



IRCLASS
Indian Register of Shipping



RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF **PLEASURE CRAFTS AND LARGE YACHTS**

JULY 2024

Preamble

The Rules for Pleasure Crafts and Yachts are divided into two Parts:

Part I – Rules and Regulations for the Construction and Classification of Pleasure Crafts ($L < 24\text{m}$).

Part II - Rules and Regulations for the Construction and Classification of Large Yachts ($L \geq 24\text{m}$ and not carrying more than 12 passengers)

General Information

This consolidated version of the 'Rules and Regulations for the Construction and Classification of Pleasure Crafts and Large Yachts' (July, 2024) supersedes the July, 2023 edition of the Rules and includes amendments published in the following :

- a) Rules Change Notice No.1 of March 2024

For ease of reference by the users, a summary of additions and amendments incorporated in the various Rule Change Notices (issued since July 2023), along with their effective dates are indicated in the respective tables.

This edition of the Rules also consists of amendments carried out subsequent to the publication of Rules Change Notice No. 1 of March 2024. Such amendments are indicated in **Table 1**.

**RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION
OF PLEASURE CRAFTS AND LARGE YACHTS – July 2023**

RULES CHANGE NOTICE No.1 – MARCH 2024

TABLE 1 – AMENDMENTS INCORPORATED IN THIS NOTICE
These amendments will come into force as indicated in the Table

Section / Clause	Subject/ Amendments
Chapter 1: General	
	<i>The amendments are applicable from 1 July 2024</i>
3/ 3.14.1.10	Rule provisions related to laying up of crafts after being suspended are deleted.

RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF PLEASURE CRAFTS AND LARGE YACHTS – July 2024

TABLE 1 – AMENDMENTS INCORPORATED IN THIS EDITION

These amendments will come into force as indicated in the Table

Section / Clause	Subject/ Amendments
Part 1, Chapter 10: Machinery	
<i>The amendments are applicable to crafts contracted for construction on or after 1 January 2025</i>	
1/ Table 1.4.1	Amendments are made to include the inclination requirements for safety equipment, switch gear, electric and electronic appliances and remote-control systems.
1/ 1.4.3 (new)	The new sub-section details craft accelerations, motions and provides requirements to ensure that essential machinery operates effectively under the effects of craft accelerations and motions.



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RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF **PLEASURE CRAFTS AND LARGE YACHTS**

PART I PLEASURE CRAFTS

JULY 2024

Part I

Rules and Regulations for the Construction and Classification of Pleasure Crafts (Length < 24m)

Indian Register of Shipping

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6	<i>Certification</i>

Section 1

General Information

1.1 Indian Register of Shipping

1.1.1 Indian Register of Shipping (hereinafter referred to as "IRS") was incorporated in 1975 as a Public Limited Company under the Indian Companies Act, for the purpose of providing amongst other things a faithful and accurate classification of mercantile shipping classed with it, to approve designs of, to survey and to issue reports on mercantile and non mercantile ships, hovercrafts, hydrofoils etc. all within the scope of classification described in the Rules. This Section contains General Regulations which have been adopted by IRS for its governance.

1.1.2 Information regarding the Board of Directors and Technical Committee of IRS is given in Part 1, Chapter 1 of the IRS Rules and Regulations for the Construction and Classification of Steel Ships (Main Rules).

1.2 Survey reports

1.2.1 All reports of survey are to be made by the Surveyors according to the form prescribed and submitted for consideration of the Board or the Sub-Committee of Classification, but the character and notations assigned by the latter is to be reported to the Board. The Board may, in specified instances,

vest in the Managing Director/ Jt. Managing Director discretionary powers to act on its behalf, and all such actions being reported to the Board at its subsequent meeting.

1.2.2 The reports of the Surveyors shall, subject to the approval of the Managing Director/ Jt. Managing Director, be open to inspection of the Owner and any other person authorized in writing by the Owner. Copies of the reports will, subject to the approval of the Managing Director/ Jt. Managing Director, be supplied to Owners or their representatives

1.3 Fees

1.3.1 Fees will be charged for all surveys and for other services rendered by IRS or any of its publications in accordance with established scales. Traveling expenses incurred by the Surveyors in connection with such services are also chargeable.

1.4 Register of Ships

1.4.1 A Register of Ships is available on-line on IRCLASS Website which contains the names of ships, character of class and notations assigned together with other relevant useful information for ships classed with IRS. This register also includes names of crafts, the

character of class notation assigned together with other relevant useful information for crafts classed with IRS.

1.5 Liability

1.5.1 Whilst Indian Register of Shipping, a Classification Society, along with its subsidiaries and associates (hereinafter referred to as the Society) and its Board/Committees use their best endeavours to ensure that the functions of the Society are properly carried out, in providing services, information or advice, neither the Society nor any of its servants or agents warrants the accuracy of any information or advice supplied. Except as set out herein, neither the Society nor any of its servants or agents (on behalf of each of whom the Society has agreed this clause) shall be liable for any loss damage or expense whatever sustained by any person due to any act or omission or error of whatsoever nature and howsoever caused of the Society, its servants or agents or due to any inaccuracy of whatsoever nature and howsoever caused in any information or advice given in any way whatsoever by or on behalf of the Society, even if held to amount to a breach of warranty. Nevertheless, if any person uses services of the Society, or relies on any information or advice given by or on behalf of the Society and suffers loss damage or expenses thereby which is proved to have been due to any negligent act omission or error of the Society its servants or agents or

any negligent inaccuracy in information or advice given by or on behalf of the society then the Society will pay compensation to such person for his proved loss up to but not exceeding the amount of the fee charged by the Society for that particular service, information or advice.

1.5.2 Any notice of claim for loss, damage or expense as referred to in 1.5.1 shall be made in writing to Head Office within six months of the date when the service, information or advice was first provided, failing which all the rights to any such claim shall be forfeited and the Society shall be relieved and discharged from all liabilities.

1.6 Access of Surveyor to crafts, shipyards or works

1.6.1 The Surveyors are to be given free access to crafts classed with/ certified by IRS as well as to shipyards/fabrication facility, works, etc. so as to perform their duties, and are to receive adequate assistance for this purpose.

1.7 Compliance with statutory requirements

1.7.1 Consideration should be given to any relevant requirements of the National Authority of the country in which the craft is to be registered.

Section 2

Definitions

2.1 The following definitions are applicable for these Rules:

.1 **Pleasure Crafts:** Pleasure Crafts are vessels carrying not more than 12 passengers, used for pleasure or recreation purposes and not for transportation of cargo or passengers. Pleasure crafts can be for personal use or for commercial use.

.2 **Personal Pleasure Crafts:** Pleasure crafts that are used for personal recreation purposes. These crafts shall not be used for commercial purposes.

.3 **Commercial Pleasure Crafts:** Pleasure crafts that are employed for commercial use.

.4 **Safe Haven:** means a port or a harbour.

.5 **Nominated Point of Departure:** means a landmark from where a craft is permitted to operate.

.6 **Fair Weather:** means sea state corresponding to wind force not exceeding Beaufort Scale 4.

Section 3

Classification Regulations

3.1 General

3.1.1 When a craft is assigned a specific Character of Class by Indian Register of Shipping, it implies that IRS is satisfied that the said craft meets, for this particular class, with these Rules and Regulations or requirements equivalent thereto. The craft will continue to be classed with IRS so long as it is found, upon examination at the prescribed periodical surveys, to be maintained in a fit and efficient condition and in accordance with the Periodical Survey requirements of these Rules.

3.1.2 The classification of a Craft with IRS does not exempt the owners from compliance with any additional and/or more stringent requirements issued by the Administration and/or local port authority.

3.2. Application of Rules

3.2.1 These rules apply to design, construction and surveys of pleasure crafts; used for

commercial (charter) purposes and for personal use; of hull length less than 24 [m] and carrying not more than 12 passengers.

3.2.2 The following are to be excluded from the scope of this rule:

- a) Craft intended solely for racing
- b) Canoes and kayaks
- c) Surf boards, powered surfboards, and Sailing surfboards
- d) Submersibles
- e) Air cushion vehicles
- f) Hydrofoils
- g) Steam powered craft
- h) Personal watercraft (like jet skis, water scooters)
- i) Inflatable boat

3.2.3 The types of hull construction, sizes and applicable regulatory requirements for pleasure crafts covered by these rules are indicated in Table 3.2.3.

Table 3.2.3 - Application of Rules	
Hull Type	Monohull or Multihull
Hull Materials	Steel / Aluminium / Composites / Wood
Propulsion	Diesel/ Petrol
Length	< 24 [m]
Gross Tonnage	< 400 GT
Number of Passengers	(≤ 12)
Classification Rules	Present Rules
Regulatory	National Rules, EC directives (as applicable)

3.3 Scope

3.3.1 The owner may opt for Certification or Classification of Pleasure Crafts.

3.3.2 The certification service is provided on the basic assumption that other parties involved (yard, designers, manufacturers, sub-contractors, owners, etc.) fulfill their individual obligations. The certification service is not performed in substitution of other parties' role or obligations. The certificate verifies the compliance with the requirements at the date of the certificate; but does not contain any commitment by the owner to maintain the standard while in service.

3.3.3 The classification certificate will have a validity of maximum 5 years as the owner commits to have the craft under periodical surveys. All crafts under class are to be subjected to periodical surveys for the purpose of maintenance of class. Crafts classed with IRS are to be subjected to intermediate and special surveys for continuation of the classification.

3.3.4 The classification and /or the certification of a Pleasure Craft does not relieve the stakeholders (craft owner, building yard or designer) from compliance with any requirements issued by the Flag Administrations.

3.3.5 The classification process consists of :

- A technical review of the design plans and related documents for a new craft to verify compliance with the applicable Rules;
- Attendance at the construction of the craft in the shipyard by IRS surveyor(s) to verify that the vessel is constructed in accordance with the approved design plans and classification Rules;
- Attendance by IRS surveyor(s) at the relevant production facilities that provide key components such as the steel, engine, generators and castings to verify that the component conforms to the applicable Rule requirements;
- Attendance by IRS surveyor(s) at the sea trials and other trials relating to the vessel and its equipment prior to delivery to verify conformance with the applicable Rule requirements;
- Upon satisfactory completion of the above, the builder's/ shipowner's request for the issuance of a class certificate will be considered by IRS and, if deemed satisfactory, the assignment of class may be approved and a certificate of classification issued;
- Once in service, the owner is to submit the craft to a clearly specified programme of periodical class surveys, carried out onboard the craft, to verify that the craft continues to meet the relevant Rule requirements for continuation of class. A classification survey is a visual examination that normally consists of an overall examination of the items identified in the Rules for survey, detailed check of selected parts on a sampling basis and witnessing tests, measurements and trials where applicable.
- When a Surveyor identifies corrosion, structural defects or damage to hull, machinery and/or equipment which, based on the Rules and in the opinion of the Surveyor, affects the craft's class, remedial measures and/ or appropriate conditions of class are specified in order to retain class. Conditions of class are requirements to the effect that specific measures, repairs, surveys etc. are to be

carried out within a specified time limit in order to retain class.

3.4 Interpretation of the Rules

3.4.1 The correct interpretation of the requirements contained in the rules and other regulations is the sole responsibility and at the sole discretion of IRS

3.5 Character of Classification

3.5.1 The following Characters and symbols are assigned by IRS to indicate classification of crafts:


a) Character SUL assigned to Pleasure Crafts indicates that the hull and its appendages and equipment (i.e. anchors, chain cable and hawsers) meet the Rule requirements for assignment of this Character of Class.


b) Character SU (-) assigned to Pleasure Crafts indicates that the hull and its appendages meet the Rule requirements but equipment (i.e. anchors, chain cable and hawsers) is not supplied or maintained as per the relevant Rules but is considered by IRS to be acceptable for their particular service.

c) Character SU assigned to Pleasure Crafts indicates that the hull and its appendages meet the Rule requirements but in respect of the equipment, IRS has agreed that the normal equipment is not necessary in view of their particular service.


Guidance Note: Appendages to the hull referred to in 3.5.1 a), b) and c) means the rudder & rudder stock, rudder horn, sole pieces, propeller nozzles, shaft brackets, skeg etc. which are covered by the rule requirements.

3.5.2 Character IY assigned to self-propelled Pleasure crafts indicates that the machinery meets the rule requirements for assignment of this Character of Class.

3.5.3 The distinguishing mark  inserted before Characters of Class or Class Notation(s) is assigned to new craft constructed under special survey of IRS in compliance with the Rules to the satisfaction of IRS

3.5.4 The distinguishing mark  inserted before a Character of Class (SUL, SU (-), SU, IY as appropriate), is assigned to crafts

admitted into IRS Class during the course of construction and surveyed by an IACS Society.

3.5.5 The distinguishing mark  inserted before a Character of Class (SUL, SU (-), SU, IY as appropriate), is assigned to crafts admitted into IRS Class at the time of delivery of the vessel and constructed under the survey of an IACS Society

3.5.6 When requested by an owner and agreed to by IRS or when considered necessary by IRS, relevant Class notation (s) as detailed in 3.6 below will be appended to the Pleasure Craft e.g.

 **SUL, PLEASURE CRAFT, PERSONAL, TYPE-1, MAT(S), MOTOR (D).**

3.6 Class Notations

3.6.1 Vessel Type Notation

PLEASURE CRAFT – Denotes that the vessel is built in accordance with the IRS Rules for Construction and Classification of Pleasure Crafts.

3.6.2 Craft Service Notation

PERSONAL – Crafts used for personal recreation purposes and not for commercial use.

CHARTER – Crafts used for commercial purposes.

3.6.3 Design Type Notation

TYPE-1 – Type 1, Crafts that operate up to distance of 1 nautical mile in fair weather and in daylight from a Nominated Point of Departure named in the Certificate of Registry and/or Certificate of Classification of the craft.

TYPE-2 – Type 2, Crafts that operate up to distance of 12 nautical miles from a Nominated Point of Departure named in the Certificate of Registry and/or Certificate of Classification of the craft.

TYPE-3 – Type 3, Crafts that operate up to distance of 24 nautical miles at sea from a Safe Haven.

TYPE-4 – Type 4, Crafts designed for Unrestricted Service

3.6.4 Design Maximum Significant Wave height

The maximum significant wave height in the area of operation of the craft depending on the design type notations assigned is to be as specified in Table 3.6.4

Table 3.6.4	
Craft Type	Significant Wave Height
4 and 3	$H_s \geq 4\text{m}$
2	$2 < H_s < 4\text{m}$
1	$1.2 < H_s \leq 2\text{m}$

3.6.5 Hull Type

Crafts of multi-hull type of construction would be assigned notation "**MULTIHULL**"

3.6.6 Material

Depending upon the material of hull construction, additional notation **MAT ()** may be assigned to the crafts, with letters within parentheses indicating the material used:

- (a) **A** – Aluminium
- (b) **S** – Steel
- (c) **F** – FRP/ GRP
- (d) **W** – Wood

3.6.7 Propulsion Type Notation

The type of propulsion provided for the craft is indicated by this notation. The Classification/ Certification of motor craft are currently envisaged in the Rules.

MOTOR (D) – A craft having motor propulsion with inboard diesel engine

MOTOR (P-I) – A craft having motor propulsion with inboard petrol engine

MOTOR (P-O) – A craft having motor propulsion with outboard petrol engine.

3.6.8 **Description:** A 'description' may be assigned to indicate the purpose or role of a craft. In general, there would be no specific rule requirements to be complied with for assignment of a description.

3.7 Materials, components, equipment and machinery

3.7.1 The materials used in the construction of craft, or in the repair of Craft already classed, are to be of good quality and free from defects and are to be tested in accordance with the rules (Chapter 3). The steel is to be manufactured by an approved process at

works recognized by IRS. Alternatively, tests to the satisfaction of IRS will be required to be carried out.

Consideration may be given by IRS to accept the works approved by IACS member societies with whom IRS currently has co-operation agreements for this purpose.

3.7.2 Certification of materials, components, equipment and machinery is carried out on the basis of the following, considering IRS and/or IMO requirements, as applicable:

- a) Type approval carried out by IRS
- b) Unit certification by IRS
- c) Alternative Certification Scheme (ACS) by IRS
- d) Mutual recognition of certificates, if type approved by an IACS member society or European Union recognized organization based on commonly agreed design requirements between IRS and the recognized organization.

3.8 Request for surveys

3.8.1 It is the responsibility of the Builders or Owners, as applicable, to inform the Surveyors of IRS at the location where the surveys for supervision during new construction or Craft in service are to be undertaken and to ensure that all surveys for issue of class certificate for new construction, and maintenance of class for craft in service are carried out.

3.9 Repairs

3.9.1 Any repairs to the Craft either as a result of damage or wear and tear which are required for the maintenance of Craft's class are to be carried out under the inspection of and to the satisfaction of the Surveyors.

3.10 Alterations

3.10.1 No alterations which may affect classification are to be made to the hull or machinery of a classed unit unless plans of proposed alterations are submitted and approved by IRS before the work of alterations is commenced. Such work is to be carried out

in accordance with approved plans and tested on completion as required by the Rules and to the satisfaction of the Surveyor(s).

3.11 Date of build

3.11.1 The date of completion of the special survey inspection will normally be taken as the date of build to be entered in the Register Book.

Where there is a substantial delay between completion of construction survey and the Craft commencing service, the date of commissioning may be specified on the classification certificate.

When modifications are carried out on a Craft, the initial date of build remains assigned to the Craft.

3.12 Appeal from Surveyors' recommendations

3.12.1 If the recommendations of the Surveyors are considered in any case to be unnecessary or unreasonable, appeal may be made to IRS, who may direct a special examination to be held.

3.13 Certificate of Class

3.13.1 Certificate of Class will be issued to Builders or Owners when the required reports on completion of Special Surveys of new Craft or of existing Craft submitted for classification have been received from the Surveyors and approved by IRS.

3.13.2 Certificates of class maintenance in respect of completed periodical special surveys will also be issued to Owners.

3.13.3 The Surveyors are permitted to issue Interim Certificates to enable a Craft, classed with IRS, to proceed with its operation provided that, in their opinion, it is in a fit and efficient condition. Such Certificates will contain Surveyors' recommendations for continuance of Class, but in all cases are subject to confirmation by IRS.

3.13.4 Individual Certificates can also be issued for, equipments and fittings which have been manufactured under IRS Survey and in accordance with these Regulations.

3.14 Suspension, withdrawal and deletion of class

3.14.1 Suspension

3.14.1.1 The class of a Craft will be automatically suspended from the expiry date of the Certificate of Class or by the expiry date of any extension granted, if the special survey has not been completed by the due date and an extension has not been agreed to, or the vessel is not under attendance by the Surveyor with a view to complete the surveys prior to resuming service.

3.14.1.2 The class of a Craft will also be automatically suspended if the intermediate survey becomes overdue.

3.14.1.3 Classification will be reinstated upon satisfactory completion of overdue survey. The scope of the overdue surveys will be based on the survey requirements applicable to the Craft at the original due date and not based on the age of the vessel when the survey is carried out. Such surveys will be credited from the date originally due. However, the craft will remain dis-classed from the date of suspension until the date class is reinstated.

The Owners and the Flag State, where applicable, would be informed in writing, of the suspension and reinstatement of Classification.

3.14.1.4 When the surveys relating to specific additional notations of hull or equipment or machinery have not been complied with and thereby the craft is not entitled to retain that notation, then the specific notation will be suspended till the related surveys are completed.

3.14.1.5 The class of the craft will also be subject to a suspension procedure if recommendations and/or conditions of class are not dealt with by the due date or postponed by agreement, by the due date.

3.14.1.6 The class of a craft is liable to be withheld or, if already granted may be withdrawn in case of any non-payment of fees or expenses chargeable for the service rendered.

3.14.1.7 When it is found that a craft is being operated in a manner contrary to that agreed at the time of classification, or is being operated in conditions onerous than those agreed, the class is liable to be suspended.

3.14.1.8 The class of a craft will be liable to be suspended if the Owner fails to notify IRS of any damage to the craft's hull, machinery or equipment, which may adversely affect classification of the vessel or subsequently fails to arrange for the survey as may be advised by IRS.

3.14.1.9 The class of a craft will be suspended after a major casualty to the craft, such as grounding, sinking or breaking up, if the Owner is unable to arrange for the craft's survey by IRS and commence repairs within a reasonable period of the occurrence of the casualty, unless otherwise agreed to with IRS.

3.14.1.10 Crafts laid up in accordance with the Rules prior to surveys becoming overdue will not be suspended when surveys addressed above become overdue.

3.14.2 Withdrawal

3.14.2.1 Craft's class will be withdrawn, at the end of six months of suspension, if the Owner has not commenced any action to reinstate the craft's class. A longer suspension period may be granted when the craft is not trading or in cases of lay-up awaiting attendance for reinstatement or disposition, in the event of a casualty

3.14.2.2 When the class of a craft holding IRS class, is withdrawn by IRS in consequence of a request from the Owners, the notation "Class withdrawn at Owners' request" (with date) will be made in the Register Book. This entry will continue till the craft's class is reinstated or deleted.

3.14.2.3 When the Regulations as regards surveys of the craft have not been complied with and the craft thereby is not entitled to retain her class, the class will be withdrawn and the notation "IRS Class withdrawn" (with date) will be made in the Register Book. This entry will continue till the craft's class is reinstated or deleted.

3.14.2.4 The withdrawal of a craft will be confirmed in writing to the Owner and the Flag State, where applicable

3.14.3 Deletion of class

3.14.3.1 A craft will be considered to "cease to exist" when it is destroyed by scrapping or by sinking to unsalvageable depths or abandoned by the owner.

3.14.3.2 A craft can also be considered to “cease to exist” when it is broken up either by grounding or due to structural failure or due to actions of war or sabotage.

3.14.3.3 Craft’s class will be deleted when it ceases to exist.

3.15 Reclassification

3.15.1 When Owners request for reclassification of a craft for which the class previously assigned has been withdrawn, IRS will require a Special Survey for Reclassification to be held by the IRS

Surveyors. The extent of the survey will depend upon the age of the craft and the circumstances of each case.

3.15.2 If the craft is found or placed in good and efficient condition in accordance with the requirements of the Rules and Regulations at the Special Survey for Reclassification, IRS may decide to reinstate her original class or assign such other class as considered appropriate.

3.15.3 The date of reclassification will appear in the Register Book.

Section 4

Classification of Crafts Built under the Survey of Indian Register of Shipping

4.1 Classification of new constructions

4.1.1 The request for classification of new constructions is to be submitted to IRS by the shipyard or ship owner in the form provided by IRS. The request is to include complete details regarding class notation and statutory certificates required, where applicable.

4.1.2 Where orders for major machinery and equipment are placed on manufacturer or suppliers, IRS will have to be informed. Responsibility for compliance with IRS Rules and Regulations shall be with the manufacturers/suppliers.

4.1.3 Plans and particulars as specified in the Rules will have to be submitted to IRS in triplicate sufficiently in advance of commencement of construction. One copy with stamp of approval will be returned. Any deviation from approved drawings will require to be approved by IRS prior to execution of work.

IRS reserves the right to request for additional plans, information or particulars to be submitted.

Approval of plans and calculations by IRS does not relieve the Builders of their responsibility for the design, construction and installation of the various parts, nor does it absolve the Builders from their duty of carrying out any alterations or additions to the various parts on board deemed necessary by IRS during construction or installation on board or trials.

4.1.4 IRS will assess the production facilities and procedures of the shipyard and other manufacturers as to whether they meet the requirements of the construction Rules.

4.1.5 During construction of a Craft, IRS will ensure by surveys that parts of craft requiring approval have been constructed in compliance with approved drawings, all required tests and trials are performed satisfactorily, workmanship is in compliance with current engineering practices and welded parts are produced by qualified welders.

4.1.6 The craft will be subjected to operational trials in the presence of IRS Surveyor.

4.1.7 On completion of the construction and trials of the craft, copies of as fitted plans showing the craft as built, essential certificates and records, operating manual etc. are to be submitted by the Builder generally prior to issuance of the Interim Certificate of Class.

4.2 Scope of Classification

4.2.1 Classification covers Craft's hull, appendages and machinery including electrical systems to the extent as specified in these Rules and Regulations.

4.3 Plans and design data

4.3.1 In general, following plans are to be submitted for the approval of IRS prior the commencement of the work. More detailed requirements for documentation given in individual chapter are also to be complied with.

4.3.1.1 Hull

- a) Structural plans of hull, superstructure and deckhouses;
- b) Engine and machinery foundations, Hatchways, hatch covers and coamings arrangements
- c) Stability Calculations
- d) Other plans and documents as necessary.

4.3.1.2 Machinery and Electrical Installations

- a) Machinery room arrangement

- b) Propeller and shafting arrangement and details
- c) Machinery and craft piping systems including fuel oil, seawater, bilge system
- d) Ventilation arrangement
- e) Fire control plan
- f) Steering gear arrangement
- g) Escape arrangement
- h) Electric loading calculations
- i) Other plans and documents as necessary.

4.3.2 Manufacturers of engine and shaft arrangement are to submit plans and documents in accordance with Ch.12 of Rules and Regulations for the Construction and Classification of High Speed crafts and Light Crafts for the approval of the IRS

4.3.3 When Crafts are constructed in FRP, the lay-up procedure, joint details, secondary bonding details and materials list are to be submitted.

4.4 Plans and documents for reference

4.4.1 Following plans and documents are to be submitted for reference:

- a) General Arrangement
- b) Specifications
- c) Lines Plan/ Hydrostatics
- d) Other plans and documents as necessary.

Section 5

Classification of Crafts Not-Built under the Survey of Indian Register of Shipping

5.1 General procedure for classification of Craft not built under survey of IRS

5.1.1 Plans of Craft are to be submitted for approval. It is preferable to have the plans approved before the classification survey is commenced.

5.1.2 Full special classification surveys would require to be carried out by IRS Surveyors in order to satisfy themselves regarding the workmanship and to verify the approved scantlings and arrangements. The scope of these surveys may, however, be modified in the case of Crafts built under the Special Survey and holding valid certificates of class of IACS member societies, if prior to commencement of survey by IRS, documentary evidence of all classification surveys held by the other society subsequent to last special survey carried out by them could be produced. In such cases, a special survey notation will not be assigned in conjunction with the classification survey. The next special survey therefore would become due five years from the special survey held by the other society and not five years from classification with IRS.

In cases of transfer of class from another society to single class of IRS, the interim certificate of class or any other documents enabling the Craft to operate can be issued only after all overdue surveys and recommendations or conditions of class issued by the previous society are satisfactorily completed.

5.1.3 For Craft not built under survey of IRS but subsequently taken in class with the above procedure, the mark signifying the survey during construction will be omitted.

5.1.4 Once a Craft has been taken into IRS class, periodical surveys are subsequently to be held as per these rules.

5.2 Plans and data to be furnished as required in 5.1.1

5.2.1 Plans of hull and equipment showing the main scantlings and arrangements of the actual Craft and any proposed alterations are to be submitted for approval. These are to normally comprise of the plans listed in 4.3.

Section 6

Certification

6.1 General

6.1.1 Certification process involves verification of compliance with the requirements of the Rules applicable to a specific object, a vessel, a component or a material.

6.1.2 Certification is documented by a certificate for the object(s) stating the certification procedure applied, the conditions, restrictions and when relevant the validity of the certificate.

6.1.3 Certification of Pleasure Crafts may be carried out according to the requirements in these Rules and/ or recognized national/ international requirements.

6.1.4 Requirements of national authorities/ Flag Administrations, where the pleasure crafts are registered are to be taken cognizance of whilst certifying the crafts. In the case of EU certification, IRS would certify compliance of the Pleasure Crafts with the EU Recreational Craft Directives (RCD), as amended from time to time.

End of Chapter

Chapter 2

Surveys

Section	Contents
1	<i>General Requirements</i>
2	<i>Periodical Surveys</i>

Section 1

General Requirements

1.1 General

1.1.1 All Pleasure Crafts under the Classification scheme are to be subject to periodical surveys for the purpose of maintenance of class. Crafts classed with IRS are to be subjected to intermediate and special surveys for continuation of the classification.

1.1.2 Crafts under the Certification scheme would not be subject to periodical surveys.

1.2 Lay-up and Reactivation Surveys

1.2.1 In the case of Crafts which have been out of service for an extended period of six (6) months or more, the requirements for reactivation surveys will be specially considered in each case with due regard given to the status of surveys at the time of the commencement of the lay-up period, the length of the period, and conditions under

which the unit had been maintained during that period.

1.3 Surveys for Damage

1.3.1 It is the responsibility of the owner/operator of the Craft to report to IRS without delay any damage, defect or breakdown, which could invalidate the conditions for which a classification has been assigned so that it may be examined at the earliest opportunity by IRS Surveyor(s). All repairs found necessary by the Surveyor are to be carried out to his satisfaction.

1.4 Unscheduled Surveys

1.4.1 In the event that IRS has reason to believe that its Rules and Regulations are not being complied with, IRS reserves the right to perform unscheduled surveys of the hull or machinery.

Section 2

Periodical Surveys

2.1 General

2.1.1 Underwater examination of Crafts is to be carried out twice in a five-year period during the validity of the Class Certificate and the maximum interval between two such inspections is not to exceed 36 months.

2.2 Intermediate Surveys

2.2.1 General

2.2.1.1 The due date of intermediate survey is 2.5 years after the completion date of the initial classification survey or previous special

survey. The intermediate survey may be carried out within a time window of 6 months before or after the due date.

2.2.1.2 The survey is to be carried out on shore, in dry dock or on a slipway. The vessel is to be placed at a height enabling its keel and bottom to be thoroughly examined.

2.2.2 Hull

2.2.2.1 At each survey the hull is to be generally examined, so far as can be seen, and placed in satisfactory condition as necessary. In addition to the following items are to be examined, placed in satisfactory condition and reported upon:

- a) External examination of the hull structure, including the deckhouse, inside of engine room and foundations. For crafts constructed of aluminum, special attention is to be paid to galvanic corrosion of underwater plating which is in close proximity to other metals.
- b) Watertight closures, such as hatches, skylights, air and sounding pipes, scuppers, discharge lines, doors etc. including their seals and locking devices.
- c) Sea valves and all inlet and outlet shell openings. All opening to the sea, including sanitary and other overboard discharges (together with the connected valves) are to be examined internally and externally and the fastenings to the shell plating are to be renewed when considered necessary by the Surveyor. For crafts constructed of aluminum insulating material in joints of shell connections between dissimilar metals is to be examined and renewed if necessary.
- d) Anchoring equipment is to be examined and placed in satisfactory condition.

2.2.3 Machinery and Systems

2.2.3.1 At each Survey the machinery and electrical installation are to be generally examined, so far as can be seen, and placed in satisfactory condition as necessary. The survey should include the examination of the following.

- a) Main and auxiliary machinery with relevant components.
- b) Electrical installation, including relevant machinery, switchboards and cabling.
- c) Rudder and steering gear, including measurement of bearing clearances.
- d) Propeller, including fastening devices.
- e) External examination of the entire propeller shaft system without withdrawal of the shaft, including measurement of bearing clearances.
- f) Fire protection and fire-fighting equipment.

2.3 Special Surveys

2.3.1 General

2.3.1.1 All Pleasure Crafts classed with IRS are to undergo Special Surveys at 5 yearly intervals. The first special survey is to be completed within 5 years from the date of the initial classification survey and thereafter 5 years from the assigned date of the previous special survey. However, an extension of class of 3 months maximum beyond the 5th year may be granted in exceptional circumstances, provided the requirements of 2.1.1 are complied with. In such cases, the next period of class will start from the expiry date of the special survey before extension was granted.

2.3.1.2 Special survey is to include compliance with intermediate survey requirements.

2.3.1.3 The Craft is to be placed in dry-dock or on a slipway. The vessel is to be placed at a height enabling its keel and bottom to be thoroughly examined.

2.3.2 Hull

- a) Thickness measurements of Crafts of Steel and Aluminum are to be carried out in accordance with Table 2.3.4.
- b) All decks, casings and superstructures are to be examined. Particular attention is to be given to the corners of openings and other discontinuities in way of decks and topsides.

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- c) The interior of the Craft is to be opened out by removal of lining, ceiling, portable tanks and ballast as may be required by the Surveyor to satisfy himself as to the condition of all parts of the structure.
 - d) All integral tanks are to be tested with a head of liquid to the highest point that liquid will rise under service conditions.
 - e) Hose testing of all watertight/ weathertight enclosures.
 - f) Examination of anchors, anchor windlass, hawse pipes, chain cables and hawsers.
 - g) All fastening, including those through the ballast keel are to be hammer tested to ascertain their soundness and drawn for examination as considered necessary by the surveyor. During second special survey and subsequent, on all crafts fitted with a ballast keel, fastenings are to be drawn for examination as may be required by the surveyor.
 - h) Thickness measurement may be required to be carried out in any part of the craft where wastage is evident or suspect,
 - i) In addition, the following requirements apply to Crafts constructed of fibre reinforced plastic:
 - i. The framing and holds, hull laminate of the deck, deep tanks, peaks, bilges and drain wells, and machinery spaces are to be cleaned and examined. Linings, ceiling, tanks, and portable ballast are to be removed as considered necessary by the attending Surveyor.
 - ii. Where there is evidence of cracking, distortion, wetness, or delamination, destructive or nondestructive testing and removal and repair of the defect is to be carried out to the satisfaction of the attending Surveyor.
 - iii. Engine foundations and their attachment to the hull are to be examined.
 - iv. The hull, fastenings, and backing reinforcements in way of hull fittings and attachments are to be examined. Fastenings are to be withdrawn as considered necessary by the attending Surveyor.
 - j) In addition to the following requirements apply to those Crafts constructed of wood:
 - i. Where the planking is sheathed with metal, such portions are to be removed as required by the Surveyor. If sheathed with reinforced plastics or similar material, the sheathing is to be examined to ensure it is adhering satisfactorily and that there is no possibility of water seepage occurring along plank edges.
 - ii. The caulking of the outside and deck planking is to be tested and re-caulked as necessary.
 - iii. If a wood craft is sheathed with metal, such sheathing as will at least permit an examination of the wood keel, garboards, plank ends, stern and sternpost is to be removed as requested by the Surveyor, during second special survey and subsequent.
 - iv. In wood crafts, fastenings as may be required by the Surveyor are to be drawn for examination, during second special survey and subsequent.

2.3.3 Machinery and Systems

2.3.3.1 The following examination and testing are to be carried out:

- a) The rudder is to be examined, the condition of the carrier and bearing and the effectiveness of the stuffing boxes are to be ascertained.
- b) Inspection of bilge and ballast lines, including pumps with operational trials of the system.
- c) Dismounting of sea valves if deemed necessary by surveyor after external inspection.
- d) Removal of propeller shaft if deemed necessary by the surveyor after external inspection.
- e) Dismounting of individual components of the machinery if deemed necessary by the surveyor after external inspection.
- f) Partial or complete disassembly of engine as deemed necessary by the surveyor, taking into account

manufacturer's recommendations and records of maintenance.

- g) Operational trials of the entire machinery and electrical installation, with the ship afloat.

2.3.4 Thickness Measurement

2.3.4.1 Parts damaged or worn to such an extent as to no longer comply with the requirements of rules are to be repaired or replaced.

2.3.4.2 Components with thickness of less than 90% of those stipulated are to be renewed.

2.3.4.3 Anchors are to be replaced, if their weights have been reduced by more than 10% compared with the rule weight.

2.3.4.4 Chain-link cables are to be renewed, if the prescribed cross-section of the chain links has been reduced by more than 12%.

Table 2.3.4 - Minimum Requirements for Thickness Gauging

Special Survey No.1	Special Survey No.2	Special Survey No.3	Special Survey No.4
Areas considered suspect by the Surveyor, throughout the vessel	Areas considered suspect by the Surveyor, throughout the vessel	Areas considered suspect by the Surveyor, throughout the vessel	Areas considered suspect by the Surveyor, throughout the vessel
		Two wind-and-water strakes, port and starboard, for half-length amidships.	Two wind-and-water strakes, port and starboard, for half-length amidships.
		All exposed main deck and superstructure deck plating.	All exposed main deck and superstructure deck plating.
			Flat keel plating full length, plus extensive bottom plating.

End of Chapter

Chapter 3

Materials

Section	Contents
1	<i>General</i>
2	<i>Structural Steel</i>
3	<i>Aluminium Alloys</i>
4	<i>Glass Reinforced Plastic Materials</i>
5	<i>Wood</i>

Section 1

General

1.1 Scope

1.1.1 These Rules provide for the use of steel, marine grade aluminium alloys and glass reinforced plastics in the construction or repair of hull structures of Pleasure Crafts.

1.1.2 The choice of materials is to take into account the manufacturing conditions in the boat yard, environmental limitations, the anticipated manufacturing process, competence of the welders/ craftsmen, etc.

1.1.3 Materials used for the construction or repair of machinery components or systems or components are to be in general, manufactured, tested and inspected according to the relevant requirements given in Part 2 of the *Rules and Regulations for the Construction and Classification of Steel Ships*.

1.1.4 Materials complying with recognized national or international standards (for e.g. ISO 12215) giving equivalent requirements may also be accepted.

1.1.5 When combining metals of different type or composition, the galvanic potential difference is to be considered in order to avoid contact corrosion. The rate of contact corrosion may be influenced by environmental conditions, heat treatment, welding and forming.

1.1.6 The negative effect on certain timber by adjacent metals and vice versa is to be taken into account whilst selecting the materials to be in contact or is to be neutralized by shielding or insulation.

1.1.7 The Craft manufacturer is to provide instructions regarding the following:

- Possible reduction of mechanical properties by the induction of heat;
- Use of chemicals and anti-fouling paints that are incompatible with aluminium.

1.2 Identification, Storage and Handling

1.2.1 The Craft builder is to establish and maintain a procedure to ensure that materials and consumables used in the construction process are identified (by colour coding and/or marking or any other means, as appropriate) from arrival in the yard through to fabrication in such a way as to ensure that the type and grade are easily recognized.

1.2.2 The Craft builder is to maintain purchase documents containing a clear description of the material ordered for construction referring to the appropriate standards or specifications, in order to ensure traceability.

1.2.3 Materials are to be stored in accordance with the material manufacturer's requirements. Storage arrangements are to be such as to prevent deterioration through adverse environmental conditions and poor handling.

1.2.4 Welding consumables are to be stored in suitable conditions to maintain them in

accordance with the material manufacturer's recommendations.

1.2.5 Defective/ sub-standard materials are to be disposed off in accordance with the builder's conformity assurance procedures.

Section 2

Structural Steel

2.1 Manufacture, Inspection and Testing

2.1.1 All steel rolled products, castings and forgings used in the construction and repairs of hull structures of Pleasure Crafts are to be in general, manufactured and tested in accordance with the requirements of Ch. 3, Sec. 2 of the *IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts*.

2.2 Higher Strength Steels

2.2.1 Higher strength steel may be used in the construction of Pleasure Crafts, provided it is taken into consideration that, when fatigue load is present, the effective fatigue strength of a welded joint may not be greater than a welded joint in normal strength steels. Where higher strength steel is proposed for the hull structure, the drawings indicating extent of use, location, material properties and dimensions are to be submitted to IRS for approval.

2.3 Stainless Steels

2.3.1 Austenitic stainless steels may be used

for construction in Pleasure Crafts subject to careful consideration of the following:

- Environmental conditions to which the craft may be subjected;
- Any intended combination of different metals, the means of insulation from each other and surface protection and coating;
- Detail design to reduce the possibility of pitting and/ or crevice corrosion.

2.3.2 This group of steels comprises low-carbon austenitic steels which achieve their corrosion resistance in fresh and sea water by additions of Chromium (Cr), Nickel (Ni), Molybdenum (Mo) and may additionally be stabilized for a stable after-welding condition by Titanium (Ti) and Niobium (Nb).

2.3.3 Alloys suitable for marine use are in general those with a minimum mass fraction of 12% Chromium (Cr) and a pitting resistance equivalent (W) exceeding 25 ($W = \% \text{Cr} + 3.3\% \text{Mo}$).

Section 3

Aluminum Alloys

3.1 Manufacture, Inspection and Testing

3.1.1 All aluminium alloy rolled or extruded products, castings or aluminium/ steel transition joints used in the construction and repairs of hull structures of Pleasure Crafts are to be in general, manufactured and tested in accordance with the requirements of Ch. 3, Sec. 3 of the *IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts*.

3.1.2 Aluminium alloys used for hull structure of Pleasure Crafts are to be of the 5000 or 6000 series.

3.1.3 Alloys of the Aluminium-Copper group (3000 series) and Aluminium-Zinc group (7000 series) are not to be used for the construction of Pleasure Crafts. They may be used for secondary purposes in Pleasure Crafts with special protection, e.g. anodizing, painting.

Section 4

Glass Reinforced Plastics Materials

4.1 General

4.1.1 Glass reinforced plastics materials used in the construction and repairs of hull structures of Pleasure Crafts are to be in general, manufactured and tested in accordance with the requirements of Ch. 3, Sec. 4 of the *IRS Rules and Regulations for*

the Construction and Classification of High Speed Crafts and Light Crafts.

4.1.2 Materials (resins, gelcoats, fibre reinforcements, core for sandwich structures) other than those listed in the Rules would be specially considered.

Section 5

Wood

5.1 General

5.1.1 Requirements specified in this Section are applicable to structural wood and plywood used in the hull structure of Pleasure Crafts.

5.1.2 Wood and plywood used for hull structure of Pleasure Crafts are to be approved by IRS.

5.1.3 A list of International and Indian Standards for examination of timber, plywood etc. is provided in Appendix I. Detailed list of Indian Standards useful for Timber Engineering are also provided in '*Handbook on Timber Engineering*' SP:33-1986, Bureau of Indian Standards.

5.2 Requirements for wood

5.2.1 Solid timber

5.2.1.1 Timber is to be suitable for use in the intended marine environment and is to be of durability classes 1, 2 or 3, (see Table 5.2.1.1) except, where otherwise specified in this Section.

5.2.1.2 A selection of such wood species is given in Table 5.2.1.2. Wood of lower durability classes may be used, as listed in Table 5.2.1.2, provided the mechanical properties are sufficient for scantlings and suitable preservations are applied.

Table 5.2.1.1 – Designation of Durability of Wood

Durability class	Endurance (years)	Resistance
1	> 25	High resistance
2	15 to 25	Resistant
3	10 to 15	Moderate resistance
4	< 10	Non-resistant

Table 5.2.1.2 – Wood Designation and Durability Classes (Selection)

Trade name	Botanical designation	Durability class
Teak	Tectona grandis	1
Iroko	Chlorophora excelsa	1
Macore	Tieghemelia heckelii	1
Andaman Padauk	Pterocarpus dalbergioides	1
Sipo, Utile	Entandophragma utile	2
Mahogany	Swietenia macrophylla	2
Oak, European	Quercus robur	2
Red cedar, western	Thuja plicata	2
Khaya, Benin mahogany	Khaya ivorensis	2, 3
Agba	Gossweilerodendron balsamiferum	2, 3
Douglas fir, Oregon pine	Pseudotsuga menziesil	3
Larch	Larix deciduas	3
Pine	Pinun sylverstris	3
Fir	Abies alba	4
Fir, spruce	Picea abies	4
Spruce	Picea glauca	4
Anhili	Artocarpus hirsutus	4

5.2.1.3 Timber for structural parts are to be free from defects that might impair the strength or durability of the small craft, e.g. blueing, brittleness, rot, cracks, knots and sapwood.

5.2.1.4 Timber used for planking of the hull is to be cut with consideration of warping, shrinkage and swelling in the as-assembled condition.

5.2.1.5 Timber intended to be used for planking of the hull is to be quarter sawn (rift sawn), with an angle of the annular rings to the lower cut edge less than 45 deg for single-skin carvel construction, except for strip plank construction with small strip width.

5.2.1.6 The moisture content of the wood is to be within the limits required by the method of joining the parts (glueing, laminating, sheathing) and consideration of the dimensional stability of the structure.

5.2.1.7 Timber for structural purposes where encapsulated or over-laminated is to have average moisture content not greater than 15%.

5.3 Plywood

5.3.1 Plywood intended to be used for external structural members, e.g. hull, weather deck not sheathed by fibre reinforced plastics (FRP) laminate or similar, superstructures and deckhouses, is to be marine-grade plywood. Where a Craft is intended to be only temporarily used in the water and the hull is protected by a wood-penetrating medium (e.g. epoxy resin) other waterproof and boil proof external-grade plywood may be used.

5.3.2 Other members inside the hull may be made of waterproof and boil proof plywood (which does not fully comply with marine-grade plywood). It is to be durable.

5.4 Veneers for moulded construction

5.4.1 Veneers used in the construction of the hull, deck and superstructure are, in general to be of durability class 1 or 2. As an exception; veneers of durability less than 2 may be used if adequately preserved by resin penetration or FRP sheathing.

5.5 Wood composite structures

5.5.1 For the purpose of this Section, composite structures are wooden, generally of moulded construction and made of layers of veneers or strip planking with cove-and-bead or tongue-and-groove edge joints with one or more layers of synthetic fibres incorporated taking a significant part of the stress. The synthetic fibres are generally used in the form of fabrics, for example glass, aramid, carbon fibres, or a combination of these.

5.5.2 When selecting wood and fibre fabrics for the purpose of composite construction, the resin used for saturating the fibres is to be capable of achieving a good penetration into the surface of the wood and a structurally sound bond between wood and fabric.

5.5.3 Where composite construction is used, the different properties of the materials being used are to be taken into account and the way in which applied loads will be shared.

5.6 Data Sheet

5.6.1 A data sheet of the material or other suitable written information, listing

- The botanical name of the wood in addition to the trade name;
- The average density for a defined moisture content;
- The average mechanical properties, according to the appropriate standard; and
- Moisture content when delivered and method of drying (air or kiln).

5.7 Workshop Conditions

5.7.1 The premises used for production and storage are to be suitable and equipped to provide the conditions necessary for fault-free bonding by adhesives.

5.7.2 Facilities to monitor and, if necessary, to control temperature, humidity and other environmental conditions during manufacturing are to be provided in the workshop.

5.8 Storage and Handling of Material

5.8.1 Timber is to be stored in dry and well-ventilated premises, where it is protected from direct sunlight and excessive moisture. Timber is to be stored horizontally, each plank or layer being separated from each other to achieve air circulation.

5.8.2 Adhesives are to be suitable for the intended purpose and are to be stored as specified by the manufacturers in their original containers. They are not to be used after their expiry date.

5.8.3 Fastening elements for load bearing parts of the construction e.g. nails, screws and bolts are to be corrosion resistant or hot-dipped galvanized.

5.9 Manufacture of Wooden Crafts

5.9.1 The manufacturing of the Craft is to take place in conditions such that the requirements and limitations specified by the manufacturer of the materials (e.g. glue, resin or paint) are met.

5.9.2 The moisture content of the wood is to be checked before gluing. The moisture content is not to exceed that which permits full joint strength. Areas to be glued are to be free from any contamination that might impair the strength of the bond.

5.9.3 Wooden craft are to be constructed in such a manner that water cannot collect in areas, from where it cannot be drained. They are to be constructed in a way that natural ventilation is promoted to all areas of the craft.

5.9.4 A protective coating or surface treatment is to be applied to finished surfaces not intended to be left bare, for example teak decks. Any coating or treatment is not to adversely react with the adhesives, reduce the mechanical property of the joint or have a detrimental effect on the wood itself.

5.10 Other Materials

5.10.1 Materials not listed in Cl. 5.2 may be used if adequate suitability and durability for the intended purpose can be demonstrated.

5.10.2 The suitability can be demonstrated by

- Laboratory tests;
- Long-term tests with the boat as finished; and
- Reports on similar small craft with comparable hull parameters and size and operating environment.

5.10.3 A data sheet of the material or other suitable written information, listing the following, is to be maintained:

- The generic name of the material;
- The chemical composition of the material;
- The mechanical properties of the material in the finished condition;
- Any manufacturing information as to the process required (plastic material preferably); and
- Information on the durability under UV and marine atmospheric conditions (plastic material preferably).

Appendix I	
Standard No	Description
ISO 1029:1974	<i>Coniferous Sawn Timber – Defects - Classification</i>
ISO 1031:1974	<i>Coniferous Sawn Timber – Defects – Terms and Conditions</i>
ISO 1032:1974	<i>Coniferous Sawn Timber – Sizes – Terms and Definitions</i>
ISO 1096:2014	<i>Plywood - Classification</i>
ISO 2300:1973	<i>Sawn Timber of broadleaved species – Defects – Terms and Definitions</i>
ISO 2074:2007	<i>Plywood – Vocabulary</i>
ISO 2299:1973	<i>Sawn Timber of broadleaved species – Defects – Classification</i>
ISO 2301:1973	<i>Sawn Timber of broadleaved species – Defects – Measurement</i>
ISO 3129:2012	<i>Wood – Sampling Methods and general requirements for physical and mechanical testing of small clear wood specimens</i>
ISO 13061-1:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 1: Determination of moisture content for physical and mechanical tests</i>
ISO 13061-2:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 2: Determination of density for physical and mechanical tests</i>
ISO 3132:1975	<i>Wood – Testing in compression perpendicular to grain (under revision)</i>
ISO 13061-3:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 3: Determination of ultimate strength in static bending</i>
ISO 13061-6:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 6: Determination of ultimate tensile stress parallel to grain</i>
ISO 13061-7:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 7: Determination of ultimate tensile stress perpendicular to grain</i>
ISO 3347:1976	<i>Wood – Determination of ultimate shearing stress parallel to grain</i>
ISO 3348:1975	<i>Wood – Determination of impact bending strength</i>
ISO 13061-4:2014	<i>Physical and mechanical properties of wood - Test methods for small clear wood specimens - Part 4: Determination of modulus of elasticity in static bending</i>

Standard No	Description
ISO 3787:1976	<i>Wood – Determination of ultimate stress in compression parallel to grain</i>
ISO 24294:2013	<i>Timber-Round and Sawn Timber - Vocabulary</i>
SP 33 : 1986	<i>Handbook on Timber Engineering</i>
IS 190 : 1991	<i>Coniferous Sawn Timber (Baulks and Scantlings)</i>
IS 401 : 2001	<i>Preservation of Timber – Code of Practice</i>
IS 1141 : 1993	<i>Seasoning of Timber – Code of Practice</i>
IS 1326 : 1992	<i>Non-coniferous Sawn Timber (Baulks and Scantlings)</i>
IS 3364 : Part 1 : 1976	<i>Methods of measurement and evaluation of defects in Timber : Part 1 Logs</i>
IS 3364 : Part 2 : 1976	<i>Methods of measurement and evaluation of defects in Timber : Part 2 Converted Timber</i>
IS 4895 : 1985	<i>Teak Logs</i>
IS 6534 : 1971	<i>Guiding principles for grading and inspection of timber</i>

End of Chapter

Chapter 4

Structures

Section	Contents
1	<i>Arrangements</i>
2	<i>Structures: Pleasure Crafts of Steel, Aluminium and Fibre Reinforced Plastics</i>
3	<i>Structures : Wooden Vessels</i>

Section 1

Arrangements

1.1 General Requirements

1.1.1 The design of hull structure and construction is to provide strength and service life for the safe operation of a Craft, at its service draught and maximum service speed, to withstand the sea and weather conditions likely to be encountered in the intended area of operation.

1.1.2 A Pleasure Craft may be constructed of steel, aluminium alloy, fibre reinforced plastics (FRP), wood or composites.

1.2 Decks

1.2.1 All design categories of Pleasure Craft are required to be fitted with a watertight weather deck over the length of the Craft, and be of adequate structural strength to withstand the sea and weather conditions likely to be encountered in the intended area of operation.

1.2.2 A Design Type 1 Pleasure Craft may be permitted without watertight weather deck provided reserve buoyancy and stability for the Craft with its full complement of persons is adequate to remain afloat to survive the consequences of swamping.

1.2.3 A watertight weather deck referred to in 1.2.1 is to extend from stem to stern and have positive freeboard throughout, in any condition of loading of the Craft.

1.2.4 The weather deck may be stepped, recessed or raised provided the stepped,

recessed or raised portion is of watertight construction.

1.3 Recesses

1.3.1 For motorised Pleasure Crafts, recesses in a weather deck are to be of watertight construction and have means of drainage capable of efficient operation when the Craft is heeled to 10°. Such drainage is to have an effective area, excluding grills and baffles, of at least 20 [cm²] for each cubic metre of volume of recess below the weather deck.

1.3.2 Alternative arrangements for the size and drainage of a recess may be accepted provided it can be demonstrated that, with the Craft upright and at its deepest draught, the recess drains from a swamped condition within 3 minutes; or the cockpit or recess are to comply with *ISO 11812 (Small Craft – Watertight and Quick Draining Cockpits)*

1.3.3 If a recess is provided with a locker that gives direct access to the interior of the hull, the locker is to be fitted with weather tight cover(s). In addition the cover(s) to the locker are to be permanently attached to the Craft's structure and fitted with efficient locking devices to secure the cover(s) in the closed position.

1.4 Watertight Bulkheads

1.4.1 The strength of a watertight bulkhead and the effectiveness of any alternative means is to be adequate for the intended purpose and to the satisfaction of IRS.

1.4.2 When pipes, cables, etc. penetrate watertight bulkheads, they are to be provided with valves and/or watertight glands, as appropriate.

1.4.3 A doorway fitted in a watertight bulkhead is to be constructed so as to be watertight from both sides and be kept closed at sea, unless opened for access only, at the discretion of the skipper. A notice is to be fitted to both sides of the door "To be kept closed at sea, open for access only". Sliding watertight doors, where fitted, are to be provided with suitable safety provision to avoid injury to personnel by closure of the door.

1.5 Hatchways and Hatches

1.5.1 General requirements

1.5.1.1 A hatchway that gives access to spaces below the weather deck is to be of efficient construction and be provided with efficient means of weather tight closure.

1.5.1.2 A cover to a hatchway is to be hinged, sliding, or permanently secured by other equivalent means to the structure of the Craft and be provided with sufficient locking devices to enable it to be positively secured in the closed position.

1.5.1.3 A hatchway with a hinged cover which is located in the forward portion of the Craft is to normally have the hinges fitted to the forward side of the hatch, as protection of the opening from boarding seas. A hatch with the hinges on the after side of the hatch is to be secured closed at sea, and be provided with a suitable blank. These requirements are not applicable to small spaces drained directly overboard, e.g. anchor lockers.

1.5.1.4 Hatches which are used for escape purposes are to be capable of being opened from both sides.

1.5.1.5 Hatches in recessed or stepped decks of Crafts, that provide access to sea inlet valves, are to have access openings at least 300mm above the minimum freeboard to deck, or the sea inlet valves fitted with remote closing devices.

1.5.2 Hatchways that are open at sea

1.5.2.1 In general, hatches are to be kept secured closed at sea. However, a hatch

(other than a companion hatch) that is to be open at sea for lengthy periods is to be:

(a) Kept as small as practicable, but never more than 1[m²] in plane area at the top of the coaming;

(b) Located on the centre line of the Craft or as close thereto as practicable;

(c) Fitted such that the access opening is at least 300 [mm] above the top of the adjacent weather deck at side.

1.6 Doorways and Companionways

1.6.1 Doorways located above the Weather Deck

1.6.1.1 A doorway located above the weather deck that gives access to spaces below is to be provided with a weather tight door. The door is to be of efficient construction, permanently attached to the bulkhead, not open inwards, and sized such that the door overlaps the clear opening on all sides, and has efficient means of closure which can be operated from either side.

1.6.1.2 A doorway is to be located as close as practicable to the centre line of the Craft. However, if hinged and located in the side of a house, the door is to be hinged on the forward edge. Doors using articulated systems are to be specially considered, in order to provide an equivalent arrangement.

1.6.1.3 A doorway that is either forward or side facing is to be provided with a coaming, the top of which is at least 300 [mm] above the weather deck. A coaming may be portable provided it can be permanently secured to the structure of the Craft and can be locked in position whilst at sea.

1.6.2 Companion Hatch Openings

1.6.2.1 A companion hatch opening from a cockpit or recess that gives access to spaces below the weather deck is to be fitted with a coaming or washboard, the top of which is at least 300 [mm] above the sole of the cockpit or recess.

1.6.2.2 When washboards are used to close a vertical opening they are to be so arranged and fitted that they will not become dislodged.

1.6.2.3 The maximum breadth of the opening of a companion hatch is not to exceed 1[m].

1.7 Skylights

1.7.1 The skylight is to be of efficient weather tight construction and is to be located on the centre line of the Craft, or as near thereto as practicable, unless it is required to provide a means of escape from a compartment below deck.

1.7.2 When a skylight is an opening type it is to be provided with efficient means whereby it can be secured in the closed position.

1.7.3 A skylight that is provided as a means of escape is to be capable of being opened from both sides.

1.7.4 Unless the glazing material and its method of fixing in the frame is equivalent in strength to that required for the structure in which it is fitted, a portable "blank" is to be provided which can be efficiently secured in place in event of breakage of the glazing.

1.8 Portlights and Windows

1.8.1 The portlight or window to a space below the weather deck or in a step, recess, raised deck structure, deckhouse or superstructure protecting openings leading below the weather deck shall be of efficient construction which provides weather tight integrity (and be of strength compatible with size) for the intended area of operation of the Craft.

1.8.2 A portlight or window is not to be fitted in the main hull below the weather deck, unless the glazing material and its method of fixing in the frame are equivalent in strength, with regard to design pressure, to that required for the structure in which it is fitted.

1.8.3 Portlights fitted in the hull of the Craft below the level of the weather deck are to be either non-opening or of a non-readily opening type, have a glazed diameter of not more than 250 [mm], or equivalent area, and be in accordance with a recognised national/international standard. Portlights of the non-readily opening type are to be secured closed when the Craft is in navigation. Proposals to accept portlights, to a recognised standard, greater than 250 [mm] diameter, up to a maximum of 400 [mm] or equivalent area, may be considered, with due regard to their fore and aft, and vertical positioning, to the

satisfaction of IRS. Proposals for larger portlights will be specially considered.

1.8.4 Portlights, windows and their frames are to comply with appropriate National or International Standards.

1.8.5 A portlight fitted below the weather deck and not provided with an attached deadlight is to be provided with a "blank" (the number of blanks are to be sufficient for at least half of the number of such portlights of each different size in the Craft), which can be efficiently secured in place in the event of breakage of the portlight. The blank is to be of suitable material and strength.

1.8.6 A window fitted in the main hull below the weather deck is to meet the requirements of 1.7.2, or be provided with a blank meeting the requirements of 1.8.7.

1.8.7 In a Craft which operates more than 24 miles from a safe haven, portable "blanks" for windows are to be provided (the number of blanks are to be sufficient for at least half of the number of such windows of each different size in the Craft) which can be efficiently secured in place in the event of breakage of a window. Such a "blank" is not required for a window which satisfies 1.8.2.

1.8.8 Wheelhouse windows and their frames are to meet the requirements of 1.7.4, having due regard to the increased thickness of windows comprising one or more laminations in order to achieve equivalent strength; are not be of polarised or tinted glass when provided for navigational visibility (although portable tinted screens may be provided for nominated windows)

1.9 Water Freeing Arrangements

1.9.1 General

1.9.1.1 When a deck is fitted with bulwarks such that shipped water may be trapped behind them, the bulwarks are to be provided with efficient freeing ports that will ensure the deck can be effectively drained.

1.9.1.2 The area of freeing ports is to be at least 4% of the bulwark area and be situated in the lower third of the bulwark height, as close to the deck as practicable.

1.9.1.3 A Craft of less than 12 [m] in length, having a well deck aft which is fitted with

bulwarks all round and of Type 2, 3 & 4, is to be provided with freeing ports required by 1.9.1.2 or may be provided with a minimum of two ports fitted (one port and one starboard), which may be in the transom, each having a clear area of at least 225 cm². Ports may only be fitted in the transom on Crafts where the shipping of water will not result in a trim by the head such that water will not drain.

1.9.1.4 Smaller ports may however be accepted in a Craft having only small side deck areas in which water can be trapped, the reduced area being based on the volume of water which is likely to become so trapped.

1.9.1.5 When a non-return shutter or flap is fitted to a freeing port it is to have sufficient clearance to prevent jamming and any hinges are to have pins or bearings of non-corrosive material.

1.9.1.6 An open Pleasure Craft is to be provided with bilge pumping arrangement.

1.9.1.7 In a Craft where freeing ports cannot be fitted, other efficient means of clearing trapped water from the Craft are to be provided to the satisfaction of IRS.

1.9.1.8 Structures and spaces considered to be non-weather tight are to be provided with efficient drainage.

1.9.1.9 A Craft intended to operate in sea areas where ice accretion can occur would be specially considered with regard to water freeing arrangements.

1.10 Bulwarks, Guard Rails and Handrails

1.10.1 Bulwarks, guardrails and guard wires are to be supported efficiently by stays or stanchions. When application of such measures would impede the proper working of the Craft, alternative safety measures are to be considered.

1.10.2 To protect persons from falling overboard, and when the proper working of the Craft is not impeded and there are persons frequently on the deck, bulwarks or three courses of rails or taut wires are to be provided and the bulwark top or top course be not than 1000 [mm] above the deck. The distance between the lowest course and the deck is not to exceed 230 [mm] and the distance between other courses are not to exceed 380 [mm].

1.10.3 In a Craft fitted with a cockpit that opens aft to the sea, additional guardrails are to be fitted so that there is no unprotected vertical opening (i.e. between vertical 'members') greater than 500 [mm] in width.

1.10.4 Where it is impractical and unnecessary to fit guardrails, alternative arrangements may be acceptable subject to IRS/ Administration being satisfied as to the adequacy of the proposed arrangements. For example, on small motor Crafts with narrow side decks alongside a deck house, a handrail on the side of the deckhouse may be fitted. On the foredeck, a centre line handrail may be considered more workable.

1.10.5 Handrails are to be provided for access stairways, ladder ways, passage ways and for decks without bulwarks or guardrails. This provision is not to be used in lieu of guardrails and bulwarks where required by these Rules.

Section 2

Structures: Pleasure Crafts of Steel, Aluminium and Fibre Reinforced Plastics

2.1 Design Requirements

2.1.1 The structural design requirements for various categories of Pleasure Crafts (2.1 and 2.2) are to correspond to equivalent requirements of '*IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts*' (as given in Table 2.1.1):

Table 2.1.1	
Craft Type	Equivalent Notations of HSC&LC Rules
3 and 4	RS 0
2	RS 1
1	RS 2

2.2 Alternative Standards

2.2.1 Pleasure Crafts of Steel, Aluminium and FRP designed to ISO 12215 may also be accepted.

2.2.2 Pleasure Crafts designed in accordance with ISO 12215 are to meet the requirements of Table 2.2.2

Table 2.2.2	
Craft Type	Equivalent Design Category ISO 12215
3 and 4	A
2	B
1	C

2.3 Scantlings: Steel and Aluminium Vessels

2.3.1 The scantlings of Crafts made of steel and aluminium are to be decided based on the requirements applicable in Ch. 6 of the *IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts*.

2.4 Scantlings: FRP Vessels

2.4.1 The scantlings of Crafts made of Fibre Reinforced Plastics are to be decided based on the requirements applicable in Ch. 7 of the *IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts*.

Section 3

Structures : Wooden Vessels

3.1 Design Loads and Scantlings : Wooden Vessels

3.1.1 Design loads and scantlings for the wooden hulled crafts may be determined in accordance with the requirements in ISO 12215-5:2008 (as amended).

3.1.2 Pleasure Crafts designed in accordance with ISO 12215 are to meet the requirements of Table 3.1.2:

Table 3.1.2	
Craft Type	Equivalent Design Category ISO 12215
3 and 4	A
2	B
1	C

End of Chapter

Chapter 5

Stability

Section	Contents
1	<i>General</i>

Section 1

General

1.1 All Pleasure Crafts will be assigned class or certified only after it has been demonstrated that their intact stability and damage stability (where applicable) are in compliance with the standards laid down by the National Statutory Authority.

1.2. Where the Administration has not specified criteria of stability for Crafts of less than 24 [m] in length, appropriate criteria for the type of craft may be applied which is acceptable to IRS (see 1.4).

1.3 All Pleasure Crafts are to be provided with approved stability information booklets/ stability compliance certificate, as applicable.

1.4 In general, Pleasure Crafts complying with the following standards may be accepted:

(a) *ISO 12217: Small Craft - Stability and Buoyancy Assessment and Categorization*

(i) *ISO 12217-1: Non-sailing boats of hull length greater than or equal to 6 m;*

(ii) *ISO 12217-3: Boats of hull length less than 6m.*

End of Chapter

Chapter 6

Rudders and Steering Arrangements

Section	Contents
1	General

Section 1

General

1.1 Steering

1.1.1 Pleasure crafts are to be provided with efficient means of steering.

1.1.2 The control position is to be located so that the person conning the Craft has a clear view for the safe navigation of the Craft.

1.1.3 When steering gear is fitted with remote control, arrangements are to be made for emergency steering in the event of failure of the control. Arrangements may take the form of the following, and be to the satisfaction of IRS :

- a) A tiller to fit the head of the rudderstock.
- b) A rod attachment that may be fitted to a Z-drive framework.
- c) A steering oar.
- d) In the case of twin screw pleasure crafts, manipulation of power distribution between the drives. In the case of twin stern-drive arrangements, means are to be provided to lock the drives in the amidships position.

e) In the case of a pleasure craft fitted with outboard motor (s), a means to control the direction of thrust.

1.1.4 If emergency steering is impractical, alternative safety measures and/ or procedures (e.g. restriction in the area of operation etc.) to deal with any steering failure situation is to be agreed.

1.1.5 Steering systems are to comply with an appropriate national / international standard (such as ISO 8847, ISO 10592 etc.) for small craft steering systems.

1.2 Rudder system

1.2.1 As appropriate to the Craft, the rudder and rudder stock construction materials, design in total (including tiller head attachments, bearings and pintles) and the supporting structures shall be adequate for the operating conditions of the Craft.

1.2.2 Construction and fittings are to be to an appropriate national/international standard (such as ISO 12215-8), to the satisfaction of IRS.

End of Chapter

Chapter 7

Anchoring and Mooring

Section	Contents
1	<i>General Requirements</i>
2	<i>Anchors, Cables and Towlines</i>

Section 1

General Requirements

1.1 General

1.1.1 The requirements given in Table 2 of this Section are for a Craft of normal form which may be expected to ride-out storms whilst at anchor in harbour. The anchors and cables are

not designed to hold a Craft off exposed coasts in rough weather nor stop a Craft that is moving.

1.1.2 Provision is to be made for the secure storage of the anchor and its cable.

Section 2

Anchors, Cables and Towlines

2.1 Anchors

2.1.1 Pleasure Crafts of Design Type 1 are to be provided with an anchor of sufficient mass for the size of the Craft and as a minimum, the mass is to correspond to that of a kedge, as illustrated in the Table 2.

2.1.2 Pleasure Crafts of Design Type 2, 3 or 4 are to be provided with at least two anchors (one main and one kedge or two main) and cables, in accordance with the requirements of Table 2. Anchors of equivalent holding power may be proposed and provided, subject to approval by IRS.

2.1.3 The values given in Table 2 for anchor masses refer to High Holding Power anchors. Anchors of other designs may be accepted based on the stated holding power.

2.1.4 When a fisherman type of anchor is provided, the mass given in the table is to be increased by 75% but the diameter of the anchor cable need not be increased.

2.1.5 For Pleasure Crafts with an unusually high windage, due to high freeboard, a large rig, large deckhouses or superstructures, the mass of the anchor and the anchor cable diameter is to be increased above that required in Table 2 to correspond to the increased wind loading. The increase in anchor mass and corresponding cable strength is to be to the satisfaction of IRS.

2.1.6 For Pleasure Crafts of unusual form, the anchor and cable size is to be to the satisfaction of IRS.

2.1.7 Anchors are to be rigged ready for use. The anchor may be left unready only where the particular operating patterns dictate.

2.1.8 The design of the anchor is to be acceptable to IRS.

2.1.9 Stainless steel and aluminium anchors will be separately considered dependent upon the test loads for which the anchor has been designed.

2.2 Cables

2.2.1 The length of anchor cable attached to an anchor is to be appropriate to the area of operation but, generally, is not to be less than 4 x the Craft's mean length or 30 [m], whichever is the longer, for each of the main and kedge anchors.

2.2.2 The cable for main anchors and for kedge anchors may be of chain or rope.

2.2.3 When the anchor cable is of fibre rope or wire, there is not to be less than 10 [m] or 20% of the minimum required cable length, whichever is the greater, of chain between the rope and the anchor. Where the anchor cable is wire then proposals to substitute the chain tail by an anchor and/or chain of enhanced mass will be considered to the satisfaction of IRS, with special attention paid to the anchor performance, i.e. catenary.

2.2.4 The strength, form and material of the anchor cable and its attachments to the anchor and the Craft are to be approved.

2.2.5 Anchoring systems incorporating a windlass are to have the bitter end of the cable secured to the Craft's structure and capable of being released in an emergency.

2.2.6 Anchor steel wire rope is to be fitted with thimbles at both ends.

2.3 Towline

2.3.1 A Craft is to be provided with a towline of not less than the length and diameter of the kedge anchor cable. The towline may be the warp for the second anchor.

2.4 Operations

2.4.1 When an anchor mass is more than 30 [kg], an efficient mechanical means is to be provided for handling the anchor.

2.4.2 There is to be a strong securing point on the foredeck or equivalent structure and where appropriate a fairlead or roller at the stem head.

Table 2 - Anchor and Anchor Cable Requirements						
Mean Length *	Anchor Mass		Anchor Cable Diameter			
	Main	Kedge	Main Chain	Main Rope**	Kedge Chain	Kedge Rope**
(metres)	(kg)	(kg)	(mm)	(mm)	(mm)	(mm)
6	8	4	6	12	6	10
7	9	4	8	12	6	10
8	10	5	8	12	6	10
9	11	5	8	12	6	10
10	13	6	8	12	6	10
11	15	7	8	12	6	10
12	18	9	8	14	8	12
13	21	10	10	14	8	12
14	24	12	10	14	8	12
15	27	13	10	14	8	12
16	30	15	10	14	8	12
17	34	17	10	14	8	14
18	38	19	10	16	8	14
19	42	21	12	16	10	14
20	47	23	12	16	10	14
21	52	26	12	16	10	14
22	57	28	12	19	10	16
23	62	31	12	19	10	16
24	68	34	12	19	10	16
* For the purposes of this section, mean length is defined as: $(\text{Length} + \text{Length on waterline})/2$						
** The rope diameter given is for nylon construction. When rope of another construction is proposed, the breaking load is not to be less than that of the nylon rope specified in the table.						

End of Chapter

Chapter 8

Fire Safety

Section	Contents
1	<i>General</i>
2	<i>Fire Prevention</i>
3	<i>Fire Detection and Alarms</i>
4	<i>Fire fighting</i>
5	<i>Means of Escape</i>

Section 1

General

1.1 General

1.1.1 Attention is drawn to relevant statutory requirements/ regulations of the country in which the pleasure craft is registered.

1.2 Alternative Methods

1.2.1 As an alternative to complying with the provisions of this Chapter, the fire-protection arrangements may also be provided in line with international standards like *NFPA 302: "Fire Protection Standard for Pleasure and Commercial Motor Craft"*; or *ISO 9094, "Small Craft - Fire Protection"*.

1.3 Definitions

1.3.1 *Engine Space*. The engine space is the space or compartment of the craft, containing main or auxiliary engine(s).

1.3.2 *Fire Test Procedures Code (FTP Code)*. Fire Test Procedures Code means the "International Code for Application of Fire Test Procedures", as adopted by the Maritime Safety Committee of the IMO by Resolution MSC.61 (67), as may be amended by the IMO.

1.3.3 *Furniture of restricted fire risk*. Furniture of restricted fire risk is furniture complying with the following:

a) case furniture such as desks, wardrobes, dressing tables, bureau, or dressers are constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 [mm] may be used on the working surface of such articles;

b) free-standing furniture such as chairs, sofas, or tables are constructed with frames of non-combustible materials;

c) draperies, curtains and other suspended textile materials having qualities of resistance to the propagation of flame not inferior to those of wool having a mass of 0.8 [kg/m²], this being determined in accordance with the FTP Code;

d) upholstered furniture having qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the FTP Code;

e) bedding components having qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the FTP Code.

1.3.4 *Galleys.* Spaces containing any electrically heated cooking plate or hot plate for keeping food warm with a power of more than 5 [kW] are to be regarded, for the purpose of this Chapter, as galleys.

1.3.5 *Low-flame-spread*

a) A low flame spread means that the surface will adequately restrict the spread of flame, this being determined in accordance with the FTP Code

b) Non-combustible materials are generally considered as low flame spread. However, the method of application and fixing would be specially considered.

1.3.6 *Non-combustible material*

a) Non-combustible material is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750 [°C], this being determined in accordance with the FTP Code. Any other material is a combustible material.

b) In general, products made only of glass, concrete, ceramic products, natural stone, masonry units, common metals and metal alloys are considered as being non-combustible and may be installed without testing and approval.

1.3.7 *Pantries*

a) Pantries (including isolated pantries) containing no cooking appliances may contain:

- coffee automats, toasters, dishwashers, microwave ovens, water boilers, induction heaters and similar appliances, each with a maximum power of 5 [kW]
- electrically heated cooking plates and hot plates for keeping food warm, each with a maximum power of 2 [kW] and a surface temperature not greater than 150 [°C]. A dining room containing such appliances is not regarded as a pantry.

b) Main pantries and pantries containing cooking appliances may contain:

- coffee automats, toasters, dishwashers, microwave ovens, water boilers, induction heaters and similar appliances, each with a power of more than 5 [kW]
- electrically heated cooking plates and hot plates for keeping food warm, each with a maximum power of 5 [kW].

1.3.8 *Steel or other equivalent material.* Steel or other equivalent material means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).

1.3.9 *Service spaces.* Service spaces are those spaces used for galleys, pantries containing cooking appliances, lockers, mail rooms, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

1.3.10 *Standard fire test.* A standard fire test is a test in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve in accordance with the test method specified in the FTP Code.

1.4 Documentation

1.4.1 The following documentation/ drawings are to be forwarded to IRS for approval, as applicable:

- Means of escape and, where required, the relevant dimensioning. Escape route signage;
- Plans showing the system operation and the type and location of all fire detectors. The plans are to indicate the position of the fire detectors in relation to significant items of machinery, ventilation and extraction openings.
- Arrangement of fixed fire-extinguishing systems, if any;

- Arrangement of sprinkler or sprinkler equivalent systems including the capacity and head of the pumps, if any;
- Fire control plan showing the position of all fixed or portable extinguishing appliances;
- Electrical diagram of the fixed gas fire-extinguishing system, if any;
- Electrical diagram of the sprinkler systems, if any.

1.4.2 The following documentation/ drawings are to be forwarded to IRS for information:

- General arrangement plan showing the purpose of the various spaces of the pleasure craft.

1.4.3 Plans are to be schematic and functional and to contain all information necessary, as relevant, for their correct interpretation and verification such as:

- service pressures
- capacity and head of pumps and compressors, if any
- materials and dimensions of piping and associated fittings
- volumes of protected spaces, for gas and foam fire-extinguishing systems
- surface areas of protected zones for automatic sprinkler and pressure water-spraying, low expansion foam and powder fire extinguishing systems

- capacity, in volume and/ or in mass, of vessels or bottles containing the extinguishing media or propelling gases, for gas,
- automatic sprinkler, foam and powder fire-extinguishing systems
- type, number and location of nozzles of extinguishing media for gas, automatic sprinkler, pressure water-spraying, foam and powder fire-extinguishing systems.

1.4.4 All or part of the information may be provided, instead of on the above plans, in suitable operation manuals or in specifications of the systems.

1.5 Type Approval

1.5.1 The following materials, equipment, systems or products in general used for fire protection are to be type approved by IRS. In certain special cases, acceptance may be accorded for individual crafts on the basis of suitable documentation or ad hoc tests:

- a) fixed powder fire extinguishing systems, including the powder
- b) equivalent fixed gas fire extinguishing systems
- c) equivalent water mist fire extinguishing systems
- d) sprinkler heads for automatic sprinkler systems.

Section 2

Fire Prevention

2.1 General

2.1.1 Measures are to be taken to prevent a fire from starting as well as from spreading in the area of possible sources of fire. The following possible sources of fire are to be considered:

- machinery
- electrical installations and appliances
- heating and cooking appliances

2.2 Thermal and Acoustic Insulation

2.2.1 Material used for thermal and acoustic insulation in any compartment or enclosure containing engines or heaters is to be of "Low

Flame Spread" type determined in accordance with the FTP Code.

2.2.2 Insulation materials in accommodation spaces, service spaces (except domestic refrigeration compartments), control stations and machinery spaces are to be non-combustible.

2.2.3 Vapour barriers and adhesive used in conjunction with insulation, as well as insulation of pipes fittings, for cold service systems, need not be non-combustible materials, but they are to be kept to the minimum quantity practicable and their exposed surfaces are to have qualities of resistance to the propagation of flame to the satisfaction of IRS.

2.3 Structural Fire Protection, Materials and Arrangements

2.3.1 Machinery Space Boundaries

2.3.1.1 The engine spaces, as well as their funnels, are to be separated from accommodation spaces and store rooms containing combustible materials and liquids. Their enclosure is not to be permeable to oil fuel and oil fuel vapors

2.3.1.2 Engine space boundaries are to be arranged to contain the fire-extinguishing medium, i.e. the engine space is to be capable of being closed down in order that the fire-extinguishing medium cannot escape. Such arrangements are to cater for the fire flaps provided. Fans located within or feeding a machinery space are to be capable of being stopped from outside the space in the event of a fire. Systems compromising automatic stopping of fans in the event of a fire are to be supplemented with a manual override.

2.3.1.3 Where it is not practical to have a machinery space, the engine is to be enclosed in a box. The box is to perform the same function as the machinery space boundaries in Cl. 2.3.1.2 above.

2.3.1.4 Pleasure Crafts that have the machinery space boundaries constructed of steel (rated A-0 in accordance with the FTP code) require no additional fire protection. However, surfaces on the opposite side of the machinery space are to be coated with finishes which have a Class 1 surface spread of flame rating when tested in accordance with FTP Code.

2.3.1.5 For all Design Types of Pleasure Crafts constructed in FRP, machinery space boundaries are to prevent the passage of smoke and flame for 15 minutes, when tested in accordance with the FTP Code. Fire resistance of FRP may be achieved by the use

of woven roving glass layers or additives (which must be added strictly in accordance with the manufacturer's requirements) to the resin. Intumescent polyester, epoxy, vinyl ester or phenolic resin surface coatings may also be used; however, solvent borne intumescent paints are not to be used. The requirement for the fire test may be waived if the construction complies with an ISO or equivalent standard.

2.3.1.6 For all Pleasure Crafts constructed in Aluminium and Wood, the machinery space boundaries are to have an equivalent level of fire protection when compared to FRP construction.

2.3.1.7 Interior stairways below the weather deck are to be of steel or other material having acceptable fire resisting properties.

2.3.1.8 The engine spaces are to be adequately ventilated to prevent the build up/ accumulation of explosive gases. Chapter 9, Section 4 of these Rules may also be referred for requirements of ventilation systems.

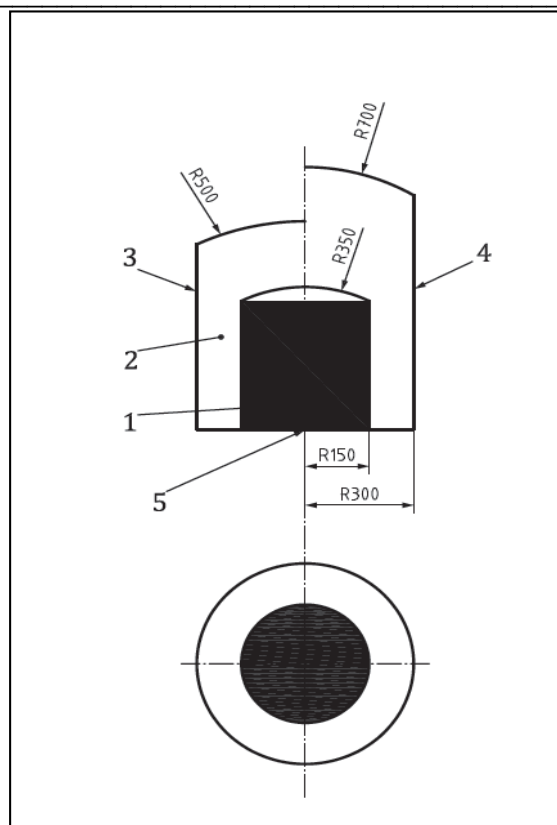
2.4 Galley Equipment

2.4.1 Open Flame Gas Appliances

2.4.1.1 In cooking units using fuel which is liquid at atmospheric pressure (see ISO 14895), open-flame burners are to be fitted with a readily accessible drip-pan.

2.4.2 Combustible materials near open-flame cooking appliances.

2.4.2.1 Materials and finishes used in the vicinity of open-flame cooking devices within the ranges defined in Fig 2.4.2.1 are to comply with the following requirements, taking into account the movement of the burner up to an angle of 10° for motorboats, where gimbaled stoves are fitted:



Note - All dimensions are in mm and measurements are from the centre of the burner

1 – Zone I

2 – Zone II

3 – Limit of Zone II for LPG, CNG or Electric Appliances

4 – Limit of Zone II for Liquid Fuel Appliances

5 – Centre of Burner

Fig 2.4.2.1 Material Requirements in vicinity of Open Flame Cooking Appliances

a) Free-hanging curtains or other fabrics are not to be fitted in Zone I and Zone II;

b) Exposed materials installed in Zone I are to be glass, ceramics, aluminium, ferrous metals, or other materials with similar fireproof characteristics;

c) Exposed materials installed in Zone II are to be glass, ceramics, metal or other material with similar fireproof characteristics. They are to be thermally insulated from the supporting substrate to prevent combustion of the substrate, if the surface temperature exceeds 80 °C. The thermal insulation may be achieved by an air gap or the use of a suitable material.

2.4.3 Combustible materials near other cooking appliances

2.4.3.1 The location of any electric cooking plate or any oven is to be such that curtains or

other similar materials cannot be scorched or set on fire by heat from the element.

2.4.4 Cooking Appliances

2.4.4.1 Petrol is not to be used for cooking, heating or lighting under any condition.

2.4.4.2 Galley stoves or cookers operating with liquid fuels are to be provided with save-walls of noncombustible materials. Measures are to be taken to prevent any leaking fuel to spread through the craft.

2.4.4.3 For the operation of galley stoves and cookers using liquid fuels, the ventilation openings are to be adequately sized. If such openings are closable a notice is to be fitted at the appliance stating that the ventilation openings are to be kept open during the use of the stove/cooker.

2.4.4.4 Ventilation exhaust systems serving galleys are to be independent of systems serving other spaces. The galley ventilation exhaust systems need not be completely separated, but may be served by separate ducts from a ventilation unit serving other spaces if an automatic fire damper is fitted in the galley ventilation duct near the ventilation unit. Ventilation exhaust ducts serving galleys are to be of non-combustible material.

2.4.4.5 Doors on a cooking appliance are to be provided with hinges and locking devices to prevent accidental opening in heavy seas.

2.4.4.6 A cooking appliance is to be installed to prevent movement in heavy seas.

2.4.4.7 For a grill or similar type of cooking appliance, means are to be provided to collect grease or fat and to prevent its spillage on wiring or the deck.

2.4.4.8 Electric connections for a cooking appliance are to be drip proof.

2.5 Gas Systems

2.5.1 The design, installation and testing of each LPG system should comply with recognized standards such as ABYC A-1, "Marine Liquefied Petroleum Gas (LPG) Systems

2.5.2 The design, installation and testing of each CNG system should comply with recognized standards such as ABYC A-22, "Marine Compressed Natural Gas (CNG) Systems".

2.6 Other ignition sources

2.6.1 Electric radiators, if used, are to be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators are to be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

2.6.2 Open flame gas appliances used as heating or lighting appliances are not to be used outside galleys.

Section 3

Fire Detection and Alarms

3.1 Fire Detectors

3.1.1 Fire detection devices (e.g. smoke detectors or heat detectors) are to:

- be constructed according to a national/international standard; and
- be suitable for the space it is monitoring; and
- provide an audible alarm; and
- be connected to the on-board electrical supply or be independently powered.

3.1.2 Fire detectors for specific spaces

3.1.2.1 Smoke detectors are to be used in accommodation spaces.

3.1.2.2 Heat detectors are to be used in the vicinity of any cooking appliances.

3.1.2.3 The coverage area and the installation are to be as per the detector manufacturer's instructions.

3.1.2.4 The detectors are to be of an approved type.

3.1.3 Provision of fire detectors

3.1.3.1 In Pleasure Crafts where the total installed power (propulsion and electrical generation) is greater than 750 [kW] efficient fire detectors are to be fitted in the engine space(s).

3.1.3.2 Design Type 2, 3 and 4 Pleasure Crafts (of lengths greater than 12 [m]) are to be fitted with efficient fire detectors in spaces containing open flame devices.

3.1.3.3 On all Crafts, where an area is identified as posing a fire risk to personnel on board (e.g. galleys, sleeping accommodation), fire detection equipment is to be installed to protect that area.

3.1.3.4 In engine spaces, where petrol is used for fuel, the detector is to be either ignition protected or designed to operate in a location suitable for a petrol/ air mixture.

3.2 Fire Alarms

3.2.1 Suitable fire alarms are to be provided in all pleasure crafts.

3.2.1.1 The fire alarm is to initiate a continuous visual and audible alarm at the operating position that can be silenced by the operator only.

Section 4

Fire fighting

4.1 General

4.1.1 All pleasure crafts are to be provided with efficient firefighting equipment that is serviced at recommended service intervals.

4.2 Requirements

4.2.1 The following minimum fire-fighting equipment are to be provided for each type of pleasure craft:

4.2.1.1 Design Type 4

(a) One power driven fire pump of capacity as specified for a bilge pump in Chapter 9, located outside the machinery space, with a hose of adequate length and appropriate nozzle that can direct a jet of water to any part of the Craft;

(b) One portable fire extinguisher of recognised standard for use in all types of fires, each at access to galley, entrance to any accommodation space and at the entrance to the machinery space (minimum 3 nos.);

(c) One fire blanket of a recognized standard, in galley;

(d) Two fire buckets with lanyard.

4.2.1.2 Design Type 3

(a) One portable fire extinguisher of recognised standard for use in all types of fires, each at access to any accommodation space and at the entrance to the machinery space (minimum 2 nos.);

(b) One fire blanket of a recognized standard, in galley;

(c) Two fire buckets with lanyard.

4.2.1.3 Design Type 2

(a) One portable fire extinguisher of recognised standard for use in all types of fires;

(b) Two fire buckets with lanyard.

(c) In the case of crafts of 12 m length and above requirements of 4.2.1.2 (a) and (b) are to be complied with.

4.2.1.4 Design Type 1

4.2.1.4.1 For Crafts fitted with engines, one portable fire extinguisher of suitable type and size. However, in a non-decked (or partially decked) sailing vessel with no engines and no cooking appliances, fire extinguisher is not required.

4.3 Fire-extinguishing arrangements in machinery spaces

4.3.1 Design Type 3 and 4 Pleasure Crafts are to be provided with a fixed fire extinguishing system installed in their machinery space, appropriate to the space to be protected and be installed and maintained in accordance with the manufacturer's requirements.

4.3.2 In the case of pleasure crafts of all categories fitted with petrol engines, the protection of the engine space is to be achieved by a fixed fire-extinguishing system.

4.3.3 A fixed fire extinguishing system required by 4.3.1 may be a fixed gas fire-extinguishing system. The fixed fire extinguishing system is to generally activate by manual means. If automatically activating fixed fire extinguishing system is provided, ventilation fans stops, closure of openings and fuel oil pump stops are

also to be activated automatically upon fixed fire-extinguishing system activation and means for manual activation of the system are to be additionally available.

4.3.4 Engine spaces protected by a gas smothering system are to be gastight such that leakage of the system will not penetrate accommodation and service spaces.

4.3.5 Means are to be provided to close all engine space openings.

4.3.6 Means are to be provided outside of the engine space for:

- (a) stopping all ventilation fans serving the space; and
- (b) shutting off the source of power or fuel for any machinery or equipment in the space that could contribute to

sustaining a fire or create any other unsafe condition in the case of fire.

4.4 Portable Fire-fighting Equipment

4.4.1 The scale of portable fire-fighting equipment is to be based on the requirements of the respective Flag Administrations.

4.4.2 Portable extinguishers located where they might be exposed to splashed or sprayed water are to have extinguisher operating nozzle and triggering devices shielded unless the extinguishers are certified or listed for marine service.

4.4.3 Extinguishing media are not to be used so that it results in toxic concentrations in the space where it is discharged. Extinguishing media containing Halon 1211, 1301 and 2402 and per-fluorocarbons are not to be used.

Section 5

Means of Escape

5.1 General

5.1.1 The hull is to be so arranged that all compartments are accessible and all escape hatches are unobstructed and readily accessible.

5.2 Escape Requirements

5.2.1 Arrangement of stairways, ladders, hatches and corridors serving all spaces normally accessible is to provide ready means of escape to a deck from which embarkation into survival craft may be possible.

5.2.2 Footholds, ladders, steps or other means are to be provided for deck hatches which are designated as exits. These aids are to be permanently installed and non-removable.

5.2.3 Alternative escape routes are not required for shower and toilet compartments, as they are regarded as part of the compartment or passageway that gives access to their doors.

5.2.4 Escape routes are to be maintained in a safe condition, clear of obstacles to ensure accessibility.

5.2.5 Exits are to be readily accessible. Exits leading to the weather deck or to the open air are to be capable of being opened from the inside and outside when secured and unlocked. Dead end corridors are not to be provided.

5.2.6 Means of escape are to be clearly marked for their purpose on both sides, by means of the appropriate symbol, and the function of each escape route demonstrated by practical tests to the satisfaction of the attending Surveyor.

5.2.7 All crafts of more than 6 [m] in length are to be provided with a minimum of two means of escape in each accommodation, service and engine space.

5.2.8 Only one means of escape may be accepted in an accommodation, service or engine space, if

- (a) the space is not normally occupied;
- (b) the dimensions of the space do not permit more than one means of escape; or
- (c) the deck area is not more than 28 [m²].

5.2.9 The exits are to have a minimum clear opening size of 560 [mm] x 560 [mm], unless not practicable. In such cases, the clear opening size of the exits would be specially considered, based on compliance with a national/ international standard.

5.2.10 No escape route is to pass directly over an open flame appliance or a radiated heat device.

5.2.11 All doors in escape routes are to be openable from either side. All doors are to be

openable in the direction of escape without a key. All handles on the inside of weathertight doors and hatches are to be non-removable. Where doors are lockable, measures to ensure access from outside the space are to be provided for rescue purposes.

5.2.12 Any hatch that is required for egress is to have a means of being operated from the inside and a means of being operated from the outside when not secured from the inside. All hinged hatches are to have a means or method to support the hatch in an open position.

End of Chapter

Chapter 9

Piping and Ventilation System

Section	Contents
1	<i>General</i>
2	<i>Air and Sounding Pipes</i>
3	<i>Fuel Oil System</i>
4	<i>Bilge System</i>
5	<i>Exhaust System</i>
6	<i>Ventilation System</i>

Section 1

General

1.1 Application

1.1.1 Requirements of this chapter are applicable to pleasure crafts propelled by diesel or petrol internal combustion engines.

1.1.2 As an alternative to the requirements given in this chapter, the requirements of recognized national /international standards may be accepted.

1.2 Valves and Associated Piping

1.2.1 In general, unless otherwise specified in the individual sections, material and design requirements of pipes are to be in accordance with Chapter 11 of *Rules and Regulations for the Construction and Classification of High Speed Craft and Light Crafts*.

1.2.2 A valve or similar fitting attached to the side of the Craft below the waterline, within an engine space or other high fire risk area, is to be normally of steel, bronze, copper, or other non-brittle fire resistant material or equivalent.

1.2.3 Flexible or non-metallic piping, which presents a risk of flooding, fitted in an engine space or fire risk area is to be efficiently

insulated against fire, or be of fire resistant material, e.g. *ISO Standard 7840* or means are to be provided to stop the ingress of water in the event of the pipe being damaged, operable from outside the space.

1.3 Sea Inlets and Discharges

1.3.1 An opening below the weather deck is to be provided with an efficient means of closure.

1.3.2 When an opening is for the purpose of an inlet or discharge below the waterline it is to be fitted with a seacock, valve or other effective means of closure that is readily accessible.

1.3.3 When an opening is for a log or other sensor, which is capable of being withdrawn, it is to be fitted in an efficient watertight manner and provided with an effective means of closure when such a fitting is removed.

1.3.4 Inlet and discharge pipes from marine toilets are to be provided with shell fittings as required by 1.3.2. When the rim of a marine toilet is less than 300 [mm] above the deepest waterline of the Craft, unless otherwise indicated by manufacturer's recommendations, anti - syphon measures are to be provided.

Section 2

Air and Sounding Pipes

2.1 Air Pipes

2.1.1 General

2.1.1.1 All air pipes extending to exposed decks are to have a minimum height measured from the deck to the point where water may have access below as follows:

- 300 [mm] where the deck is less than 0.05L above the design waterline; and
- 150 [mm] on all other decks.

2.1.1.2 Air pipes may discharge through the side of the superstructure provided that this is at a height of at least 0.02L above any waterline when the intact craft is heeled to an angle of 15°.

2.1.1.3 All air pipes are to be equipped with weathertight closing appliances of approved automatic type.

2.1.1.4 Air pipes are to be fitted to all tanks, cofferdams, tunnels and other compartments which are not fitted with alternative ventilation arrangements.

2.1.1.5 Air pipes are to be fitted at the opposite end of the tank to that which the filling pipes are placed and/or at the highest part of the tank.

2.1.2 Termination of air pipes

2.1.2.1 Air pipes to double bottom tanks, deep tanks extending to the shell plating, or tanks which can be run up from the sea are to be led to above the watertight deck. Air pipes to oil fuel tanks, cofferdams and all tanks which can be pumped up are to be led to the open.

2.1.2.2 The open ends of air pipes to oil fuel tanks are to be situated where no danger will be incurred from issuing oil vapour when the tank is being filled.

2.1.3 Gauze diaphragms

2.1.3.1 The open ends of air pipes to oil fuel tanks are to be fitted with a wire gauze

diaphragm of non-corrodible material which can be readily removed for cleaning or renewal.

2.1.3.2 Where wire gauze diaphragms are fitted at air pipe openings, the area of the opening through the gauze is to be not less than twice the cross-sectional area required for the pipe.

2.1.4 Air pipe closing appliances

2.1.4.1 Closing appliances fitted to tank air pipes are to be of a type which will allow the free passage of air or liquid to prevent the tanks being subjected to a pressure or vacuum greater than that for which they are designed.

2.1.5 Nameplates

2.1.5.1 Nameplates are to be affixed to the upper ends of all air and sounding pipes.

2.1.6 Size of air pipes

2.1.6.1 For every tank which can be filled by onboard pumps, the total cross-sectional area of the air pipes and the air pipe closing devices is to be such that when the tank is overflowing at the maximum pumping capacity available for the tank, it will not be subjected to a pressure greater than that for which it is designed.

2.1.6.2 In all cases, whether a tank is filled by onboard pumps or other means, the total cross-sectional area of the pipes is to be not less than 1.25 times the effective area of the respective filling pipe.

2.2 Sounding Pipes

2.2.1 General

2.2.1.1 Provision is to be made for sounding all tanks and the bilges of those compartments which are not at all times readily accessible. The soundings are to be taken as near the suction pipes as practicable. (Also refer to 3.9.5).

2.2.1.2 An approved level gauge or remote reading level device may be accepted in lieu of a sounding pipe.

2.2.2 Sounding arrangements for oil fuel, lubricating oil and other flammable liquids

2.2.2.1 Safe and efficient means of ascertaining the amount of oil in any storage tank are to be provided.

2.2.2.2 For oil fuel, lubricating oil and other flammable liquids, closed sounding devices are preferred. Design details of such devices are to be submitted and they are to be tested after fitting on board, to the satisfaction of the Surveyors.

2.2.2.3 If closed sounding devices are fitted, failure of the device or over filling of the tank is not to result in the release of tank contents.

2.2.2.4 Where sounding pipes are used they are not to terminate in any space where risk of ignition or spillage from the sounding pipe might arise. Terminations are to be provided with a suitable means of closure and provision to prevent spillage during refueling/refilling operations.

2.2.2.5 Where gauge glasses are used they are to be of flat type of heat resisting quality, adequately protected from mechanical damage and fitted with self-closing valves at the lower ends and at the top ends if these are connected to the tanks below the maximum liquid level.

Section 3

Fuel Oil System

3.1 Application

3.1.1 This section applies to all parts of permanently installed diesel and petrol fuel systems from the fuel fill opening to the point of connection with the propulsion or auxiliary engine(s) on inboard- and outboard-powered pleasure craft.

3.1.2 Attention is drawn to any relevant statutory requirements of the country in which the ship is to be registered.

3.2 Alternative Standards

3.2.1 As an alternative to complying with the provisions of this section, compliance with following standard is acceptable, as applicable

- a) American Boat and Yacht Council (ABYC) H-24, or
- b) ABYC H-33 or
- c) ISO 10088.

3.3 General Requirements

3.3.1 All components of a fuel system, including tank penetrations and fittings, are to be:

- a) accessible; and

- b) protected from leaks caused by corrosion, shock or fire.

3.3.2 Fuel systems are to be able to operate in the ambient environment condition corresponding to the area of operation.

3.3.3 After installation a leakage test is to be carried out of the whole installation with a pressure equal to 20 [kPa].

3.4 Fuel Filling System

3.4.1 Fuel Fill Lines

3.4.1.1 All fuel fill lines are to be protected from damage.

3.4.1.2 Fuel fill lines are to be hose or metal pipe in accordance with 3.5.4 and 3.5.5 respectively.

3.4.1.3 Each fuel tank is to have an individual fill line.

3.4.1.4 Every fuel fill hose installed in the engine spaces is to be of recognized standards and suitable for the intended use:

3.4.1.5 The fill pipe installation is to be self-draining and lead directly from the deck fill to the tank in such a way as to prevent any vapour locks.

3.4.1.6 The minimum inside diameter of the fill system is to be 28.5 [mm]. In order to maintain the minimum diameter, the minimum hose ID using standard fittings is to be 38 [mm].

3.4.1.7 Fuel hose connection fitting must be of a type that prevents any leakage.

3.5 Fuel Distribution System

3.5.1 All fuel lines, including vent, delivery, and return, are to be protected from damage

3.5.2 All fuel lines, including vent, delivery, and return, are to be made of hose or metal pipe in accordance with 3.5.4 and 3.5.5 respectively.

3.5.3 All fuel distribution systems are to be provided with anti-siphon protection.

3.5.4 Flexible Lines (Hoses)

3.5.4.1 Flexible fuel fill, supply and return lines are to be of recognized standards such as

- a) Type A1 in accordance with ISO 7840 or
- b) USCG type A1 or A1-15 hose in accordance with SAE J1527.

3.5.4.2 Nonmetallic vent hoses in engine spaces are to be in accordance with 3.5.4.1. Tank vent hoses installed outside of engine spaces are to be of any hose type in accordance with SAE J1427 or ISO 7840.

3.5.5 Metallic Lines

3.5.5.1 Every metallic fuel line and vent lines are to be made of steel or seamless copper/ copper alloy.

3.5.5.2 Fuel lines of Copper/ Copper alloy are to have a minimum wall thickness of 0.75 [mm]. The minimum wall thickness of Steel piping is to be as given in Chapter 11 of *IRS Rules and Regulations for the Construction and Classification of High Speed Crafts and Light crafts*.

3.5.5.3 In case of aluminium hull, metallic fuel lines are to be galvanically protected.

3.5.6 Fittings

3.5.6.1 Connections and joints are to be minimized in fuel oil piping.

3.5.6.2 A petrol fuel system is not to have a fitting for draining fuel other than a plug that is used to service the fuel filter or strainer.

3.6 Fuel Valves

3.6.1 Valves on Filling and suction pipes

3.6.1.1 All suction pipes to oil fuel tanks are to be provided with valves.

3.6.1.2 Where the filling pipes to oil fuel tanks are not led to the upper part of the said tanks, they are to be provided with non-return valves at their ends terminating to the tanks.

3.6.1.3 For storage tanks, filling pipes may also be used for suction purposes.

3.6.2 Remote control of valves

3.6.2.1 Every fuel oil pipe which, if damaged, would allow oil to escape from a tank is to be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space in which such tanks are situated in the event of a fire occurring in such space.

3.6.2.2 Such valves and cocks are also to include local control and indicators are to be provided on the remote and local controls to show whether they are open or shut.

3.7 Filters

3.7.1 Every fuel filter or strainer is to be capable of resisting damages by fire according to the requirements in recognized standards such as ISO 7840, Annex A or ABYC H-24 for fuel systems unless the filter or strainer is inside the fuel tank.

3.8 Electrical Grounding

3.8.1 Each metal or metallic plated component of the fuel fill system and fuel tank that is in contact with the fuel must be grounded.

3.8.2 Static conductive neoprene tubing or piping that is used in lieu of metallic conductors is to be installed in direct contact with non-painted attachment surfaces.

3.9 Fuel tanks

3.9.1 General

3.9.1.1 Every fuel tank must provide for protection from leakage caused by shock, corrosion, abrasion or fire.

3.9.1.2 In order to prevent leakage, the threaded connections into fuel tanks are to be as per recognized standards, such as ANSI/ASME B1.20.1 - 1983

3.9.2 Installation

3.9.2.1 Every fuel tank is to be installed so that all connections, accessories, and labels are accessible for inspection and maintenance.

3.9.2.2 Adequate supports are to be fitted as necessary to ensure the structural integrity of every tank.

3.9.3 Petrol Tanks

3.9.3.1 A petrol fuel tank is not to be made integral with the hull.

3.9.3.2 A petrol fuel tank is not to have openings in the bottom, sides, or ends.

3.9.3.3 Clean-out plates are not to be installed in petrol fuel tanks.

3.9.4 Diesel oil Tanks

3.9.4.1 A diesel fuel tank can be made integral as well as non-integral with the hull.

3.9.4.2 Clean-out plates may be installed in the top or sides of diesel fuel tanks.

3.9.5 Fuel Gauges

3.9.5.1 Every fuel tank is to be installed with mechanical or remote reading fuel gauges, unless the tank installation permits sounding.

3.10 Additional Requirements for Outboard Engines

3.10.1 When the outboard engine fuel hose is designed to be disconnected, all permanent fuel lines in outboard motor vessels are to terminate aft of the stern or are to be provided with means so that any leakage will not enter the vessel.

3.10.2 Quick disconnect fittings used between fuel distribution lines and outboard motors are to automatically shut off fuel flow when disconnected.

3.10.3 In order to prevent leakage of fuel, suitable bowls are to be used for outboard engines.

3.11 Additional Requirement for Inboard Petrol Engine

3.11.1 In general, installation of petrol inboard engine below deck or in enclosed condition, on a craft is not acceptable, unless following requirements are met.

3.11.2 In order to prevent leakage of fuel, metal bowls are to be used for inboard Petrol engines. Every fuel-water separator bowl used for petrol engines is to meet recognized fire protection standards such as, NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*.

Section 4

Bilge System

4.1 Application

4.1.1 This section specifies requirements for removing normal accumulation of bilge water.

4.1.2 Attention is drawn to any relevant statutory requirements of the country in which the ship is to be registered.

4.2 Alternative Standards

4.2.1 As an alternative to complying with the provisions of this section, compliance with following standard is acceptable

- a) ISO 15083.

4.3 General

4.3.1 A craft should have an efficient bilge pumping system, with suction pipes so arranged that any compartment (other than a tank permanently used for the carriage of liquids which is provided with efficient means of pumping or drainage) can be drained

4.3.2 Provided the safety of a craft is not impaired, waiver of the means of pumping or drainage of particular compartments may be considered.

4.3.3 For motorised Crafts, all compartments shall be able to be drained when the Craft is heeled up to an angle of +/- 10 degrees.

4.4 Bilge Pumps

4.4.1 Number of pumps

4.4.1.1 All crafts other than those mentioned in 4.4.1.3 are to be provided with at least two bilge pumps, one of which may be power driven situated in two separate spaces. All pumped spaces are to be capable of being drained after the failure of one pump.

4.4.1.2 All open crafts, of 6 [m] in length and over, are to carry a hand bailer or bucket in addition to the bilge pumping requirements in 4.4.1.1.

4.4.1.3 For open crafts of less than 6 [m] in length, operating in Type 1 & 2, a minimum of one hand operated bilge pump or a bailer or a bucket is to be provided.

4.4.2 Power Pump Capacity

4.4.2.1 The capacity of each bilge pump, according is not to be less than

- 10 [l/min] for boats with length less than or equal to 6 [m],
- 15 [l/min] for boats with length greater than 6 m and less than 12 [m], or

- 30 [l/min] for boats with length greater than or equal to 12 [m].

These capacities are to be achieved when the pump is subjected to a back pressure of 10 [kPa].

4.5 Bilge Pumping System

4.5.1 When considered necessary, to prevent back flooding, bilge suction valves are to be of non-return type.

4.5.2 The piping is to be of metal, rigid plastic, non-collapsible and non-oil degradable hose with flanged, screwed, or robust double-clamped connections, where practicable.

4.5.3 In general, the piping is not to be less than 25 [mm] in diameter.

4.6 Control

4.6.1 A bilge alarm is to be fitted in any watertight compartment containing propulsion machinery or other compartment likely to accumulate bilge water, e.g. where a skin fitting is present, where the bilge level cannot be readily seen.

4.6.2 To prevent pollution, compartments containing potential pollutants are not to be fitted with auto-start bilge pumps.

4.6.3 An auto-start bilge pump; where fitted in a clean compartment and where a significant quantity of water could accumulate unnoticed; is to be fitted with an audible alarm at the control position(s) or in the compartment. Should a number of such locations/alarms be present, then visual alarm indication is also to be fitted to enable rapid location of the source of the alarm.

4.6.4 The alarm is to provide an audible warning, and preferably a visual warning also, at the control position.

Section 5

Exhaust System

5.1 Application

5.1.1 This section applies to exhaust systems for all engines.

5.1.2 Attention is drawn to any relevant statutory requirements of the country in which the ship is to be registered.

5.2 Alternative Standards

5.2.1 As an alternative to complying with the provisions of this section, compliance with following standard is acceptable, as applicable

- a) ABYC P-1

5.3 General

5.3.1 An engine exhaust outlet that penetrates the hull below the weather deck is to be provided with means to prevent back flooding into the hull through the exhaust system. The means may be provided by system design and/or arrangement, built-in valve or a portable fitting which can be applied readily in an emergency.

5.3.2 Every exhaust system fitting, joint, clamp, and support is to be accessible. All hose connections are to be double clamped.

5.3.3 Exhaust system piping, components and

connection are to be independently supported to minimize failure from vibration, shock and expansion.

5.3.4 Exhaust system piping is to be kept at a safe distance from combustible material

5.3.5 Protective guards, jacketing or covers are to be provided wherever persons or gear might come into contact with the exhaust system

5.3.6 Exhaust gas systems are to be so designed that pressure losses in the exhaust lines do not exceed the maximum values permitted by the engine manufacturer.

5.4 Limitation of exhaust line surface temperature

5.4.1 Exhaust gas pipes and silencers are to be either water cooled or efficiently insulated where:

- their surface temperature may exceed 220 [°C], or
- they pass through spaces of the craft where a temperature rise may be dangerous.

b) The insulation of exhaust systems is to comply with the provisions of Chapter 10, 1.9.

Section 6

Ventilation System

6.1 Application

6.1.1 This section applies to ventilation systems of crafts using petrol or diesel oil for electrical generation, mechanical power or propulsion including outboard powered crafts.

6.1.2 Attention is drawn to any relevant statutory requirements of the country in which the ship is to be registered.

6.2 Alternative Standards

6.2.1 As an alternative to complying with the provisions of this section, compliance with following standard is acceptable, as applicable

- a) ABYC H-2, or
- b) ABYC H-32 or
- c) ISO 11105.

6.3 Diesel Fuel System

6.3.1 On a vessel, a space that contains a combustion engine is to be ventilated to ensure a sufficient supply of air for combustion and cooling.

6.4 Petrol Fuel System

6.4.1 Natural Ventilation

6.4.1.1 A separate natural ventilation system is required for any enclosed space that contains one of the following sources of petrol vapour:

- a) a permanently installed petrol engine;
or
- b) a portable petrol fuel tank that ventilates into the space;

6.4.2 Ducts

6.4.2.1 At least one exhaust duct is to extend down to the bilge of the space from which the fumes are to be expelled. If the space is an engine space, the exhaust duct entrances are to be located as near as possible under the engine, or engines.

6.4.2.2 Duct termination in bilges is to be secured above the level of normal accumulations of bilge water.

6.4.3 Ventilation Openings

6.4.3.1 External openings of intakes and exhausts are to be located and oriented to prevent entry of fuel vapors

6.4.3.2 Ventilation openings are to be located in positions on deck so as to minimize the ingress of water, taking into account all service conditions of heel, trim, wave action, loading, and the effect of operating the vessel in reverse.

6.4.3.3 Neither supply nor exhaust air ducts from engine spaces or engine exhaust outlets are to open into accommodation space.

6.4.3.4 A ventilator is to be of efficient construction and, where situated on the weather deck and not complying with 6.4.4.5, is to be provided with a readily available means of

weather tight closure, consideration is to be given to requirements of Fire Protection.

6.4.3.5 A ventilator which is to be kept open, e.g. for the supply of air to machinery or for the discharge of noxious or flammable gases, would be specially considered with respect to its location and height above deck having regard to 6.4.2.1 and the down flooding angle.

6.4.3.6 Motorised Pleasure Crafts that are fitted with engine air intakes in the hull side, which do not satisfy the above requirements, would be specially considered, subject to approval by the Administration.

6.4.5 Powered Ventilation

6.4.5.1 An enclosed space that contains a petrol engine is to meet the following conditions (also refer to 6.4.1):

- a) its ventilation system is to be supplemented by powered ventilation; and
- b) at each engine ignition switch, a safety notice is to be displayed indicating that the blower is to be operated for four minutes before the engine is started

6.4.5.2 Blowers for powered ventilation may be installed with separate ducting or installed in the natural ventilation exhaust duct.

6.4.5.3 Blowers are to be mounted as high as practicable above the bilge low point to prevent contact with bilge fluid, except for blowers designed in combination with bilge pumps, which can be operated submerged.

6.4.5.4 Blower motors are to be of a sealed type or ignition protected and is to be suitable for installation in damp locations.

6.4.5.5 The blower is to be designed for a minimum of four (4) minutes of continuous operation, more if required, to clear any space of vapours.

6.5 Battery Storage spaces

6.5.1 Spaces containing batteries are to be provided with ventilation for the removal of hydrogen gas released by the battery.

End of Chapter

Chapter 10

Machinery

Section	Contents
1	<i>General</i>
2	<i>Engines</i>
3	<i>Propulsion System</i>

Section 1

General

1.1 General

1.1.1 Engines of less than 100 [kW] capacity may be accepted based upon manufacturer's certificate provided they are of an approved type.

1.1.2 Attention is drawn to any relevant statutory requirements of the country in which the craft is to be registered.

1.1.3 The certification of machinery is to be generally in accordance with requirements given in IRS Rules and Regulations for the Construction and Classification of Steel Ships, Part 4, Chapter 1, Section 4.

1.2 Definitions

1.2.1 *Engine Space*. The engine space is the space or compartment of the craft, containing main or auxiliary engine(s).

1.3 Type approval program

1.3.1 Products that can be consistently manufactured to the same design and specification may be type approved in accordance with "IRS certification scheme for type approval of products".

1.3.2 For engines, the requirements given in IRS classification Note "Approval of IC engines" are applicable for type approval.

1.4 Environmental Condition

1.4.1 All machinery installed are to be operational in the angle of inclinations stated in Table 1.4.1 and Craft accelerations and motions stated in 1.4.3.

Table 1.4.1 : Machinery Inclinations				
Installations/Components	Angle of Inclination ¹ (deg)			
	athwartships		Fore-and-aft	
	Static	Dynamic	Static	Dynamic
Main and auxiliary machinery	15	22.5	5	7.5
Safety equipment e.g. emergency power installations, emergency fire pumps and their devices Switch gear, electric and electronic appliances ² and remote control systems	22.5	22.5	10	10
Notes 1. Athwartships and fore and aft inclinations occur simultaneously. 2. Switches and controls are to remain in their last set position. No undesired switching operations or operational changes are to occur. 3. Any deviations from these angles of inclination taking into consideration the size and service conditions of the craft will be specially considered.				

1.4.2 Design of the machinery installation is to be subject to the following conditions:

- Outside Air Temperature 45 °C.
- Outside water Temperature 32 °C.
- The ambient temperature during operation in the vicinity of internal combustion (IC) engines is not to exceed 60 °C.

1.4.3 Craft accelerations and motions

1.4.3.1 General

.1 Main propulsion and steering machinery and auxiliary machinery that is essential to the propulsion and steering, and the safety of the craft is to be capable of operation under the effects of acceleration and motions.

.2 The requirements in 1.4.3.2 to 1.4.3.4 apply where documented evidence of equipment suitability is specifically required by the Rules.

1.4.3.2 Documentation

.1 The shipbuilders are to identify and document the craft accelerations and motions periods to which machinery and equipment might be subjected to. The expected accelerations and craft motions periods are to be within machinery and equipment manufacturers requirements. The estimations

are to consider craft type, machinery or equipment location and expected service conditions.

1.4.3.3 Evaluation of equipment suitability

.1 Machinery and equipment manufacturers are to submit evidence of their machinery or equipment, that can operate under the required static and dynamic conditions stated in Table 1.4.1 and at least at the levels of Craft accelerations as stated in 1.4.3.2 and/or specified in the Rules. Documentation of satisfactory performance is to take the form of:

- Report of testing under representative conditions; or
- Report of theoretical verification using recognized computational techniques accompanied by detailed and relevant validation data; or
- Historical data which provides relevant demonstration of satisfactory experience in service.

1.4.3.4 Installation and operation

.1 Machinery and equipment manufacturers are to submit details of the requirements /recommendations for installation of the machinery and equipment onboard to ensure satisfactory operation in service under the required static and dynamic conditions as described in Table 1.4.1 and at least at the

levels of Craft accelerations as stated in 1.4.3.2 and/or specified in the Rules.

Note: Consideration should be given for positioning machinery in order to minimize the dynamic load on bearings due to craft motion.

.2 Shipbuilders are to submit details demonstrating that the installation of the machinery and equipment onboard is in accordance with manufacturer's requirements /recommendations.

1.5 Arrangement

1.5.1 Machinery installations are to be arranged with adequate access for operation, checking and routine maintenance.

1.6 Foundation

1.6.1 Machinery installations are to be securely fastened to the craft, taking into account the loads to be expected. Foundations and seatings are to be properly integrated into the structure of the hull.

1.7 Ventilation

1.7.1 Adequate ventilation is to be provided in spaces where machinery is installed, taking appropriate account of the air required for combustion and cooling.

1.8 Protective measures

1.8.1 Machinery installations are to be such that the risk of accidents is substantially excluded. Exposed moving parts and rotating shafts are to be protected by means of suitable guards. This may be dispensed with if moving parts and rotating shafts are adequately protected by other permanently installed equipment.

1.8.2 Surfaces, having temperature exceeding 60°C, with which the crew are likely to come into contact during operation are to be suitably protected or insulated.

1.8.3 Surfaces of machinery with temperatures above 220°C, e.g. steam, thermal oil and exhaust gas lines, silencers, exhaust gas boilers and turbochargers, are to be effectively insulated with non-combustible material or equivalently protected to prevent the ignition of

combustible materials coming into contact with them.

1.8.4 Insulating material for machinery installations is to be not readily ignitable. The insulation is to be suitably protected against penetration by moisture and leaking oil. It is to be so applied that

- maintenance can be carried out without damaging the insulation, or
- the insulation can be easily removed for maintenance or repairs and properly replaced on completion of the work.

1.8.5 Only fire retardant paints are to be used on machinery and in areas where machinery is installed.

1.9 Monitoring

1.9.1 In general manufacturer's recommendations, are to be followed for providing operating and monitoring equipment.

1.9.2 As a minimum, following maneuvering and monitoring instruments are to be provided near control position

- rudder indicator
- main engine speed indicator
- remote stoppage of main/auxiliary engines
- bilge water level alarm

1.10 Fuels

1.10.1 Fuel oils employed for engines and boilers are, in general, to have a flash point (determined using the closed cup test) of not less than 60°C. However, for engines driving emergency generators, fuel oils having a flash point of less than 60°C but not less than 43°C are acceptable.

1.10.2 For crafts, where special precautions are taken to the IRS's satisfaction, fuel oils having a flash point less than 60°C but not less than 43°C may be used for engines a provided that, from previously effected checks, it is evident that the temperature of spaces where fuel oil is stored or employed will be at least 10°C below the fuel oil flash point at all times.

Section 2

Engines

2.1 General

2.1.1 The following requirements are applicable to propulsion and auxiliary engines

2.1.2 On any craft, where each engine is capable of developing a shaft power at the propeller of 5 [kW] or more is to be provided with astern power.

2.2 Approval

2.2.1 New engine types or developments of existing types are to be subjected to an agreed program of type testing to complement the design appraisal and review of documentation.

2.3 Owner's Manual

2.3.1 A manual is to be provided with every engine giving the operating and maintenance instructions.

2.4 Maintenance

2.4.1 Provision is to be made for removal of substantially all of the oil from the engine sump without spillage of oil into the bilge. Means are to be provided to determine the correct oil level in the engine.

2.4.2 A suitable drip tray wider and longer than the engine and gear box must be fitted to collect leakage of fuel and lubricating oil. It should be of such size and depth as to collect oil which may fall from the engine when the craft is pitching or heavily heeling.

2.5 Engine Foundation

2.5.1 Inboard Engines

2.5.1.1 The engine foundations are to be of robust construction and adequately attached to the hull. They are to be so designed and arranged that they can withstand the various stresses they are subjected to, without detrimental deformations to the machines they are supporting. Provision is to be made, as far as practicable, to ensure continuity between the longitudinal and transverse elements of the seatings and the corresponding elements of the adjacent hull.

2.5.1.2 Engine bearers must be of adequate size and extend as far forward and aft as is practicable. Built-up engine seatings must be effectively supported both longitudinally and transversely.

2.5.1.3 Particular attention is to be paid to the arrangement of thrust-bearing seatings and their attachment to the hull.

2.5.1.4 Engines are to be so fixed to their foundation as to prevent any displacement due to the movements of the craft.

2.5.1.5 Where resilient mountings are fitted, the output shaft is to be connected to the propeller shaft through a flexible coupling. Satisfactory arrangements are to be made to transmit thrust, and flexibility is to be provided in all fuel, water, exhaust lines and electrical cables.

2.5.1.6 Where resilient mountings are fitted, the permissible radial shaft displacement of the flexible coupling is not to be exceeded.

2.5.2 Outboard Engines

2.5.2.1 A watertight and self-draining motor well is to be designed into the transom of all outboard engine yachts.

2.5.2.2 The strength and rigidity of the transom should be related to the thrust imposed by the propeller and its resultant moment imposed upon the transom under dynamic loads. For craft built in composite materials and except for engines of very low power, the transom is to be, as a general rule, of sandwich construction having a core of waterproof plywood or of equivalent strength. The internal skin of the sandwich must be of thickness not less than that of the craft's side skin, and the outer skin not less than that of the bottom. The internal skin is to be carried well forward along the sides and bottom of the craft and gradually tapered in thickness towards its edges. Protective plates should be fitted in way of engine fixing clamps.

2.5.2.3 Outboard engines should be capable of being fastened to the hull with belts, chains or other safety dispositions.

2.6 Engine Starting System

2.6.1 Alternative means of starting other than compressed air or batteries may be specially considered.

2.6.2 Craft in which the only means of propulsion is an internal combustion engine with electric starting is to be provided with two batteries or group of batteries, each one of sufficient capacity for ensuring at least the six consecutive start attempts of the main propulsion engine.

2.6.3 For craft fitted with one propulsion engine, one battery or group of batteries is to be reserved for the engine starting device, the other may be used for supplying the craft's electrical services. Capacity of starting batteries used for supplying other services is to be designed accordingly. It is to be possible to select which battery or group of batteries is used for which service and also to connect both battery groups in parallel in an emergency to assist engine start.

2.6.4 For craft fitted with two main propulsion engines with electric starting device, each main engine may be equipped with only one starting battery, provided that each battery is capable of being connected via a changeover switch and fixed cables to the starting system of the other main engine. The arrangement is to be such that the batteries cannot be connected in parallel.

2.6.5 Provision is to be made to maintain the stored energy of starting batteries at all times.

2.6.6 Compressed air system used for engine starting is to be generally in accordance with the requirements of Pt.4, Ch.4, of the *Rules and Regulations for the Construction and Classification of Steel Ships*.

2.6.7 Where suitable emergency manual starting means are provided, relaxation of these requirements may be considered by IRS.

2.6.8 In case of engines which can be started manually, the cranking position is to be arranged with sufficient space. Crank handles are to disengage automatically when the engine starts and to be kick-back proof.

2.7 Control Systems

2.7.1 On a twin-engine craft, the throttle controls should be so located that both engines can be throttled with one hand.

2.7.2 Where control cables are used, they are to be installed with as few bends as possible.

2.8 Safety Arrangements

2.8.1 General

2.8.1.1 Except where duly justified, a means for operating the throttle without engaging the gears is to be provided for all craft exceeding 5 [kW] in shaft power. To ensure this, it should not be possible to start the motor unless the shift control is in neutral position.

2.8.1.2 Non-propulsion engines intended for automatic operation are to be fitted with an automatic shutdown device actuated by low oil pressure or high cooling fluid temperature.

2.8.1.3 Engine crankcases are to be sufficiently vented to prevent excessive pressurization.

2.8.1.4 Each outboard engine is to be provided with a tilt mechanism which shall operate when the drive leg comes into contact with an obstruction. Adequate means are to be provided to adjust the force required to activate the tilt mechanism.

2.8.2 Governors

2.8.2.1 Each engine, except the auxiliary engines for driving electric generators is to be fitted with a speed governor so adjusted that the engine does not exceed the rated speed by more than 15%.

2.8.2.2 Auxiliary engines intended for driving electric generators are to be fitted with a speed governor which prevents any transient speed variations in excess of 10% of the rated speed when the rated power is suddenly thrown off or specific loads are suddenly thrown on.

2.8.3 Overspeed Protection devices

2.8.3.1 In addition to the speed governor, the following engines are to be fitted with a separate overspeed protective device so adjusted that the engine cannot exceed the rated speed by more than 20%. Arrangements are to be made to test the overspeed protective device:

- a) main propulsion engine having a rated power of 220 [kW] and above, which can be declutched or which drives a controllable pitch propeller, and

- b) auxiliary engine having a rated power of 220 [kW] and above, except those for driving electric generators for which [2.8.3.4] applies.

2.8.3.2 Equivalent arrangements may be accepted subject to special consideration by the IRS in each case.

2.8.3.3 The overspeed protective device, including its driving mechanism or speed sensor, is to be independent of the governor.

2.8.3.4 In addition to the speed governor, auxiliary engines of rated power equal to or greater than 220 [kW] driving electric generators are to be fitted with a separate overspeed protective device, with a means for manual tripping, adjusted so as to prevent the rated speed from being exceeded by more than 15%. This device is to automatically shut down the engine.

2.9 Alarm Devices

2.9.1 Engines are to be provided with the following alarm devices:

- low-pressure alarm device for lubricating oil
- high-temperature alarm device for cooling water
- Alarm for High engine speed

2.9.2 The alarms are to be visual and audible

2.10 Transmission Reduction Gear

2.10.1 Reduction gear and transmissions are to be of marine type and suitably matched to the engine with which they are to be used.

2.10.2 The reduction gear is to be able to withstand momentary overspeeds of 115% of the maximum rated engine speed in forward and reverse.

2.10.3 Reduction gear incorporating an independent oiling system is to include a suitable oil sump, an oil level indicating device, and a vent located to provide adequate breathing, but positioned to prevent oil leakage from the transmission under normal operating conditions.

2.10.4 Reduction gear and transmissions are to be provided with a method of cooling so that recommended maximum sump temperatures will not be exceeded under normal operating conditions.

2.10.5 Hydraulically actuated transmissions are to have a provision to monitor oil pressure and/or oil temperature.

2.11 Engine cooling system

2.11.1 Where sea water is used for the direct cooling of the engine, an efficient strainer which can be cleared from inside the craft is to be fitted between the sea inlet valve and the pump.

2.11.2 Means are to be provided for cleaning the strainer without interruption to the cooling water supply, where necessary.

2.11.3 Means are to be provided for indicating the temperature of the engine cooling media

2.11.4 Alarms for the engine cooling water system are to be provided in accordance with 2.7.

Section 3

Propulsion System

3.1 Shafting

3.1.1 Shafting and arrangement are to be in accordance with the relevant requirements of *Ch.12, Sec.1 Rules and Regulations for the Construction and Classification of High Speed crafts and Light crafts*.

3.2 Propeller

3.2.1 When the diameter of the propeller exceeds 1.00 m, the propeller materials and scantling are, are to comply with *Ch.12, Sec.1 Rules and Regulations for the Construction and Classification of High Speed crafts and Light crafts*.

3.2.2 Alternatively, scantlings of propellers either justified by adequate calculations or satisfactory experience in service may be accepted.

3.3 Thrusters and Waterjets

3.3.1 Thrusters and waterjets, developing power equal to 110 [kW] or more intended for propulsion and steering are to be in compliance with the relevant requirements of *Ch.12, Sec.1 Rules and Regulations for the Construction and Classification of High Speed crafts and Light crafts*.

3.3.2 Thrusters and waterjets, developing power less than 110 [kW] intended for propulsion and steering are to be built in accordance with sound marine practice.

3.4 Steering and rudder arrangements

3.4.1 Steering and rudder arrangements are to be in accordance with Chapter 6

End of Chapter

Chapter 11

Electrical Installations

Section	Contents
1	<i>General</i>
2	<i>Requirements for Electrical Installations</i>
3	<i>Electrical Cables and Conductors</i>

Section 1

General

1.1 Application

1.1.1 The requirements of this Chapter apply to permanently installed electrical installations on Pleasure Crafts.

1.1.2 Attention is also drawn to relevant statutory requirements of the country in which the Pleasure Craft is registered.

1.1.3 Electrical arrangements are to be such as to minimize the risk of fire and electric shock. Tanks, machinery or other metallic objects that do not have proper electrical continuity with the water surrounding the craft are to have special earthing arrangements to reduce such risks.

1.1.4 The following standards may be used in the case of Pleasure Crafts:

- *ISO 10133*; for direct current system installations which operate at a rated voltage not exceeding 50 [V];
- *ISO 13297*; for single-phase alternating current installations which operate at a rated voltage not exceeding 250 [V];
- *IEC 60092-507*; for three-phase alternating current systems which operate at a rated voltage not exceeding 500 [V].

1.1.5 Other national/ international standards may also be used in consultation with IRS.

1.2 Documentation to be submitted

1.2.1 A single line diagram of the complete electrical installation is to be submitted for machinery applicable to the Craft, including the following, as applicable:

- a) power sources (generators and batteries including their electrical characteristics);
- b) Switchboard/ distribution panels and all feeders;
- c) indication of protective devices (including their characteristics and settings);
- d) cross-sectional areas of the cables and their characteristics.

1.2.2 Line diagrams of control circuits and a list of monitored, control and alarm points for machinery or equipment.

1.2.3 IRS may request the submission of additional documents in the case of non-conventional design or if it is deemed necessary for the evaluation of the system, equipment or components.

1.3 Test and Trials

1.3.1 Before a new installation (or any alteration or addition to an existing installation) is put into service, trials are to be carried out. All tests and trials are to be carried out in accordance with an approved trial schedule.

1.3.2 These trials are in addition to any acceptance tests which may have been carried out at the manufacturers' works.

Section 2

Requirements for Electrical Installations

2.1 Power Supply Requirements

2.1.1 Electrical load is to take into account and be sufficient to provide all lighting including navigational and search light, navigational equipment, firefighting, bilge transfer, steering, control and alarm system loads unless separate/individual source of energy (prime movers) are provided for any of these items. The electrical power may be provided by generator or battery, with rating sufficient to ensure the operation of services indicated above.

2.1.2 Where battery is provided as the main source, adequate means of charging is to be provided. Further battery system is to be duplicated. The charging provision need not be provided on Type 1 pleasure crafts provided the source of energy is sufficient for the nature of the operation undertaken by the Crafts.

2.1.3 A battery of sufficient rating to power essential services (emergency lighting, steering systems, navigation and communication equipment) is to be provided and is to comply with the requirements of 2.5.2 and 2.5.3. The battery is to be provided with suitable charging facility.

2.1.4 If arrangement of one of the batteries is in accordance with 2.1.3, a separate battery for essential services may be considered not necessary.

2.2 Protection

2.2.1 General

2.2.1.1 All circuits, except the main supply from the battery to the starter motor and electrically driven steering motors, are to be provided with

electrical protection against overload and short circuit, (i.e. fuses or circuit breakers are to be installed).

2.2.1.2 The rating of over current protection devices is not to exceed the rated current capacity of the conductor being protected. Short circuit protection is to be suitable for the total rated current of the consumers in the circuit protected. Where a single outboard engine is installed and fitted with in-line fuses, suitable procedures is to be established to enable the engine to be started in the event of a damaged fuse.

2.2.1.3 Steering circuits, the loss of which would lead to steering failure, are to have an overload alarm in lieu of overload protection (this does not apply to auto-pilot motors). However, all circuits are to be protected against short circuit events.

2.2.1.4 Every unearthed, conductor is to be protected by a manually reset, trip-free circuit breaker or fuse.

2.2.1.5 The current rating of each circuit breaker or fuse is not to exceed the current rating of the smallest conductor in the circuit, except as provided in 2.2.1.3.

2.2.1.6 If the value specified in 2.2.1.5 does not correspond to a standard circuit breaker or fuse rating, the next larger rated circuit breaker or fuse may be used, provided it does not exceed 150% of the allowed current capacity of the conductor.

2.2.2 Generators

2.2.2.1 All generators are to be protected against over-current and short-circuit current.

2.2.2.2 Generators driven by auxiliary engines are to be protected by circuit-breakers (fuses may be accepted for the protection of generators having rated power less than 50 [kW] and not designed to run in parallel).

2.2.3 Motors

2.2.3.1 Motors having rated power of 1 [kW] or above are to be protected against overload, short-circuit and under-voltage.

2.2.3.2 Means are to be provided to stop electric motors of engine room fans and pumps handling flammable liquids. Such means are to be located outside the space where the subject motors are located.

2.3 Hazardous Spaces

2.3.1 Where practicable, electrical equipment is not to be installed in a space where petroleum vapour or other hydrocarbon gas is likely to accumulate. When equipment is installed in such a space it must comply with a recognised standard for prevention of ignition of a flammable atmosphere.

2.3.2 Any compartment that contains a gas consuming appliance or any compartment into which flammable gas may leak or accumulate, is to be provided with a hydrocarbon gas detector and alarm. The detector and alarm is to be designed to comply with a recognized standard in accordance with 2.3.1.

2.3.3 The provisions of 2.3.1 will not be applicable, if:

(a) the vessel uses diesel fuel as its only fuel source;

(b) the electrical component is isolated, in accordance with the requirements given below, from fuel sources such as

- (i) engines and cooking appliances,
- (ii) valves, connections or other fittings on vent lines, fill lines or distribution lines, and
- (iii) fuel tanks; or

(c) the electrical component is located in a compartment where the only source of flammable vapour is from liquefied petroleum gas (LPG) or compressed natural gas (CNG) appliances, cylinders, fittings, valves or

regulators; the compartment is an accommodation space and meets the requirements of ventilation in accordance with Ch. 9, 6.4.1.1 (a) of these Rules.

2.4 Earthing

2.4.1 The engine block may be used as the common return for accessories mounted on the engine, except on metallic small vessels, where the engine is not isolated from the hull.

2.4.2 A metallic hull or the earthing conductor is not to be used as the return conductor.

2.4.2.1 If one side of the DC system is to be earthed, the earthed conductor is to be of negative polarity.

2.4.2.2 In steel and aluminum small vessels, non-conducting exposed metal parts of electrical equipment that require earthing are to be effectively earthed to the hull.

2.4.3 On small wood, fibre-reinforced plastic and composite vessels, a continuous earthing conductor is to be installed to facilitate the earthing of non-conducting exposed metal parts of electrical, electronic, and communication equipment that requires earthing. The earthing conductor is to terminate at a point on the main engine or at a copper plate of area not less than 0.2 [m²] fixed to the keel below the light waterline so as to be fully immersed under all conditions of heel or trim.

2.4.4 Every earthing conductor is to be of copper or other corrosion-resistant material and securely installed and protected, where necessary, against damage and electrolytic corrosion.

2.4.5 Every earthing connection to the small vessel's structure, or on wood, fibre-reinforced plastic, and composite small vessels, to the continuous earthing conductor; is to be made in an accessible position and secured by a screw or connector of brass or other corrosion-resistant material used solely for that purpose.

2.5 Batteries

2.5.1 The location in which a battery is installed is to be dry, well-ventilated and above bilge water level.

2.5.2 Batteries supplying essential services (emergency lighting, steering systems, navigation and communication equipment) are

to be located in a position not likely to flood in normal operations or in the event of minor damage.

2.5.3 The batteries are to be rated for 6 hours in the case of Type 3 and 4, for 3 hours in the case of Type 2 and 1 hour in the case of Type 1 pleasure crafts.

2.5.4 Batteries, as installed in small crafts, are to be capable of inclinations of up to 40 degrees, without leakage of electrolyte. Means are to be provided for containment of any spilled electrolyte.

2.5.5 Batteries are to be protected against mechanical damage by either location or an enclosure, and electrically protected by a non-conductive cover to protect metal objects coming in direct contact with the unearthed terminals of the battery.

2.5.6 Battery charging systems are to be automatic and fitted with circuitry to prevent overcharging.

2.5.7 Depending upon the maximum charging power output, the location of the battery is to be as shown in Table 2.5.7.

Table 2.5.7 - Battery location with respect to maximum charging power output		
Sr. No	Maximum Charging Power Output	Battery Location
(i)	Output < 0.2 [kW]	Any suitable space without any special container requirements
(ii)	$0.2 \leq \text{Output} \leq 2.0$ [kW]	Batteries are to be located in machinery space or other well ventilated space in a box or locker
(iii)	Output > 2.0 [kW]	Batteries located in suitably ventilated, dedicated compartment within the craft, or, a locker on the open deck

2.5.8 A battery cut-out switch is to be provided for all systems. It is preferred that this switch acts as an isolator, i.e. it is double pole, however, single pole is acceptable on the positive conductor. If a battery changeover switch is fitted and is provided with an "off" position, this may serve as the cut-out switch also.

2.5.9 Battery switches are to be placed in a readily accessible location as close as practicable to the battery, or batteries.

2.5.10 Battery disconnect switches are to be capable of carrying the maximum current of the distribution system including the intermittent load of the starter motor circuit.

2.5.11 Facility for safe manual operation is also to be provided if remote controlled battery disconnect switches are used.

2.5.12 Battery power supply to radio equipment is to be in compliance with relevant flag administration requirement.

2.5.13 A dedicated circuit from the main switchboard is to be provided to supply the radio equipment.

2.6 Distribution panels

2.6.1 The front side of distribution panels is to be readily accessible, and the rear side is to be accessible, as far as practicable.

2.6.2 Distribution panels are to be designed, constructed, and installed so that there are no exposed live parts accessible to the operator in the normal operating position.

2.6.3 Distribution panels are to be weatherproof or protected from weather and splash.

2.6.4 Connections and components on panel boards are to be in locations protected from the exposed conditions in accordance with IEC 60529:

- (a) minimum IP 67 if exposed to short-term immersion;

- (b) minimum IP 55 if exposed to splashing water;
- (c) minimum IP 20 if located in protected locations inside the craft.

2.6.5 Crafts equipped with both AC and DC electrical systems are to have their distribution from separate distribution panels. If both systems share a common enclosure, it must have a partition or have other positive means provided to clearly separate the AC and DC sections from each other. Wiring diagrams to identify circuits, components, and conductors are to be included.

2.6.6 The switchboard or distribution panel board is to be provided with clear permanent markings of the nominal voltage, types and provide circuit identification.

2.7 Lighting

2.7.1 When general lighting within a Craft is provided by a centralised electrical system, an

alternative source of lighting (which may be a suitable portable battery operated lamp(s) if practical, taking into consideration the size and complexity of the craft) is to be provided. This alternative source of lighting is to be sufficient for the following:

- (a) Enable persons to make their way to the open deck.
- (b) Illuminate survival craft launching and embarkation.
- (c) Illuminate man-overboard rescue equipment and rescue areas.
- (d) Permit work on essential machinery.

2.8 Lightning Protection

2.8.1 Lightning protection is to be provided, where a considerable risk of lightning strike is identified. Lightning protection arrangements may be provided in accordance with ISO 10134 "Small Craft – Electrical Devices – Lightning-Protection Systems".

Section 3

Electrical Cables and Conductors

3.1 General

3.1.1 Electrical cables are not to be installed in hazardous areas except as specifically permitted or when associated with intrinsically safe circuits.

3.1.2 All cables installed in hazardous areas are to be sheathed with at least a non-metallic impervious sheath in combination with braiding or other metallic covering.

3.1.3 Cables are to be manufactured in accordance with the relevant recommendations of IEC Publications 60092- 350, 60092-352, 60092-353, 60092-354 and 60092- 376 or in accordance with other equivalent international or national marine standards such as *UL 1426*, "Electrical Cables for Boats" or *IEEE Std 1580*

"Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Platforms".

3.1.4 Except for intermittent surges, no conductor is to carry a current greater than that specified in the relevant standards for the conductor's gauge and temperature rating.

3.1.5 When the conductors are carrying the maximum nominal service current, the voltage drop from the main or emergency switchboard bus bars to any point in the installation is not to exceed 6% of the nominal voltage. For battery circuits with supply voltage less than 50 [V], this value may be increased to 10%. For the circuits of navigation lights, the voltage drop is not to exceed 5% of the rated voltage under normal conditions.

End of Chapter



IRCLASS
Indian Register of Shipping



RULES AND REGULATIONS FOR THE CONSTRUCTION AND CLASSIFICATION OF **PLEASURE CRAFTS AND LARGE YACHTS**

PART II LARGE YACHTS

JULY 2024

Part II

Rules and Regulations for the Construction and Classification of Large Yachts

**(Length \geq 24m and not carrying more than
12 Passengers)**

Part II

Large Yachts

Chapter 1

General

1. Part II of these Rules is applicable to the Construction and Classification of Large Yachts i.e. which are 24 m and over in load line length, are in commercial use for sport or pleasure, do not carry cargo and do not carry more than 12 passengers. In general, the Rules are applicable to large yachts of length less than 150 m. Large yachts of 150 m and above will be subjected to special consideration based on evaluation of structural strength by direct analysis methods.

Large Yachts for non-commercial use complying with the Regulations of a National Authority with the number of persons intended to be carried as permitted by those Regulations may also be considered for Classification/ Certification.

2. Classification/ certification of Large Yachts are considered based on the relevant requirements in the *Rules and Regulations for the Construction and Classification of Steel Ships* (Main Rules), *Rules and Regulations for the Construction and Classification of High Speed Crafts and Light Crafts* (HSC & LC

Rules) as well as the special statutory requirements of the National Authority for such vessels.

3. Where the National Authority has not specified any Rules for Yachts, compliance with the Large Commercial Yacht Code (LY3 Code) of the UK Maritime and Coastguard Agency (MCA) would be considered.

4. Table 4 lists the applicable requirements for Large Yachts in IRS Rules and the LY3 Code for the purpose of Classification/ Certification.

5. Other statutory requirements of the National Authority/ LY3 Code are also to be complied with as a pre-requisite for Classification/ Certification.

6. In addition to the Notations indicated in Part 1, Chapter 1 of the *Rules and Regulations for the Construction and Classification of Steel Ships*, a ship type notation "**LARGE YACHT**" would be assigned to vessels built in accordance with Part II.

Table 4 : Applicable Requirements to be followed for Large Yachts			
S No	Topic	Applicability/ Reference	Remarks
1	Surveys	As per applicable provisions of Pt.1, Ch.2 of the Main Rules and the applicable requirements of the survey guidelines in Section 28 of the LY3 Code.	
2	Materials	Pt. 2 of the Main Rules and Ch.3 of the HSC&LC Rules, as applicable.	
3	Weathertight and Watertight Integrity, Load Line and Stability	Sections 4, 5, 6, 11 and 12 of the LY3 Code	
4	Structures	Applicable requirements of Ch. 6 of the HSC&LC Rules. Design loads to be considered based on Ch. 4 of the HSC&LC Rules.	
5	Rudders and Steering Arrangements	Applicable provisions of Ch. 8 of the HSC&LC Rules for vessels < 500 GT. For vessels ≥ 500GT, applicable requirements of Pt. 3, Ch. 14 and Pt. 4, Ch. 6 of the Main Rules may be followed.	For vessels < 500GT, refer Section 9A of the LY3 Code. For vessels ≥ 500GT , refer Section 9B of the LY3 Code (SOLAS, as applicable).
6	Anchoring and Mooring	Ch. 9 of the HSC&LC Rules	
7	Fire Safety	Sections 14 and 15 of the LY3 Code, as applicable	General Fire Safety provisions are covered in Section 14 of the LY3Code. For Structural Fire Protection of vessels < 500 GT (refer Section 14A) and ≥ 500 GT (refer Section 14B). For firefighting appliances of vessels < 500 GT (refer Section 15A) and ≥ 500 GT (refer Section 15B).
8	Piping Systems	In general, the requirements of Ch. 11 of the HSC&LC Rules may be followed. For vessels ≥ 500 GT, applicable requirements of Pt. 4, Ch.2 & Ch.3 of the Main Rules may be used.	Bilge pumps and piping - For vessels < 500 GT, refer Section 10A and for vessels ≥ 500 GT, refer Section 10B of the LY3Code.

Table 4 : (Contd.)			
S No	Topic	Applicability/ Reference	Remarks
9	Machinery	For vessels < 500 GT; in general, the requirements of Ch. 12 of the HSC&LC Rules may be followed, as applicable. For Vessels ≥ 500GT, applicable requirements of Pt. 4 of the Main Rules may be followed.	For vessels < 500GT, refer Section 7A of the LY3 Code. For vessels ≥ 500GT , refer Section 7B of the LY3 Code (SOLAS, as applicable).
10	Electrical Installations	For vessels < 500 GT; in general, the requirements of Ch. 13 of the HSC&LC Rules may be followed, as applicable. Also refer Section 8A of the LY3 Code. For Vessels ≥ 500GT; applicable requirements of Pt. 4, Ch. 8 of the Main Rules may be followed. Also refer Section 8B of the LY3 Code.	For vessels < 500 GT, requirements for emergency power are to be as per Section 8A of the LY3 Code.
11	International Conventions	The applicability of various conventions and the certificates to be issued are to be as summarized in Section 28 of the LY3 Code	COLREGS, MARPOL, AFS, BWM, Polar Code, Bunkers Convention, IGF Code and national legislation of the Administration concerned.

End of Chapter