated by a surface yacht, obtained from the root mean square sound pressure level and scaling this quantity according to spherical spreading to a standard reference distance of one meter from the acoustic center of the source.

1.2.25 Sound speed profile

Measure of the speed of sound in seawater as a function of depth, measured vertically through the water column (only if measurements are carried out in water depth < 100m)

1.2.26 Start data location

Position of the acoustic center of yacht under test where data recording is started.

1.2.27 Test site

Location at which the underwater noise measurements are performed.

1.2.28 Sound pressure level

Defined as twenty times the logarithm to the base 10 of the ratio of the root-mean-square pressure of an underwater sound over a stated time interval to the reference value for sound pressure, P_{ref}, is 1 mPa.

$$L_p = 20\log_{10}\left(\frac{P_{rms}}{P_{ref}}\right)[dBre1\mu Pa]$$

2 Instrumentation, Measurements, Procedures, Reporting

2.1 General

2.1.1

In order to quantify the underwater sound from a marine yacht, three main instrumentation components are required:

- hydrophones and signal conditioning;
- data acquisition, recording, processing, and display system; and
- distance measurement system.

Detailed specifications of each of the measurement systems are given below. A summary of the attributes is given in Tab 1.

2.2 Hydrophone and signal conditioning

2.2.1

The term “hydrophone” includes any signal conditioning electronics either within or exterior to the hydrophone. The hydrophone(s) are to have sensitivity, bandwidth, and dynamic range necessary to measure the yacht under test and meet the performance noted in Tab 1.

Dolphin Class Notations require three hydrophones which are to be omni-directional across the required frequency range of 10 - 50 000 Hz. However, directional hydrophones may be used, as long as the directional characteristics are accounted for in the final data processing. The hydrophones may or may not have integral cable. However, the required performance is to be obtained with the full cable length to be used during the test.

When portable hydrophones are used, they are to be laboratory calibrated every 12 months according to IEC 60565 (or equivalent standard) for all required one-third octave bands. When fixed (i.e., permanently installed underwater) hydrophones are used, they are to be laboratory calibrated before installation to IEC 60565 (or equivalent standard) for all required one-third octave bands. It is advised to confirm the fixed hydrophone calibration by a comparative measurement utilizing a calibrated underwater sound source or reference hydrophone every 12 months.

The sensitivity and directivity of the hydrophones is to be determined to within ± 1 dB.

2.3 Data acquisition, recording, processing and display

2.3.1

The data acquisition, recording, processing, and display system is to be capable of accurately acquiring, recording, processing, and displaying data from the hydrophones. Such systems may comprise tape recorders, computer-based data acquisition systems, or hardware-specific devices (such as spectrum analyzers) or combinations of such. The data acquisition system is to have an appropriate sampling rate and anti-aliasing filers following Nyquist requirements and appropriate dynamic range for either analogue or digital systems. All frequency-domain averaging is to be linear with sampling consistent with the Data Window Period.

The time domain signal from each hydrophone is to be acquired and recorded simultaneously and be sampled accurately for all channels. Tracking and time stamp data are to be recorded synchronously with the acoustic data to enable reconstruction of the track and data processing.

The broadband processing is to cover the one-third-octave bands whose centers are from 10 Hz to 50 000 Hz. Narrow-band processing is to be in appropriate bandwidths relative to the frequencies to be determined up to 5,000 Hz, or higher as needed.

Effective narrowband processing bandwidth is to be reported in the measurement report.

2.4 Distance measurement

2.4.1

Distance measurement is required to determine continuously the actual distance between the hydrophones and the acoustic center of the yacht under test.

For measurement with surface-suspended hydrophones, the distance measurement systems only need to determine the horizontal distance from the sea surface position above the hydrophone(s) (i.e. the device or buoy used to suspend the cable) to the acoustic center of the yacht under test. The distance measurement device may utilize any method (e.g. optical, acoustical, GPS, radar) as long as the required accuracy is achieved. The distance measurement system is to be accurate to 5% of the distance at CPA. The slant range from the yacht under test to the hydrophone(s) may be computed during post-processing of the data. It is not necessary to take into account any drift that the hydrophones could experience after they are deployed, provided the hydrophone cable drift does not exceed 5°. If the drift angle does exceed 5°, then it is to either be reduced or the drift angle is to be taken into account when determining the slant range.

For measurement, with bottom-suspended hydrophones, the distance range-finding instrumentation is only to determine the horizontal distance from the sea surface position above the hydrophone(s) (corresponding to the point of attachment of the cable on sea bottom) to the acoustic center of the yacht under test. The distance measurement system is to be accurate to 5% of the distance at CPA. The slant range from the yacht under test to the hydrophone(s) may be computed during post-processing of the data. It is not necessary to take into account any drift that the hydrophones could experience after they are deployed, provided the hydrophone cable drift does not exceed 5°. If the drift angle does exceed 5°, then it is either to be reduced or the drift angle is to be taken into account when determining the slant range.

The hydrophone cable drift angle may be estimated by the use of depth gages that indicate the difference in depth with hydrophones.

Other means than the cable drift angle can be used to determine accurately the actual distance between the hydrophones and the acoustic center of the yacht under test.

2.5 Acoustic center

2.5.1

It must be possible to control the status of the shell openings from the bridge and/or other location which may be used to continuously monitor security.

Table 1 : Summary of measurement parameters

Achievable measurement uncertainty (averaged over all one third octave band frequencies)	±2.0 dB
Measurement repeatability	±2.0 dB
Bandwidth	One third octave band
Frequency range, lower one third octave band	10 Hz
Frequency range, upper one third octave band	40 000 Hz (see [2.2])
Narrowband measurements	Optional, up to 5 000Hz
Number of hydrophones	Three
Hydrophone geometry	Figure 1
Nominal hydrophone depth	15°, 30°, 45°
Minimum water depth	Greater of 150m **(1)**

(1) Measurements in shallow water can be accepted if an adequate procedure for the estimation of the actual trasmission loss has been agreed with Tasneef (e.g. actual measurement of site TL, validated propagation models, etc).

(2) As an alternative, insert voltage calibration or physical stimuli calibration by pistonphone may be accepted by Tasneef.

Minimum distance at closest point of approach (CPA)	Greater of 100m
Distance ranging uncertainty (at CPA)	2%
Acoustic center location	Centerline, see definition
Data Window Length, meters	1.5x yacht length (see [4.1])
Data Window Time, seconds	DWL/yacht speed
Data window average time	One overall sample or ≤ 1 second
Minimum number of runs per yacht conditions	4 Total, 2 port, 2 starboard
Recommended weather/sea conditions	Sea State Douglass ≤ 3; Wind Speed ≤ 10 knots
Portable hydrophone calibration	Laboratory calibration every 12 months Field calibration as below daily during measurements for a number of discrete frequencies **(2)**
Fixed hydrophone calibration	Laboratory calibration prior to installation Confirmation using calibrated sound source or reference hydrophone every 12 months Field calibration as below daily during measurements
System field calibration	Insert voltage calibration
Auxiliary data to be reported	Engine shaft speed, wind speed and direction

(1) Measurements in shallow water can be accepted if an adequate procedure for the estimation of the actual trasmission loss has been agreed with Tasneef (e.g. actual measurement of site TL, validated propagation models, etc).

(2) As an alternative, insert voltage calibration or physical stimuli calibration by pistonphone may be accepted by Tasneef.

3 Measurement requirements and procedure

3.1 Introduction

3.1.1

In order to perform an accurate measurement of a yacht's underwater sound, several factors have to be addressed correctly, e.g., selection of an appropriate test site, proper deployment of hydrophones, and proper operation of the yacht under test, etc.

3.2 Test site requirements

3.2.1

Dolphin Class Notations do not require the use of a specific ocean location for the measurement test site. It is up to the test organization to determine the suitability of the proposed test site for the intended measurements taking into consideration the specific requirement for water depth of a minimum of 200 m.

Some of the other factors to consider are ambient noise, traffic, oceanography, bottom type, local weather, yacht maneuverability and safety.

The background noise is to be low enough to permit measurement of the underwater sound of the yacht under test over the frequency range of interest. Where the background noise limits the measurements, corrections are to be applied.

There will be circumstances where the problem of background noise limiting the measurable frequencies is insurmountable. In such cases where measured levels are background limited and no correction is possible.

3.3 Sea surface conditions

3.3.1

The sea surface conditions during testing are of concern.

The recommended sea state 3 (Douglass scale) and wind speed limitation of £ 10 knots (5,4 m/s) provides a nominal value for yachts greater than 100 m.

As a generality, smaller length yachts will require lower wave heights to attain consistent radiated noise level measurements. Smaller yachts may require more benign surface conditions while larger yachts may tolerate larger surface conditions.

3.4 Hydrophone deployment

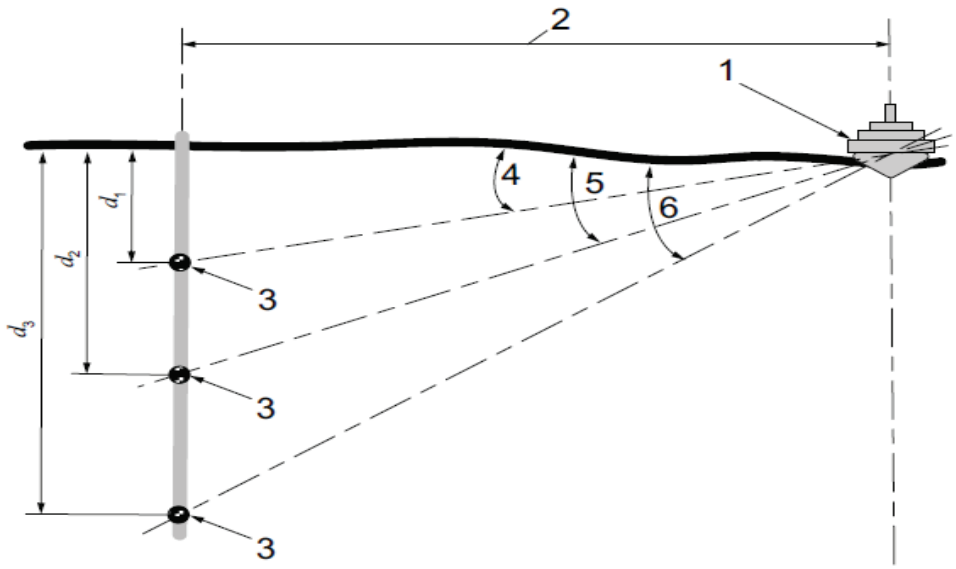
3.4.1

The three hydrophones are to be arranged vertically in the water column. The hydrophones are to be located to measure the beam aspect of the yacht under test.

The hydrophones are to be positioned vertically in the water column at depths which result from nominal 15°, 30° and 45° angles from the sea surface at a distance equal to the nominal distance at CPA (Fig 1).

Provisions are to be taken to mitigate the effects of cable strum and sea surface effects on the measurements. Fig 2 shows potential deployment approaches, but other solutions are allowed as long as the physical locations of Fig 1 and requirements with respect to the measurement uncertainty are fulfilled.

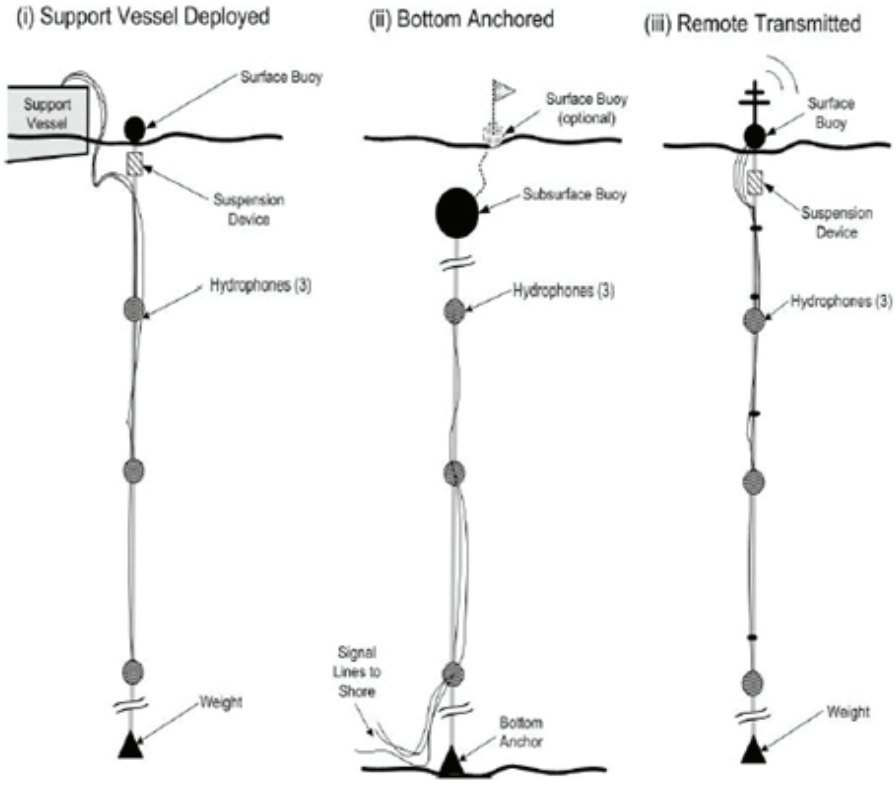
Figure 1 : Hydrophones geometry



1: yacht under test
2: distance, dCPA, at closest point of approach
3: hydrophone
4: 15° angle between surface and shallowest hydrophone
5: 30° angle between surface and middle hydrophone
6: 45° angle between surface and deepest hydrophone

d1 = dCPA tan(15°)
d2 = dCPA tan(30°)
d3 = dCPA tan(45°)
dCPA = greater than150 m

Figure 2 : Typical hydrophones deployment configurations (not to scale)



3.5 Test course and yacht operation

3.5.1

The run configuration is shown in Fig 3. The yacht under test is to transit a straight line course to achieve the required distance at CPA. The starting point of the run (or COMEX) is at least twice the data window length (DWL) before the CPA. The ending point of the run (or FINEX) is twice the DWL after CPA. At COMEX, the yacht under test is to have achieved the required run conditions. Unless otherwise required by the run plan, the yacht under test is to maintain constant speed, fixed machinery conditions and minimum use of helm to maintain course through FINEX.

3.6 Sea Trails

3.6.1

When all aspects of the underwater noise survey are in place the following steps are to be used to conduct each test run. Four (4) runs with two (2) for each side of the yacht (alternating port and starboard aspect) are to be performed for each yacht condition to be tested.

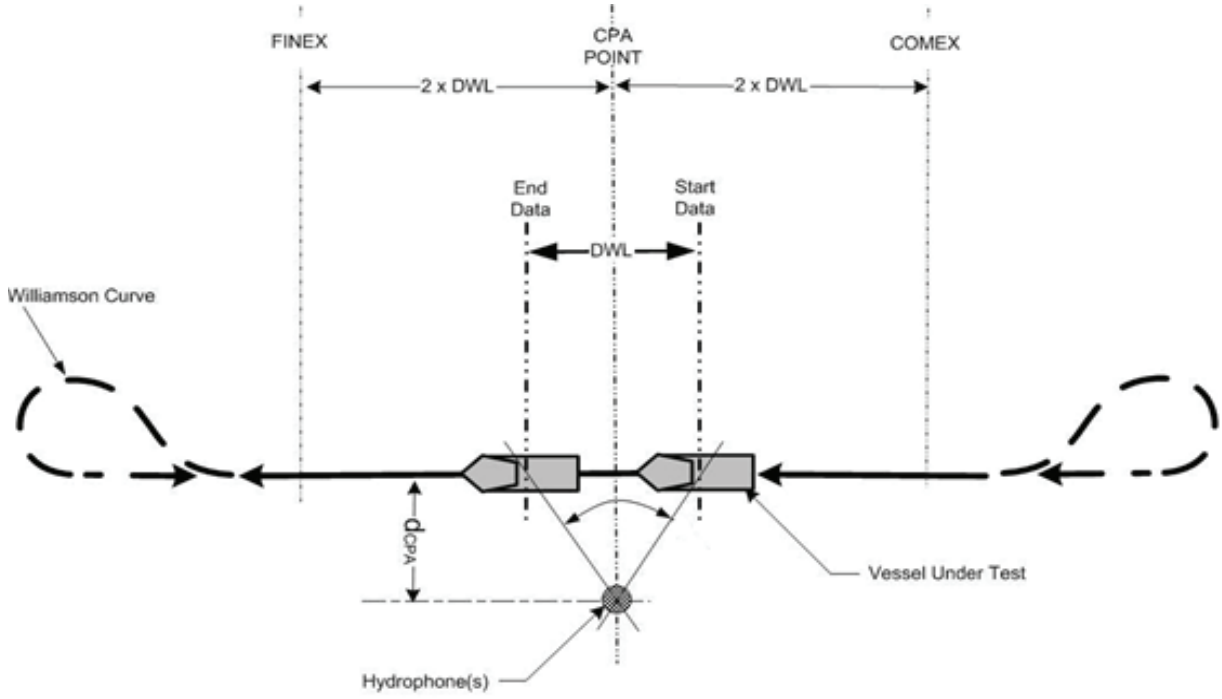
4 Post processing

4.1 Introduction

4.1.1

When the testing is completed, post processing is required to adjust sound pressure level spectra for background noise and sensitivity, and to normalize the data for distance differences and to combine multiple hydrophones and multiple runs.

Figure 3 : Test course configuration



$d_{CPA} \leq 150$ m

DWL = 1,5 x yacht length (0,5x yacht length before and 1x yacht length after CPA)

DWP = DWL / yacht speed

As a minimum the DWP is to be one overall sample over which the resulting radiated noise level is to be computed. However, the user may sub-divide the DWP into smaller samples (nominally around 1 second each) to allow for finer evaluation of the acquired data.

4.2 Background noise adjustments

4.2.1

When the testing is completed, post processing is required to adjust sound pressure level spectra for background noise and sensitivity, and to normalize the data for distance differences and to combine multiple hydrophones and multiple runs.

A background noise recording have to be carried out before and after the measurement runs.

The signal plus noise to noise ratio, or DL, is defined in Equation (2).

With the yacht stationary, a background measurement (at least 30 s average) is made when the yacht is at least 3 km far from the hydrophone(s).

If DL is greater than 10 dB, then no adjustments are necessary. If DL is between 3 and 10 dB and if the background noise is sufficiently stationary, then adjustments to the measurements are required using Equation (3). It is to be clearly identified in the report that such corrections have been applied. If DL is less than 3 dB then the data are to be so noted or discarded.

$$\Delta L = L_{P_{s+n}} - L_{P_n} = 10\log\left(\frac{P_{s+n^2}}{P_{n^2}}\right) dB \qquad (2)$$

where:

DL : is the signal plus noise to noise ratio computed using Equation (2) for each one-third-octave band;

p_{s+n} : is the root mean square sound pressure at the hydrophone in mPa. This value includes both the desired signal and undesired background noise;

p_n : is the root mean square sound pressure of the background noise at the hydrophone in mPa;

L_{Ps+n} : is the sound pressure level in decibels with yacht under test present for each run; and

L_{Pn} : is the background sound pressure level with the yacht under test not influencing the measurement (at 2 km from hydrophones) in dB;

$L'_p = 10 \log {}^{(10(L_{ps+n})/10)} - 10^{(Lp_n/10)}$ dB (3)

where:

L'_P : is the background noise adjusted sound pressure level of the yacht under test, computed in onethird-octave bands.

Equation (3) is only used if DL is greater than or equal to 3 dB and less than 10 dB.

4.3 Sensitivity adjustments

4.3.1

Additional adjustments to the L'_p value are to be made for any miscellaneous adjustments such as directivity, cable sensitivity, or amplifier gain. Sensitivity adjustments are to be made as given in Equation (4).

$L_p'' = L_p' + A_{SEN}$ (4)

where:

L_P'' : is the unweighed sound pressure level after background adjustment; and

A_{SEN} : is the adjustment for miscellaneous hydrophone sensitivities.

All sensitivity adjustments are made to one-third octave band data. Such adjustments may be measured by the user or provided by the instrumentation vendors.

L_P'' is the unweighed sound pressure level. L'_p is a weighted sound pressure level, where the weighting characterizes the frequency response of the hydrophone and processing chain. This weighting is corrected for by applying a correction A_{SEN} in each one-third octave bands.

4.4 Distance normalization

4.4.1

The final adjustment of the sensitivity-adjusted measured sound pressure level, L''_p, is normalization for distance. The typical distance from the moving yacht to the measurement transducer is 150 m. However, because of the effects of current and seas this distance may vary by ±10 %, which is acceptable as long as the distance from the hydrophones to the acoustic centre of the yacht is known.

Depending on measurement technology used (e.g., GPS, Sonar, or Laser), the distance from the yacht to the hydrophone may need to be computed using two separate distances:

a) horizontally from the yacht's acoustic centre to the sea surface above the hydrophone(s); and

b) vertically from the sea surface to each hydrophone. The total distance from the yacht to each hydrophone is determined using Equation (5).

$$d_{Total} = \sqrt{d_{horz}^2 + d_{vert}^2(h)} \quad (5)$$

where:

d_{Total} : is the total distance to be used in the distance normalization Equation (6) below;

d_{horz} : is the horizontal distance from the acoustic centre of the yacht under test to the surface buoy supporting the hydrophone(s). This distance would be that determined by the distance ranging system (i.e., GPS System, Sonar, or Laser Range Finder). The following corrections to the measured ranging value may be needed: to the centreline, to the waterline, and to the acoustic centre; and

d_{vert} : is the depth of each hydrophone (h, where h1 for shallow hydrophone, h2 for middle hydrophone, and h3 for deep hydrophone).

The underwater sound radiated noise level for each run and each hydrophone is determined by Equation (6).

$$L_s(r, h) = L_p'' + 20\log(d_{Total}/d_{ref}) \text{ dB} \quad (6)$$

where:

$L_s(r,h)$: is the underwater sound radiated noise level at a reference distance of 1 m, as a function of run number (r) and hydrophone location (h, where h1 for shallow hydrophone, h2 for middle hydrophone, and h3 for deep hydrophone);

d_{Total} : is the total distance from the yacht under test to each hydrophone (meters); and

d_{ref} : is the reference distance of 1 m.

This normalization assumes that the yacht is a directive source at the surface (i.e., the surface image is considered as part or the source and the underwater sound pressure level is specific for the beam aspect at elevation angles between 15° and 45°).

4.5 Hydrophone and run combination post processing

4.5.1

The resulting data set from measurements performed is to be one-third-octave-band sound radiated noise levels relative to 1 mPa m in decibels from 10 to 50 000 Hz. Such data sets are to be prepared for three hydrophones and for four measurement runs, two per aspect (port or starboard). The port and starboard aspect runs are to be kept separate. These multiple data sets are to be adjusted and normalized according to [4.2] through [4.4], above. This paragraph [4.5] describes how to combine the twelve data sets for each condition into one set of values in one-third-octave bands.

The first step in the post-processing is to determine the power average of the sound radiated noise level from all three hydrophones (h1, h2, and h3) which results in the sound radiated noise level for each run, LS(r) using Equation (7).

$$L_s(r) = 10\log\{(10^{Ls(r,h1)/10} + 10^{Ls(r,h2)/10} + 10^{Ls(r,h3)/10})/3\}\text{dB} \quad (7)$$

where:

$L_s(r)$: is the power-averaged underwater sound radiated noise level at the reference distance of 1 m for three hydrophones for run number r.

$L_s(r,h1)$:is the underwater sound radiated noise level for the shallow (h1) hydrophone for run number r.

$L_s(r,h2)$: is the underwater sound radiated noise level for the middle (h2) hydrophone for run number r.

$L_s(r,h3)$: is the underwater sound radiated noise level for the deep (h3) hydrophone for run number r.

The four runs of data are then arithmetically averaged to determine the final sound source value for each run as given in Equation (8).

$$L_s = \frac{\sum_{r=1}^{r=k} L_s(r)}{k} \quad (8)$$

where:

L_s : is the radiated noise level for k runs as computed in Equation (8).

$L_s(r)$: is the power-averaged underwater sound radiated noise level at the reference distance of 1 m for three hydrophones for run number r, as determined by Equation (7).

k : is the total number of runs: for k = 4 or 2 (for port- and starboard-only computations).

For each yacht condition, L_s is to be determined separately for each side of the yacht (i.e., port aspect and starboard aspect) and then for both sides together. L_s is the resulting radiated noise level for each yacht operating condition. It is a function of one-third octave bands and is to be the values that are reported, compared to limits or compared to other data sets.

5 Reporting Example

5.1

5.1.1

The test report is to include all the information and data required to verify the fulfillment of the notation.

The minimum set of information is to be agreed with Tasneef before carrying out the trials.

6 Assignment criteria

6.1

6.1.1

The additional class notation **DOLPHIN YACHT** is assigned to yachts complying with limits given in figure 4 at 8 knots.

Tasneef will assess the reported results, documented operating conditions and any other relevant information. If the results are found to be acceptable the relevant underwater noise class will be issued.

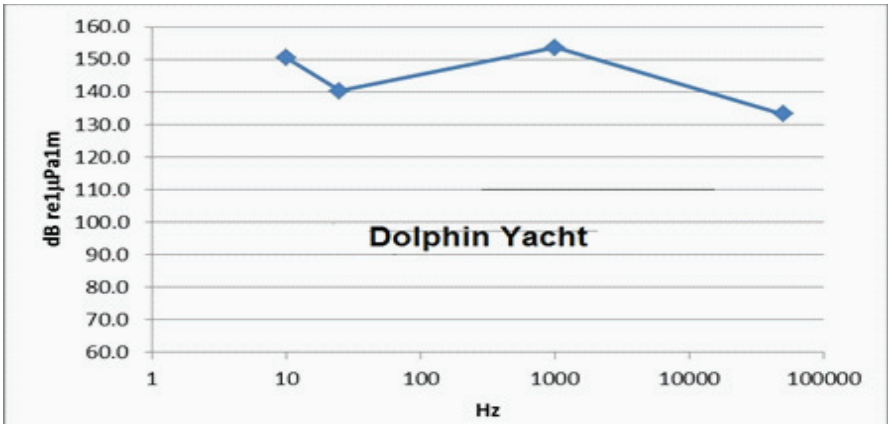
7 Equivalence

7.1

7.1.1

If some measurement requirement cannot be fulfilled, Tasneef may accept an exception as far as it is well motivated, technically documented and do not impact on the final result.

Figure 4 : Limits for DOLPHIN YACHT Additional Class Notations



DOLPHIN YACHT Notation:

10Hz - 25Hz: 173-22,5*LOG10(f)

25Hz - 1000Hz:128.7+8.3*LOG10(f)

1kHz - 50kHz: 153.6-12*LOG10(f/1000)

Chapter 12

HYBRID PROPULSION (...)

SECTION 1 GENERAL

1 General and application

1.1 Application

1.1.1

The additional class notation **HYBRID PROPULSION (...)** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.10.1] to yachts whose propulsion plant consists of two or more movers of different type (e.g.: electric motors and internal combustion engines, diesel engines and turbine, and so on) or use different sources of power (e.g. diesel generators and batteries, diesel generators, fuel cells and batteries, and so on) in compliance with the requirements given in this Section.

1.1.2

The notation is completed, in brackets, with the indication of the functional mode, i.e.:

- Parallel mode;
- Electric motor and shaft generator mode;
- genset and batteries;
- Other modes, to be defined.

1.2 General

1.2.1

The movers of different type are to be coupled by clutch or other mechanical or hydraulic couplings to the gearbox or to the shaft lines in a manner such that they may deliver the rated power in parallel mode and/or independently.

The different sources of power are to be connected in a manner such that they can deliver their power to sustain the propulsion system independently or combined together.

2 Documents to be submitted

2.1

2.1.1

The following documentation is required:

- System Description (for information);
- Analysis of the system, including a failure effect analysis, in the form of tests program to be verified on board, giving evidence that, in each operating condition, main propulsion can be restored without danger (for approval);

3 Applicable requirements

3.1

3.1.1

For the electric propulsion plant reference is to be made, as applicable, to Pt F, Ch 2, Sec 1 of the Rules for the classification of ships, referring to **AVM-APS** notation. Special consideration may be given, under the application of that section, to electrical systems which may be considered as “auxiliary propulsion system” and which may be engaged and disengaged without affecting, in any operative condition, the functionality of the primary propulsion system (i.e.: internal combustion engines).

3.1.2

For rotating machines, reference is to be made to Pt C, Ch 2, Sec 4 of the Rules for the classification of ships. In particular, for "auxiliary electrical propulsion system" the same consideration given in [3.1.1] applies.

3.1.3

A power management system is to be provided, which in general is to comply with the requirements given in Pt C, Ch 2, Sec 14, [4.2] of the Rules for the classification of ships and the relevant Automation System is to comply with the requirements for the assignment of the additional class notation **AUT-UMS (Y)** given in Ch 2.

Chapter 13
REMOTE

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1

The additional class notation **REMOTE** is assigned, in accordance with Pt A, Ch 1, Sec 2, [6.13], to yachts:

- provided with specific arrangements and qualified personnel on board in order to facilitate the Society to carry out remotely the eligible class surveys in Pt A, Ch 2, App 7, Tab 1;
- provided with electronic certificates.

The Society reserves the right, at its sole discretion, to either suspend or withdraw the Additional Class Notation in case of worsening of the ship's condition of maintenance or PSC performance, or change of Management Company, unavailability of the specific arrangements and certified personnel on board.

1.2 Definitions

1.2.1

- Remote Survey: a process of verifying that a ship and its equipment are in compliance with the Rules where the verification is undertaken, or partially undertaken, without attendance of the Surveyor on board.

Note 1: Remote classification activities not requiring a survey, such as some administrative tasks, are not to be considered as remote surveys.

- Connectivity Kit: an electronic system which allows livestreaming videos to be taken in enclosed spaces (e.g. engine room, tanks, etc.) where internet connection is not available, as detailed in [2].

2 Requirements

2.1 Devices for livestreaming

2.1.1

A portable device (smartphone, tablet, etc.) provided with wide angle functionality and high-quality optical lenses is to be available on board.

Closed type headphones with microphone, for proper communication during livestreaming, are also requested.

2.2 Connectivity Kit

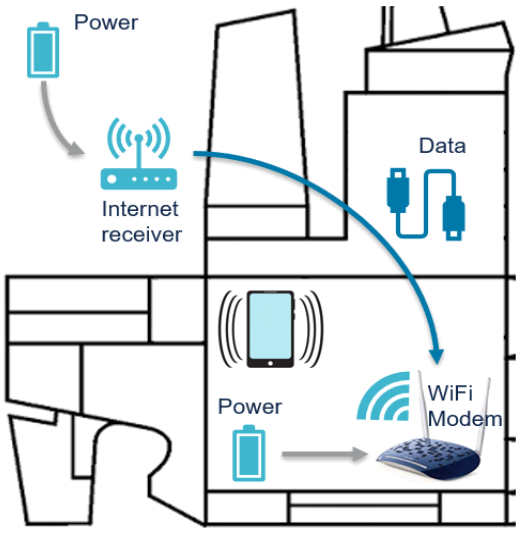
2.2.1

The yacht is to be provided with a Connectivity Kit (see Fig 1) enabling the ship to have internet access also in enclosed spaces (ballast tanks, engine room, etc.).

The kit shall be composed of:

- an internet receiver, equipped with a sim card for data transfer
- a Wi-Fi modem
- a network cable of sufficient length to connect the two a.m. devices
- power packs to make the devices independent from the ship's electrical power supply.

Figure 1



2.3 Hazardous areas

2.3.1
In hazardous areas, all devices used, under the responsibility of the Master, for livestreaming or offline recordings and the Connectivity Kit are to be of an appropriately certified safe type.

2.4 Training, qualification and certification of on-board personnel

2.4.1
The on-board personnel (yacht's crew members) who take an active part in the remote survey and manage the devices for live streaming to take videos and pictures (even if offline) and the Connectivity Kit are to be in possession of the Certificate of Competency issued by the Society upon satisfactory completion of the specific e-learning course made available by the Society and aimed at providing the necessary operational information and skills.

2.5 Electronic certificates

2.5.1
The class and statutory certificates issued to the yacht by the Society are to be in electronic form.

3 Assignment of the additional class notation

3.1

3.1.1
The additional class notation **REMOTE** is assigned upon:

- satisfactory evaluation by the Society of the requirements in [1.1] being complied with; and
- satisfactory verification on board by a Society's Surveyor of the requirements from [2.1] to [2.5] being complied with.

Chapter 14

WAPS

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1
The requirements for the assignment of the **WAPS** notation in Pt F of the Rules for the Classification of Ships are in principle applicable. Where other parts of the Rules for the Classification of Ships are recalled in Part F of Rules for the Classification of Ships, they have to be intended as the relevant part of the present Rules.

1.1.2
Structural arrangement deeply different from the one adopted in Pt F of Rules for the Classification of Ships will be subject to special considerations.

Chapter 15

PMS

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1

The requirements for the assignment of the **PMS** notation in Pt F, Ch 12, Sec 1 of Rules for the Classification of Ships are in principle applicable. Where other parts of the Rules for the Classification of Ships are recalled in Pt F of Rules for the Classification of Ships, they have to be intended as the relevant part of the present Rules.

Chapter 16
CYBER YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **CYBER YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.16] to yachts provided with cyber secure systems.

The requirements in this section apply to ships having onboard CBS connected in networks, which can be vulnerable to cyber events potentially compromising the confidentiality, integrity and/or availability of information managed by means of such systems and networks.

A Certificate of Compliance may be issued to yachts not classed with the Society, fulfilling the requirements of this section. The certificate is valid for a period of 5 years, subject to annual confirmation.

1.2 Requirements

1.2.1 The additional class notation **CYBER YACHT** is assigned to yachts complying fully with the requirements set out in Pt C Ch.3 Sec 4 and Sec 5 of Tasneef Rules for the Classification of Ships.

Chapter 17
DIGITAL YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1
The additional class notations, **DIGITAL YACHT (GOLD)**, is assigned in accordance with Pt A, Ch 1, Sec 2, [6.17] to yachts fitted with an automatic data collection system enabling the collection of navigation and machinery data and capable of transferring data (either as collected or after the necessary elaboration) ashore, allowing the continuous monitoring of the yacht through at least the minimum set of parameters described in this Section.

The additional class notations **DIGITAL YACHT (PLATINUM)** is assigned to yachts that in addition to the requirements to get the notation **DIGITAL YACHT (GOLD)** comply also with the requirements set in Ch.16 for the additional class notation **CYBER YACHT**.

A Certificate of Compliance may be issued to yachts not classed with the Society, fulfilling the requirements of this section. The certificate is valid for a period of 5 years, subject to annual confirmation.

1.2 Prerequisite

1.2.1 If the yacht is provided with a monitoring system capable of monitor essential and/or not essential systems it is to be designed in accordance with Pt C Ch 3 to the satisfaction of the Society. If the monitoring system is not foreseen special consideration may be done by the Society.

1.2.2 The hardware of the monitoring system mentioned in [1.2.1] is to be type approved by The Society.

2 Definitions

2.1

2.1.1
- Data Collector is an electronic system that performs a systematic recording of signals from sensors and equipment installed on board and information manually provided.
- Data Point is a complete set of collected and filtered data over a period not greater than 10 minutes.
- Data Storage is the operation of saving and retention of recorded data. Previously stored data are to be kept together with new data, ordered in a sequence so that their retrieval can be easily performed.
- Owner, in this section, means Yacht Owner or Yacht Management Company.
- Parameter is the variable which value is collected and recorded by the data collector.
- Recorded data is the representative value of the parameter obtained, depending from the nature of the parameter, as a mean value or a single representative value of collected data in a time frame.
- Representative Value is a processed Data Point stored.
- Time stamp is the data reference time expressed in UTC.

3 Documents to be submitted

3.1

3.1.1
The following documents are to be submitted for information:
- list of bridge collected signals
- list of machinery collected signals
- list of signals transferred ashore.

Depending on the yacht arrangement and on the data collection system architecture, additional drawings or documents may be required at Society's discretion.

4 Requirements

4.1 General

4.1.1 The yacht is to be fitted with an automatic data collector capable to transfer data ashore.

4.1.2 The minimum set of parameters that the data collector is to be capable of collecting, recording and transferring (either as collected or after the necessary elaboration) ashore.

4.2 Data to be collected, recorded and transferred by the data collector

4.2.1 Data to be sent ashore

The data relevant to the following aspects have to be sent ashore.

- Bridge/navigation data.
- Machinery and Electrical Systems data
- Non essential services data.

4.3 Minimum Data Acquisition Rate

4.3.1 Automatic data collection is to be continuous so as to allow the identification of a representative value for a time frame, in accordance with [4.4].

4.4 Recorded Data (Representative Value and Time Stamp)

4.4.1 Automatic data collection is to be continuous so as to allow the identification of a representative value for a time frame, in accordance with [4.4].

4.4.2 Data Point for each Parameter is to be processed to identify a Representative Value that, along with the reference Time stamp, will be the Recorded data. The time frame between two Representative Values is not to be greater than 10 minutes.

4.5 Storage Requirements

4.5.1 All Representative Values are to be stored along with the Time stamps indicating the time when the Representative Value was made.

A back up facility of all stored data is to be foreseen.

Being the data collection system installed on board, the backup facility is to be located elsewhere. Access to the data is to be logged, controlled and secured by the Owner.

APPENDIX 1 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 500 GT

1 General

1.1 Additional class notations DIGITAL YACHT, DIGITAL YACHT (GOLD), DIGITAL YACHT (PLATINUM)

1.1.1 Yachts of less than 500GT that comply with the requirements of Ch.17 Sec.1 may be assigned with the additional class notation **DIGITAL YACHT.** When Pt C Ch 3 is required all the Sections of Part C Ch 3 and Appendix 1 apply.

1.1.2 For the additional class notation **DIGITAL YACHT** for the hardware of the monitoring system in Sec.1 [1.2] a Declaration of Conformity in accordance with the Table.1 of Pt C Ch.3. Sec.6 may be accepted as an alternative.

1.1.3 Yachts of less than 500GT that comply in addition to the requirements for the additional class notation **DIGITAL YACHT** also fully with the requirements of Pt C Ch.3 (without the relaxations contained in Pt C Ch.3 App.1 and in [1.1.2]) may be assigned with the additional class notation **DIGITL YACHT (GOLD)**.

1.1.4 1.1.4Yachts of less than 500GT that comply with the requirements set out in [1.1.3] for the additional class notation **DIGITAL YACHT (GOLD)** and also with the requirements of additional class notation **CIBER YACHT** may obtain the additional class notation **DIGITAL YACHT (PLATINUM)**.

APPENDIX 2 ALTERNATIVES, RELAXATIONS AND ADDITIONAL CONSIDERATIONS FOR YACHTS OF LESS THAN 24M LL

Chapter 18
BIOFUEL YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **BIOFUEL YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.18] to yachts fuelled by Biofuel.

1.2 Requirements

1.2.1 The additional class notation **BIOFUEL YACHT** is assigned to yachts complying with the requirements set out in Pt C, Ch 1, Sec 4, [6.18].

Chapter 19
GAS FUELLED YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **GAS FUELLED YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.19] to yachts fuelled by gas.

1.2 Requirements

1.2.1 The additional class notation **GAS FUELLED YACHT** is assigned to yachts complying with the requirements set out in Pt C, Ch 1, Sec 4.

Chapter 20

LPG OR NH_3 FUELLED YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **LPG FUELLED YACHT** or **NH_3 FUELLED YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.20] to yachts fuelled by LPG or NH_3.

1.2 Requirements

1.2.1 The additional class notations **LPG FUELLED YACHT** or **NH_3 FUELLED YACHT** is assigned to yachts complying with the relevant requirements set out in Pt C, Ch 1, Sec 4.

Chapter 21
HYDROGEN FUELLED YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **HYDROGEN FUELLED YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.21] to yachts fuelled by hydrogen.

1.2 Requirements

1.2.1 The additional class notations **HYDROGEN FUELLED YACHT** is assigned to yachts complying with the requirements set out in Pt C, Ch 1, Sec 4.

Chapter 22

METHYL / ETHYL FUELLED YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **METHYL / ETHYL FUELLED YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.22] to yachts fuelled by Methyl or Ethyl.

1.2 Requirements

1.2.1 The additional class notations **METHYL / ETHYL FUELLED YACHT** is assigned to yachts complying with the relevant requirements set out in Pt C, Ch 1, Sec 4.

Chapter 23
BATTERY POWERED YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **BATTERY POWERED YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.23] to yachts fuelled by Batteries.

1.2 Requirements

1.2.1 The additional class notations **BATTERY POWERED YACHT** is assigned to yachts complying with the relevant requirements set out in Pt C, Ch 1, Sec 4.

Chapter 24
FUEL CELL YACHT

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notation **FUEL CELL YACHT** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.24] to yachts fuelled by Fuel Cells.

1.2 Requirements

1.2.1 The additional class notations **FUEL CELL YACHT** is assigned to yachts complying with the relevant requirements set out in Pt C, Ch 1, Sec 4.

Chapter 25

RIG, RIG GOLD, RIG PLATINUM

SECTION 1 GENERAL

1 General

1.1 Application

1.1.1 The additional class notations **RIG, RIG GOLD, RIG PLATINUM** is assigned in accordance with Pt A, Ch 1, Sec 2, [6.25] to yachts with certified RIG.

1.2 Requirements

1.2.1 The additional class notations **RIG, RIG GOLD, RIG PLATINUM** and relevant features may be assigned to yachts complying with the Tasneef “Rules for Certification of Sailing Rigs”.