Amendments to the "Rules for the Classification of Yachts"

Effective from 1/1/2026

List of the amendments:

Part B - Hull and Stability

Chapter/Section/Paragraph amended	Reason
Ch 1, Sec 1, [5.5.6](new)	to request a hose test for external hatches after they are installed on board
Ch 1, Sec 1, [5.6.4]	to specify the minimum shear modulus (G) value for interlayer material other than polycarbonate, and provide clarifications on alternatives to the installation of storm shutters
Ch 1, Sec 1, [5.6.11]	to align the reference time duration for shear modulus (G) value with the one in ISO 11336-1 Ed.2024
Ch 1, Sec 1, [5.8.1]	to request a hose test for external doors after they are installed on board
Ch 1, Sec 1, [5.12.1]	to add weather load for bulwarks located more than 1 m inwards and remove the Beaufort scale limitation for bulwarks on short range yachts
Ch 1, Sec 1, Tab 15	to editorially improve the table for better alignment with the requirements for bulwarks and guardrails or guard line in previous paragraph 5.12
Ch 1, Sec 1, [5.16.1]	to clarify requirements for inflatable gasket
Ch 1, Sec 2, [2.1.1]	to correct editorial errors by deleting requirements not applicable to yachts over 500 GT which had been moved to App 1 (applicable to yachts under 500 GT) but were not deleted from this section due to an oversight
Ch 1, Sec 2, [2.2.1]	to introduce a requirement on the cross-sectional area of the single arm propeller shaft brackets
Ch 1, Sec 2, [8](new)	to introduce requirements for stern tubes
Ch 1, Sec 3, [2.1.3](deleted)	to remove anchor requirements not applicable to yachts over 500 GT (left here due to an oversight) and move them to new paragraph 3.1.2 of App 1 (applicable to yachts under 500 GT)
Ch 1, Sec 3, Tab 1	to reduce the chain length value for some equipment number ranges in line with those in the Rules for Classification of Ships
Ch 1, App 1, [2.3](new)	to specify relaxations for propeller shaft brackets for yachts under 500 GT

Ch 1, App 1, [3.1.2](new)	to introduce anchor requirements applicable to yachts under 500 GT which had been left in paragraph 2.1.3 of Sec 3 (applicable to yachts over 500 GT) due to an oversight
Ch 1, App 1, [6.1.2](new)	to provide clarification on λ coefficient for sailing yachts under 500 GT
Ch 1, App 1, [7](new)	to move to App 1 (applicable to yachts under 500 GT) some requirements for design and testing of watertight doors for yachts under 500 GT taken from paragraph 1.9.3 of App 4 “Watertight doors and hatches: design and testing criteria”
Ch 1, App 2, [1.1.7](new)	to clarify required pressure for glazing scantling on yachts under 24 m
Ch 1, App 2, [1.1.11](new)	to clarify required distance to the windows edge on yachts under 24 m
Ch 1, App 4, [1.9.3]	to delete some requirements for design and testing of watertight doors for yachts under 500 GT moved to new paragraph 7 of App 1 (applicable to yachts under 500 GT)
Ch 4, Sec 13, [1.2.1]	to provide requirements for the FRP substrate of structural adhesive to clarify when the test of the substrate for structural adhesive can be considered satisfactory to specify which tests are required for the renewal of the type approval of structural adhesives
Editorial modifications (not all shown in this document) to correct typos and wrong terms/inaccuracies.	

Part C - Machinery, Systems and Fire Protection

Chapter/Section/Paragraph amended	**Reason**
Ch 1, Sec 2, [4.7.8]	to update the reference to ISO 8217 standard mentioned in the requirements for alarms and safeguards for emergency reciprocating I.C. engines using distillate marine fuels
Ch 1, Sec 2, [5.1.1]	to introduce IACS UR M61 (Rev.3 Feb 2024) “Starting Arrangements of Internal Combustion Engines” in line with the Rules for Classification of Ships
Ch 1, Sec 7, [2.1.6]	to introduce a reference to the requirements for stern tubes in the new paragraph 8 added to Pt B, Ch 1, Sec 2
Ch 1, Sec 10, [14.3](new)	to introduce IACS UR M84 (New Feb 2024) “Capacity and availability of compressed air for essential services” in line with the Rules for Classification of Ships
Ch 1, Sec 16, [3.5.2]	to update the hours/minutes required for electric propulsion endurance test in line with those for traditional propulsion
Ch 1, App 1, [5.8.3](new)	to add the possibility of alternative considerations for sailing yachts regarding bilge system requirements
Ch 1, App 1, [6.1.5]	to delete the possibility to have hydraulic power installations supplying steering in common with other systems for yachts under 500 GT
Ch 2, Sec 7, [3]	to align the requirements for Uninterruptible Power System (UPS) units with those in the Rules for Classification of Ships
Ch 2, Sec 8, [3.3.3]	to set to 1 minute the test voltage time duration

Ch 4, Sec 1, [1.2.3]	to insert the requirement for the acceptance of fire tests on composite constructions
Ch 4, Sec 1, [1.2.6](new)	to add the definition of storage spaces/boxes/cabinets for lithium batteries
Ch 4, Sec 2, [6.1.1]	to clarify that the fire prevention requirements for charging stations are applicable also when the batteries are inside vehicles
Ch 4, Sec 2, [6.1.2](new)	to add the fire prevention requirements for storage spaces/boxes/cabinets for lithium batteries
Ch 4, Sec 3, [3.5.1]	to clarify that steel watertight doors not requiring insulation are the steel watertight sliding doors built in accordance to SOLAS Chapter II-1
Ch 4, Sec 3, [3.7.1]	to clarify when it is possible to install windows in engine room boundaries
Ch 4, Sec 3, [4.1.3]	to clarify that the requirement for ventilation trunk is applicable only to machinery spaces of Category A
Ch 4, Sec 5, [3.1.1]	to clarify that the requirement for means escape is applicable to all type of machinery spaces not only those of Category A
Ch 4, Sec 8, [2.3.5](deleted)	to correct a typo by deleting a paragraph that duplicate a previous one
Editorial modifications (not all shown in this document) to correct typos and wrong terms/inaccuracies.	

Part D – Materials and Welding

Chapter/Section/Paragraph amended	**Reason**
Ch 4, Sec 2, Fig 7, Tab 3 and [3.13.2]	to modify some requirements for various finished products in line with those in the Rules for Classification of Ships
Editorial modifications (not all shown in this document) to correct typos and wrong terms/inaccuracies.	

Part E – Service Notations

Chapter/Section/Paragraph amended	**Reason**
Ch 2, Sec 2, [4.9](new)	to add relaxations for compressed air systems on pleasure yachts
Ch 2, Sec 2, [6](new)	to add relaxation for endurance test of main propulsion diesel engines driving fixed propeller or impellers on pleasure yachts under 300 GT
Ch 2, Sec 4, [2.1.1]	to clarify the requirements for structural fire protection for wooded and steel yachts to provide the possibility of installing a window in the bulkheads dividing the engine control room and the engine room
Editorial modifications (not all shown in this document) to correct typos and wrong terms/inaccuracies.	

Part B

Hull and Stability

Chapter 1

GENERAL

SECTION 1 GENERAL REQUIREMENTS

1 Rule application

1.1

1.1.1 Part B consists of the following Chapters:

- Ch.1 General
- Ch.2 Steel
- Ch.3 Alluminium
- Ch.4 Composite
- Ch.5 Wood
- Ch.6 Stability

Chapter 3, 4 and 5 are applicable to yachts with the hull made of materials other than steel.

Yachts of unusual form, speed or proportions or of types other than those considered in Part B will be given special consideration by the Society, also on the basis of equivalence criterion.

2 Equivalents

2.1

2.1.1 In examining constructional plans, the Society may take into account material distribution and scantlings which are different from those obtained by applying these requirements, provided that longitudinal, transversal and local strength are equivalent to those of the relevant Rule structure and that such scantlings are found satisfactory by the Society also on the basis of direct calculations of the structural strength.

In particular, the structures of yachts similar in performance to high speed craft (HSC) may have scantlings in accordance with TASNEEF "Rules for the Classification of High Speed Craft".

In such case, the Master is to be provided with a yacht operating manual indicating the appropriate speed for each sea state.

The use of TASNEEF "Rules for the Classification of High Speed Craft" for the scantlings of the structures of the afore mentioned yachts is to be agreed between the yard and the Society before the submittance of the drawings for approval and the commencement of the hull.

Special structures not provided for in these Rules, such as decks intended for the carriage of vehicles, side and stern doors and helicopter decks, may have scantlings in accordance with the TASNEEF Rules for the Classification of Ships.

3 Direct calculations for monohull and twin hull yacht

3.1 Direct calculations for monohull yachts

3.1.1 General

Direct calculations are generally required to be carried out, at the discretion of the Society, to check the primary structures of yachts which have unusual shapes and/or characteristics.

In addition, direct calculations are to be performed to check the scantlings of primary structures of yachts whenever, in the opinion of the Society, hull shapes and structural dimensions are such that the scantling formulae used in these Rules are no longer deemed to be effective.

By way of example, this may be the case in the following situations:

- elements of the primary transverse ring (beam, web and floor) have very different cross-sectional inertia, so that the boundary conditions for each are not well defined;
- marked V-shapes, so that floor and web tend to degenerate into a single element;
- complex, non-conventional geometry;
- presence of significant racking effects (yachts with many tiers of superstructure);

4.3.3 Bulkhead deck

The bulkhead deck is normally the uppermost complete deck exposed to the weather and sea, which has permanent means of closing all openings in the weather part thereof, and below which all openings in the sides of the ship are fitted with permanent means of watertight closing. In a ship having a discontinuous bulkhead deck, the lowest line of the exposed deck and the continuation of that line parallel to the upper part of the deck is taken as the bulkhead deck.

4.3.4 Watertight bulkhead

Watertight bulkheads are bulkheads extended watertight till the freeboard deck, whose scantlings comply with [5.1.4].

4.3.5 Weather deck

The weather deck is the uppermost complete weathertight deck fitted as an integral part of the vessel's structure and which is exposed to the sea and the weather.

4.3.6 Virtual freeboard deck

Where the actual freeboard from the full load waterline to the weather deck exceeds that required by ILLC '66 by at least 1,8 m for yachts having L_{LL} < 75 m, or at least 1,80 + 0,01 (L_{LL} - 75) for 75 < L_{LL} < 125, or at least 2,30 m for L_{LL} > 125 m, a virtual freeboard deck may be defined (hypotetically drawn below and parallel to the weather deck) and, for the determination of the superstructure tier, the superstructure above the weather deck may be considered as a second tier and the second tier in respect to the weather deck may be considered as a third tier and so on. All the fitting above the weather deck, abaft the forward quarter, may be considered in the same way".

The vertical distance as above defined between the assumed freeboard deck corresponding to the relevant watertight weather deck and the minimum freeboard as calculated in accordance with the Load Line Requirements may be used to reduce the requirements for closing appliances for openings in the hull, superstructure, deckhouses, relevant sills above deck and the height of air pipes and ventilators above deck, if not otherwise stated by the flag Administration.

4.3.7 Deckhouse

The deckhouse is a decked structure fitted on the weather deck, a superstructure deck or another deckhouse, having limited length and a spacing between the external longitudinal bulkheads less than 92% of the local breadth of the yacht.

4.3.8 Weathertight

A closing appliance is considered weathertight if it is designed to prevent the passage of water into the yacht in any sea condition.

4.3.9 Watertight

A closing appliance is considered watertight if it is designed to prevent the passage of water in either direction under a head of water for which the surrounding structure is designed.

4.3.10 Cofferdam

A cofferdam means an empty space arranged so that compartments on each side have no common boundary; a cofferdam may be located vertically or horizontally. As a rule, a cofferdam is to be properly ventilated and of sufficient size to allow for inspection.

4.3.11 Position 1 and position 2 *(1/7/2025)*

Postion 1 and position 2 are those defined in ILLC.

5 Subdivision, integrity of hull and superstructure

5.1 Number of watertight bulkheads

5.1.1 All Yachts are to have at least the following transverse watertight bulkheads:

- One collision bulkhead
- Two bulkheads forming the boundaries of the machinery spaces;as an alternative, the transom may be accepted as aft transverse bulkhead.

Additional bulkheads may be required for yachts required to comply with subdivision or damage stability criteria.

5.1.2 Openings in watertight bulkheads and decks *(1/1/2025)*

The number of openings in watertight subdivisions is to be limited to a minimum compatible with the proper working of the yacht. Pipes and electrical cable may be carried through watertight subdivisions provided that both the

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5.4.2 Drawings

Drawings representing the structure of the side/shell doors, their locking devices and their height above the waterline are to be sent to the Society for approval, with a general arrangement enclosed showing the intended use of the compartment which the doors give access to and the machinery and/or sports craft fitted therein.

5.4.3 Other fittings

Recesses for wells, gangways, winches, platforms, etc are to be watertight and of strength equivalent to that of the adjacent structures. Any penetrations for electrical wiring and piping are to ensure watertight integrity. Discharges are to be provided to prevent the accumulation of water in the normal foreseeable situations of transverse list and trim. See also [5.13.4].

5.5 Hatch on the weather deck

5.5.1 Hatches on the weather deck and deck above are to have a strength equivalent to that of the adjacent structures to which they are fitted and are to be weathertight. In general, hatches are to be hinged on the foreword side.

5.5.2 Where the hatches may be required to be used as a means of escape the securing arrangements are to be operable from both sides and in the direction of escape they are to be openable without a key. All handles on the inside are to be non removable. An escape hatch is to be readily identified and easy and safe to use, having due regard to its position.

5.5.3 Flush hatches on the weather deck are generally not to be fitted. Where they are foreseen they are to:

- be closed at sea;
- be fitted in a protected location close to the center line;
- have at least two drains in the aft part leading overboard;
- be fitted with gaskets;
- have at least 4 clips for size 600 x 600 mm;
- have non-oval hinges which can be considered as clips.
- be provided with open/close indication at the navigating bridge.

Flush hatches not satisfying all the above requirements have to be tested watertight

For dimensions bigger than 600 x 600 mm, the acceptance is at the discretion of the Society. Drawings representing the hatches, their position on deck, their coamings and their system of closure are to be sent for approval.

5.5.4 In general, hatches are to be kept closed at sea.

However, hatchways which may be kept open for access at sea are to be as small as practicable (a maximum of 1 square metre in clear area). Hatchways are to be as near to the centreline as practicable, especially on sailing vessels. Covers of hatchways are to be permanently attached to the hatch coamings.

5.5.5 Hatches, which are required to be watertight are to be tested according to the requirements given in Pt B, Ch 1, App ~~2~~4.

5.5.6 *(1/1/2026)*

After installation on board the hatches have to be subject to hose test to the satisfaction of the Surveyor.

5.6 Scantling of glazing

5.6.1 General

L is the scantling length in m.

L_{LL} Load line length.

T is the scantling draught in m (see [4.2.1]).

In this paragraph the word "window" is used alternatively with "portlight" and "glazing". These may have frame or not, deadlight or not depending on the context where they are used.

Only in [5.6.15] the word window is used for the larger fixed glazing that include one or more portlights (smaller not easy openable glazing).

Not easy openable means that the windows need a key or a mechanical mean or tool to be opened and that may keep it closed. For windows and door fitted in superstructure not contributing to buoyancy also redundant electrical means may be considered.

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In stepped IGU one of the panes is fixed to the framing while the other pane is not supported by the framing structure. In this case the framed pane of the IGU (either monolithic or laminated) shall be selected according to [5.6.8], [5.6.9] and [5.6.13] if monolithic and [5.6.11], [5.6.12] and [5.6.13] if laminated. The other pane is to have thickness of minimum 4mm.

In unstepped IGU both panes are supported by the framing structure. In this case both the panes of the IGU (either monolithic or laminated) shall be selected according to [5.6.8], [5.6.9] and [5.6.13] if monolithic and [5.6.11], [5.6.12] and [5.6.13] if laminated.

Otherwise the IGU may be tested hydraulically (3 samples) in accordance with [5.6.16].

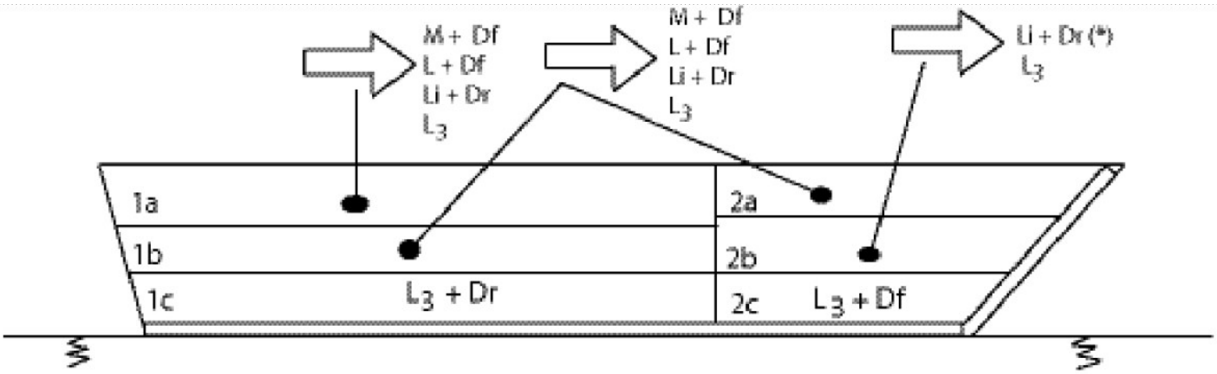
5.6.4 Deadlights and storm covers *(1/1/2026)*

Below the deck and in the superstructures contributing to the buoyancy, a deadlight for each window is to be provided. The position of such deadlights is to satisfy what follows:

- Deadlights in general are to be provided fixed in place.
- Deadlights may be removable when the glass is laminated and its load carrying capability is increased of 30%.
- Deadlights may be avoided for glazing made of laminated with an interlayer of 3mm polycarbonate or equivalent material if located in Zone 1a or 1b or 2a. The possibility to avoid such deadlight in case of interlayer matherial other than policarbonate will be evaluated if an hydrostatic test on the laminated glass with the external ply fractured is carried out (see [5.6.17 a)]).
- In Zone 2b when laminated glass with an interlayer of 3mm polycarbonate or equivalent material is used a removable deadlight is to be provided.

  The possibility to avoid such deadlight in case of interlayer material other than polycarbonate will be evaluated if an hydrostatic and a~~n impact~~ mechanical test on the laminated glass with the external ply fractured is carried out (see [5.6.17]).
- In Zone 1c a fixed or removable deadlight is to be foreseen. As an alternative [5.19] may be applied.
- In Zone 2c a fixed deadlight is to be foreseen. As an alternative [5.19] may be applied.

Figure 8 : Deadlights *(1/7/2025)*



M = monolithic glass
L = laminated glass
Li = laminated glass with load capability increased of 30%
L 3= laminated glass with 3 mm polycarbonate or equivalent
Df = fixed deadlight
Dr = removable deadlight
(*) = alternative material may be considered

To accept an interlayer material as an alternative to polycarbonate to avoid the deadlight, its G value at 25°C for short time duration (10 sec) is to be at least 100MPa.

Where portable deadlights are allowed they shall be stored in an easily accessible location and readily and safely mounted in any sea condition.

For fixed glazing glued without frame to the hull/superstructure the connection to the hull of the deadlight is to be found suitable taking into account the material of the hull and of the deadlight taking into account the test required in [5.6.18].

Materials shall be either in accordance with ISO 1751, marine grade aluminium alloy, or composite material as used for hull construction. Cast aluminium alloy shall be of a ductile type with elongation to breakage not less than 6%.

Deadlights shall be dimensioned such that when loaded by the design pressure the yield deformation stress is not exceeded. The deadlight shall be designed considering the same design pressure as required for the glazing. Subject to this pressure the stress in deadlight and all load carrying fittings is not to exceed the yield strength.

When equivalent strength is not shown by calculations, the deadlights in the mounted position shall be tested according to [5.6.18].

Guidance shall be available on board on the sea state at which deadlights shall be fitted and on maintenance and inspection and their means of securing.

In the superstructures not contributing to the buoyancy, normally deadlights need not to be provided except for windows located in the superstructures not contributing to the buoyancy if they are the prosecution of the shell (wide body yachts) when they are located below 0,08L and forward of 0,25L. Also in these location the use of an interlayer of 3mm of polycarbonate or equivalent material may be accepted as an alternative to traditional deadlights. For windows in other locations one blanking plate with the same dimension of the largest window to be foreseen on board.

When due the navigation of the yacht storm covers on windows fitted somewhere in a superstructure not contributing to the buoyancy are required by the Administration the storm cover has to satisfy what follows.

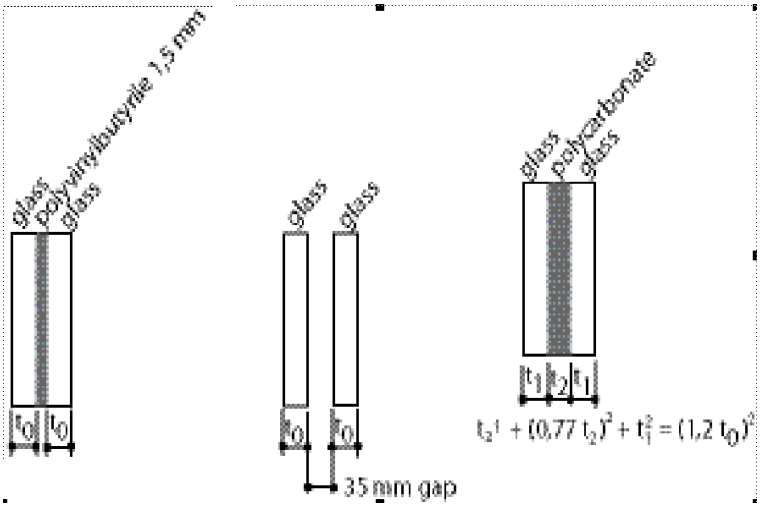
Storm shutters shall be dimensioned such that when loaded by the design pressure the yield deformation stress is not exceeded. The storm shutter shall be designed considering the same design pressure as required for the glazing. Subject to this pressure the stress in storm shutter and all load carrying fittings is not to exceed the yield strength.

When equivalent strength is not shown by calculations, the Storm shutter in the mounted position shall be hydraulically tested at a pressure of at least 4 p_D (the test may be carried out only on the largest storm shutter).

As an alternative a factor of 1,5 over the design pressure together with the use of laminated glass is considered acceptable in lieu of the storm cover.

As another alternative to storm covers also one of the arrangement in Fig 9 may be acceptable.

Figure 9



t_o is the minimum thickness required.

The alternatives acceptable to avoid deadlights are also acceptable to avoid storm shutters.

5.6.5 Preliminary tests for the acceptance of the glass

Glass panes fitted on the hull and in superstructure contributing or not to the buoyancy are to be in strengthened (thermally and chemically) safety glass.

The tests detailed in this paragraph are to be intended only for the acceptance of the glazing material. They are not to be considered as an alternative to the calculation of the required thickness and the relevant comparison with the proposed ones detailed in the following subparagraphs of this paragraph.

The following test has to be witnessed by the Surveyor.

The glass Manufacturer is to certify the homogeneity of the batches submitted for tests, as regards material, manufacturing procedure, heat treatment and suitability to meet the specified test requirements. Glass panes (thermally or chemically strengthened) are to be tested as specified in the following items a) or b).

a) a hydrostatic test of one glass pane for each batch of 100 (or fraction of 100) glass panes equal in shape and dimensions and manufactured with continuity and using the same procedure and treatments; the pane is to be tested with a load uniformly distributed on the net area, at the test pressures in the following table. The test pressure

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Sample ID	Average thickness h (mm)	Average width B (mm)	Force at breakage F_{max} (N)	Breaking position referred to loading rolls IN/OUT	Breakage origin EDGE/BODY	Time to breakage (s)	Uncertainty U (N/mm^2)	Surfaces in contact with loading rolls	Bending strength s_{bB} (N/mm^2)

5.6.11 Calculation of equivalent thickness of a laminated glass *(1/1/2026)*

Once the required monolithic thickness t_0 is calculated, the following procedure to be followed to check if the laminated glass proposed has an equivalent monolithic thickness higher than the required one, so acceptable. This procedure takes into consideration the possibility of having independent plies or collaborating plies:

Independent plies:

When the mechanical properties of the interlayer material (the laminating adhesive material) are not known, the plies of the laminated glazing have to be considered as mechanically independent.

The equivalent thickness of laminates made of n independent plies of thicknesses: t_{p1}, t_{p2}, …, t_{pn}, shall be calculated and compared with the basic thickness, t_O, calculated as explained above.

The equivalent thickness of n independent plies shall be calculated as follows. The thickness of one ply of the laminate is indicated generically as, t_j, where the index j is ranging from 1 to n.

For each ply of the laminate a partial equivalent thickness, $t_{eq,j}$, is calculated as:

$$t_{eq,\,j} = \sqrt[3]{\frac{\sum_{i=1}^{N} t^3}{t_j}}$$

and the equivalent thickness of the laminate t_{eq} shall be the minimum of the n $t_{eq,j}$ values:

$$t_{eq} = \min[t_{eq,\,j}]; \qquad j = 1, n$$

The laminate construction is accepted when it results:

$t_{eq} > t_o$

Collaborating plies:

When the mechanical properties of the interlayer are known in terms of shear modulus, G (N/mm^2), at 25 °C for ~~6~~10 s duration load the equivalent thickness shall be calculated as follows.

Preliminary calculation:

$$hs = 0,5 \cdot (t_1 + t_2) + t_i$$

$$t_{s;2} = \frac{hs \cdot t_2}{t_1 + t_2}; \qquad t_{s;1} = \frac{hs \cdot t_1}{t_1 + t_2}$$

$$Is = t_1 \cdot t^2_{s;2} + t_2 \cdot t^2_{s;1}$$

Shear transfer coefficient evaluation:

Equivalent thickness evaluation:

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5.7 Skylights

5.7.1 The relevant locking devices are to be the same as required for flush hatches (see [5.5.3]).

For the scantling of the glazing see [5.6].

5.7.2 A minimum of one portable cover for each size of glazed opening is to be provided which can be assessed rapidly and efficiently secured in the event of breakage of the skylight.

5.7.3 Skylights which are designated for escape purposes are to be openable from either side and in the direction of escape they are to be openable without a key.

All handles on the inside are to be non-removable. An escape skylight is to be readily identified and easy and safe to use, having due regard to its position.

5.8 Outer doors

5.8.1 Doors in the superstructure's side *(1/1/2026)*

Doors of exposed bulkheads of superstructures are to be of adequate dimensions and construction such as to guarantee their weathertight integrity and to be hinged in the forward edge.

The use of FRP for doors on the weather deck other than machinery spaces may be accepted, providing the doors are sufficiently strong.

For glazed doors see [5.6.2].

Where the doors may be required to be used as a means of escape, the securing arrangements are to be operable from both sides.

Where the doors may be required to be used as a means of escape, and are electrically operated they have to be also manually operable from both sides of the door in case of failure of the electrical system.

If the door is not fitted with mechanical means (or an approved redundant electrical mean) to keep it closed in emergency after a single failure it is to be treated as an easy openable window.

Doors to be kept closed during navigation and if openable out of the harbor indication in the wheelhouse of the door open is to be foreseen.

The height of the sills of doors above the exposed deck that give access to compartments below the deck is to be not less than the following value:

	Deck position 1	Deck position 2
Outer doors	100 mm	75 mm
Companionways	100 mm	75 mm

Doors on the weather deck which give direct access to machinery spaces are to have a minimum of six clips and to be outward opening.

Doors on the weather deck to 1st tier accommodation or other spaces protecting access below may have four clips.

Companionway have to be built using deck head.

Reverse sill may be accepted provided that the following conditions are satisfied:

a) Are Generally in way only of lateral and aft facing doors

b) The door is not normally used during navigation in bad weather conditions

c) The yacht is to have an increased freeboard

The design of the negative sill is to be as follow:

A negative sill to be realized with the following minimum dimensions (lxbxh).

l = at least the lower door edge

b (width) = at least the required sill height.

H (depth) = at least (h req - h off) where h req is the required sill height and h off is the offered sill height of the door (if h off = 0 then h to be at least h req).

h off = 0 then h to be at least h req).

The lower and lateral sides of the recess done to have the negative sill is to be made with a suitable scantling, and the upper side may be done with a grid of the same material of the deck finishing (teak).

The free area of the grid to be at least 50% of its total area.

Different dimensions may be evaluated based on equivalence of volume when the depth can not be satisfied but the depth to be at least 100mm for unrestricted and 75mm for short range.

At least 1 scupper sb and 1 pb with a diameter capable of granting the performance required during the test on board are to be fitted. The scuppers (material thickness and means of closure) are to be made in accordance with the requirement of pt C and discharge overboard.

Alternative solution may be accepted based on the satisfaction of the following test.

A pump of a capacity of about 30m3/h with its outlet left free (no pipes connected) is to discharge its maximum capacity of water on the recess and it is to be verified that:

- the recess is emptied for at least 80% of its volume in approximately less than 30 sec.
- the grid receives the water entirely without regurgitation on the deck around it.

After installation on board each external doors have to be subject to hose test at the Surveyor's satisfaction.

The application of the requirements of other rules equivalent to those of this section may be evaluated by the Society.

5.9 Drawings

5.9.1 *(1/7/2025)*

A plan showing the position portlights, windows, skylights, external doors and glass walls is to be submitted; their dimensions, material, relevant scantling and their sills is to be clearly indicated.

5.10 Ventilation ducts

5.10.1 General *(1/7/2025)*

Accommodation spaces are to be protected from gas or vapour fumes from machinery, exhaust and fuel systems. The yacht is to be adequately ventilated throughout all spaces. The accommodation is to be protected from the entry of gas and/or vapour fumes from machinery, exhaust and fuel systems.

Ventilation ducts are to be of efficient construction and, generally, when serving any spaces below the freeboard deck or an enclosed superstructure are to have a coming of a minimum height as indicated in Tab 11. Reduced height may be evaluated by the Society if a permanent means of closure is provided.

Table 11

Location	Coming height (mm) Short range navigation	Coming height (mm) Unrestricted navigation
Forward quarter length	450	900
Elsewhere	380	760

Ventilation ducts are to be kept as far inboard as practicable and the height above the deck of the ventilation ducts openings is to be sufficient to prevent the ingress of water when the vessel heels.

Machinery spaces are to be adequately ventilated so as to ensure that, when machinery therein is operating at full power in all weather conditions, an adequate supply of air is maintained to the spaces for safety and for the operation of the machinery, according to the Manufacturer's instructions.

The design and positioning of ventilation duct openings are to be considered with care, above all in zones of high stress or in exposed zones. The deck plating in way of the coamings is to be adequately stiffened.

The scantlings of ventilation ducts exposed to the weather are to be equivalent to those of the adjacent deck or bulkhead.

Ventilation ducts are to be adequately stayed.

Ventilation ducts which, for any reason, can be subjected to liquid pressure are to be made watertight and have scantlings suitable for withstanding the foreseen pressure.

For engine exhaust outlets, reference is to be made to [5.3.3].

5.10.2 Closing appliances *(1/7/2025)*

All ventilation ducts openings are to be provided with efficient weathertight closing appliances unless:

- The height of the coaming is greater than 4,5 m if in Position 1;
- The height of the coaming is greater than 2,3 m if in Position 2.

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As a general rule, closing appliances are to be permanently attached to the ventilation ducts coaming.

Ventilation ducts are to be fitted with a suitable means of preventing ingress of water and spray when open and have a suitable drainage arrangements leading overboard.

Adequate structural protection against the ingress of water may be evaluated by the Society as an alternative to the closing appliances.

5.11 Air pipes

5.11.1 General

Air pipes serving fuel and other tanks is to be of efficient construction and provided with permanently attached means of weathertight closure. Means of closure may be omitted if it can be shown that the open and of an air pipe is afforded adequate protection by other structures which will prevent the ingress of water.

In addition, air and sounding pipes are to comply with the requirements of Pt C, Ch 1, Sec 10, [9].

5.11.2 Height of air pipes

Where located on the weather deck, air pipes are to be kept as far inboard as practicable and be fitted with a coming of sufficient height to prevent inadvertent flooding. Generally, air pipes to tanks are to have a minimum coming height as indicated in Tab 12.

Table 12

Location	Coming height (mm) Short range navigation	Coming height (mm) Unrestricted navigation
On weather deck	380	760
Elsewhere	225	450

5.12 Bulwarks and guardrails or guardline

5.12.1 General *(1/1/2026)*

Bulwarks or railings are to be arranged on exposed decks and in areas where there is a risk of falling overboard or into internal and external lower deck spaces. This article is also applicable as far as practicable to bulwarks and handrails for protection from falling in lower areas (e.g. stairways) in internal spaces.

Where this is not practicable, handrails or stays are to be provided.

Bulwarks are to be of strong construction and adequately supported.

The height of bulwarks or rails, or a combination of both, is to be not less than 1000 mm.

The maximum clearance below the lowest course of the guardline is to be 230 mm. The other courses of guardline are to be not more than 380 mm.

The stanchions are to be spaced at not more than 2,2 m.

The scantling of a solid bulwark is to be equivalent of that of the adjacent structures of the side shell.

External glass balustrades are to provide water freeing areas in accordance with [5.13]. Openings for water freeing are to be not more than 230 mm.

Stanchions and top rail are to be able to withstand a load of at least 1 kN in the most critical point. The scantling of the top rail and the stanchions to be carried out in accordance with [5.12.2].

If the scantling of the top rail and the stanchions is not in accordance with [5.12.2], direct calculation with 1 kN as concentrated load are to sent.

Notwithstanding of the application of [5.12.2] or the alternative calculation a practical test in accordance with ISO 15085 using 1 kN instead of the value proposed by the a.m. ISO standard is required. No permanent deformation has to occur.

If the top rail material yield strength is more than 315N/mm^2, has minimum section modulus of at least 5 cm^3 and the stanchions material yield strength is more than 315 N/mm^2, the minimum section modulus is at least 16cm^3 if spaced up to 1,5m and 32cm^3 if spaced up to 2,2 m the a.m. test is not required.

The minimum values reported in this paragraph are based on a yield strength of at least 235 N/mm^2. If a material with a different yield strength is used the values to of the minimum modulus have to be duly modified.The minimum section modulus of the stanchions is to be at least 16cm3 for stanchions spaced up to 1,5m and 32cm^3 for stanchions spaced up to 2,2m.

These minimum requirements are intended for Grade A steel; for different metallic materials, an equivalent section modulus is to be calculated.

The maximum admissible stress have to be assumed as the 80% of the minimum yield strength of the material.

The top rail is to have ergonomic shape. When on glazed bulwarks it is proposed not to install a top rail the arrangement may be accepted provided special considerations are done. These considerations include but are not limited to the evaluation of the position of the glazed bulwark without top rail and the escape routes, the presence and the distances from alternative means/structure for holding purposes.

In any case when a top rail is not foreseen the exposed edges of the glazing is to be duly rounded not to constitute danger.

When on glazed bulwarks it is proposed not to install stanchions or stanchions with distance more than 2,2m the arrangement may be accepted provided special considerations are done, in particular the use of a structural interlayer material of at least 3mm is required.

The stanchions shall be rigidly fixed at their lower ends to resist rotational displacements.

The stanchions are to be structurally connected to the hull and in case of different material bimetallic joints have to be used.

Where the rails are substituted by glazing materials what follow applies. Normally stanchions and handrails have to be provided the glazing may be substitute the other transversal rails.

What follows is not applicable to small glazing panel that does not substitute rails. They have to be considered on a case by case base.

Glazing substituting the rails should not be situated in areas deemed essential for the operation of the ship. Such areas include mooring decks, lifeboat decks, external muster stations and in the vicinity of davits. Where external glass balustrades are not to be used, more traditional bulwarks or guard rails are to be fitted.

Where the glazing substitutes rails the scantling of the stanchions and of the top rails have to take into account in addition to the personnel load also the load due to the weather.

The scantling of the top rail and the stanchions have to be carried out according to [5.12.2] adding the weather load to personnel load. As an alternative to the application of [5.12.2] fem or direct calculation considering personnel and weather loads have to be sent for examination.

When the scantling of top rails and stanchions are not in accordance with [5.12.2] but are validated with fem or direct calculation the test a.m. required in accordance with ISO 15085 is to be performed with personnel and weather load. The impact test required below in accordance with EN 13049 if carried out also on the stanchions and top rail may be considered as alternative.

The weather load is to be taken not less than:

- 1st tier deck (main deck): p_1 calculated as for a windows in the first tier of superstructure or 12,5 kN/m^2 for lateral and aft glazing and 30 kN/m^2 for front glazing whichever is higher
- 2nd tier deck (upper deck): p_1 calculated as for a windows in the second tier of superstructure or 6 kN/m^2 for lateral and aft glazing and 10 kN/m^2 for front glazing whichever is higher
- 3nd tier deck (sun deck): p_1 calculated as for a windows in the third tier of superstructure or 2.5 kN/m^2 for lateral and aft glazing and 7.5 kN/m^2 for front glazing whichever is higher.

For restricted navigations (e.g. short range yacht ~~where the yacht is intended to sail with wind condition of maximum Beaufort scale 4~~) the weather loads for 2nd and 3rd deck may be reduced of 50%. For main deck level the weather load may be reduced to 10 kN/m2 for aft and side glazed bulwark located more than 1m inwards.

Provision are to be available to fit adequately spaced rails in case of failure of the glazing.

Glass or other glazing materials such as polycarbonate may be used.

If glass is used it is to be thermally or chemically strengthened glass of laminated type.

The relevant scantling is to be calculated with the above mentioned weather loads and personnel load (1 kN/m^2 considered additional to weather load) as it is supported on four sides.

In Tab 13 are reported the thickness required for different locations and different interlayer material.

If the arrangement on board foresees less than 4 supporting sides a fem calculation is to be send to demonstrate that the acceptability of the thickness proposed in Tab 13 also in case of less than 4 supporting sides. The scantling calculated with 4 sides supported is to be in any case granted.

Arrangement where stanchions or supporting top rail are not foreseen or have different spacings may be accepted provided that in addition to the scantling required above it is foreseen a structural interlayer of at least 3mm.

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	A = interlayer	B = interlayer made of structural material that passed test to avoid deadlight in area 2b				
sc 235	8+1,52+6	5+1,52+4	4+1,52+4	4+1,52+4	4+1,52+4	4+1,52+4
polycarbonate	16		12		10	
other location 4+1,25+4						

Table 14

Area	2200 x 1000	1500 x 1000	1500 x 600	1200 x 850
sc 160	14+3+14	10+3+12	10+3+8	10+3+10
sc 235	12+3+12	10+3+10	8+3+6	8+3+8
polycarbonate	40	33	25	28
Structural interlayer that passed impact test to avoid deadlight in area 2b				

Table 15

Bulwark with top rail and stanchions					
Without glazing material			With glazing material		
Calc of top rail and stanchions as [5.12.2]			Calc of top rail and stanchions as [5.12.2]		
yes		no	yes		no
top rail $z>17cm^3$, $s > 315N/mm^2$ and stanchions $z>20cm^3$ up to 1,5m or $40cm^3$ up to 2,2m $s > 315N/mm^2$?		fem or direct calculation with 1kN concentrated load	top rail $z>20cm^3$, if stanchions are spaces up to 1,5m and $40cm^3$ if stanchions are spaced up to 2,2m $s > 315N/mm^2$ and stanchions $z>30cm^3$ up to 1,5m or $40cm^3$ up to 2,2m $s > 315N/mm^2$?		fem or direct calculation with 1kN concentrated load + weather load (kN/m^2)
yes	no	+	yes	no	+
-	test ISO 15085 but with 1kN transversal load	test ISO 15085 but with 1kN transversal load	-	test ISO 15085 but with 1kN transversal load	test ISO 15085 but with 1kN transversal load + weather load (kN/m^2)
			Glass supported in 4 sides?		
			yes		no

			Scantling of glazing in acc. with Tab 13 + iterlayer 3mm structural material and top rail z>20cm³, if stanchions are spaces up to 1,5m and 40cm³ if stanchions are spaced up to 2,2m s > 315N/mm² and stanchions z>30cm³ up to 1,5m or 40cm³ up to 2,2m s > 315N/mm², weather load less than 30kN/m²?		Increased thickness of glazing in acc. with Tab 14	
			yes	no	yes	no	
			-	impact test ISO 13049	interlayer 3mm structural material and top rail z>20cm³, if stanchions are spaces up to 1,5m and 40cm³ if stanchions are spaced up to 2,2m s > 315N/mm² and stanchions z>30cm³ up to 1,5m or 40cm³ up to 2,2m s > 315N/mm², weather load less than 30kN/m²?	fem with 2 or 3 sides supported in addition to scantling in acc. with Tab 13 + impact test ISO 13094	
					yes	~~no~~ ± or	
					-	fem with 2 or 3 sides suported in addition to scantling in acc. with Tab 13 ~~impact test ISO 13049~~ + interlayer 3mm structural material and top rail z>20cm³, if stanchions are spaces up to 1,5m and 40cm³ if stanchions are spaced up to 2,2m s > 315N/mm² and stanchions z>30cm³ up to 1,5m or 40cm³ up to 2,2m s > 315N/mm², weather load less than 30kN/m²~~?~~	
							~~yes/no~~
							~~-/impact test ISO 13049~~

5.12.2 Scantling of stanchions and rails for yacht

- For bulwark without glazing material:

  The personnel load is to be taken at least equal to 1 KN and is to be considered concentrated, in the center of the top rail length for the scantling of the top rail and on top of the stanchions for the scantling of the stanchions.

  The top rail is assumed simply supported, the stanchions are assumed clamped to the deck.

- For bulwark with glazing material (in addition to what above):

  The weather load is to be added to the personnel load above mentioned.

  The weather load is considered distributed in the area included by the top rail the stanchions and the deck. (i.e. even when a gap is foreseen between the glazing and the deck and/or the top rail the area of the glazing is assumed equal to the area included between stanchions top rail and deck).

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5.13.4 Freeing ports are not required for decks located more than 2 superstructure height above the freeboard deck.

5.13.5 In any case, the freeing ports arrangement must take into account the sloping deck, by avoiding, as far as possible, the positioning of freeing ports with a major area in the bow zone.

5.13.6 Recesses

Any recess in the weather deck is to be of weathertight construction and is to be self draining under all normal conditions of heel and trim of the vessel.

A swimming pool or spa bath open to the elements is to be treated as a recess.

The means of drainage provided is to be capable of efficient operation when the vessel is heeled to an angle of 10° in the case of a motor vessel, and 30° in the case of a sailing vessel.

The drainage arrangements is to have the capability of draining the recess (when fully charged with water) within 3 minutes (see Note 1) when the vessel is upright and at the load line draught. Means are to be provided to prevent the backflow of sea water into the recess.

When it is not practical to provide drainage which meets the above requirements, alternative safety measures may be considered by the Society.

Where the above requirements for quick drainage cannot be met, the effect on intact and damage stability is to be considered taking into account the mass of water and its free surface effect.

Note 1: Regardless the drainage time, the effect of the swimming pool full of water with maximum free surfaces correction is to be taken into consideration at least in intact stability calculations.

5.14 Tanks

5.14.1 "Tanks" means the structural tanks that are part of the hull and intended to contain liquids (water, fuel oil or lube oil). In order to contain fuel oil with a flashpoint 55° C, the use of non structural tanks is required.

As far as non structural fuel tanks see Sec 4.

The tanks have to be tested in accordance with Appendix 5.

5.15 Cofferdam arrangement

5.15.1 Cofferdams are to be provided between compartments intended for liquid hydrocarbons (fuel oil, lubricating oil) and those intended for fresh water (drinking water, water for propelling machinery) as well as tanks intended for the carriage of liquid foam for fire extinguishing.

5.15.2 Cofferdams separating fuel oil tanks from lubricating oil tanks and the latter from those intended for the carriage of liquid foam for fire extinguishing or fresh water may not be required when deemed impracticable or unreasonable by the Society in relation to the characteristics and dimensions of the spaces containing such tanks, provided that:

- the thickness of common boundary plates of adjacent tanks is increased, with respect to the thickness required by 2 mm in the case of tanks carrying fresh water or boiler feed water, and by 1 mm in all other cases
- the sum of the throats of the weld fillets at the edges of these plates is not less than the thickness of the plates themselves
- the structural test is carried out with a head increased by 1 m with respect to the required pressure head.

5.15.3 Cofferdams are only required between fuel oil double bottoms and tanks immediately above where the inner bottom plating is subjected to the head of fuel oil contained therein, as in the case of a double bottom with its top raised at the sides.

Where a corner to corner situation occurs, tanks are not be considered to be adjacent.

5.16 Inflatable gasket

5.16.1 *(1/1/2026)*

Inflatable gasket may be accepted only for weathertight doors ~~located in superstructure not contributing to buoyancy~~. When the weathertightness of the door is granted only when the gasket is inflated the air compressed system used to inflate the gasket is to be specially considered.

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SECTION 2 HULL OUTFITTING

1 Rudders and steering gear

1.1 ~~General~~Rudders

1.1.1 Reference is to be made to Sec 6.

For sailing vessels special considerations may be done.

These requirements apply to ordinary profiles rudders without any special arrangement for increasing the rudder force, such as fins or flaps, steering propellers, etc.

Unconventional rudders of unusual type or shape and those with speeds exceeding 45 knots will be the subject of special consideration by the Society.

In such cases, the scantlings of the rudder and the rudder stock will be determined by means of direct calculations to be agreed with the Society as regards the loads and schematisation.

1.2 Steering gear and associated apparatus

1.2.1 Premise

These requirements apply to the most commonly used types of steering gear, which are dealt with below; any different types will be specially considered by the Society in each case.

1.2.2 Steering gear with hydraulic or electro-hydraulic type remote control

The parts of such steering gear are to comply with the specific requirements of Part C, Ch 1, Sec 10.

2 Propeller shaft brackets

2.1 Double arm brackets

2.1.1 Double arm propeller shaft brackets consist of two arms forming an angle as near as practicable to 90°, and converging into a propeller shaft bossing.

Arms having elliptical or trapezoidal section with round fairing are to have each an area A, in mm^2, at the root not less than that given by the following relationship:

$$A = 87,5 \cdot 10^{-3} d_P^2 \cdot \left(\frac{1600 + R_{ma}}{R_{ma}} \right)$$

where:

d_p : Rule diameter of the propeller shaft made of steel with ultimate tensile strength R_m = 400 N/mm^2 measured inside the liner, if any, in mm,

R_{ma} : minimum ultimate tensile strength, in N/mm^2, of the material of the brackets.

The maximum thickness in way of the above section is to be not less than 0,4 d_p.

Considering the diameter (d) of the shaft propellers calculated according to the formula given in Pt C, Ch 1, Sec 7, [2.2.3] ~~or [2.2.4] as applicable~~ taking in account the effective material mechanical characteristics the boss is to have length not more than 4 d, but in no case may a length less than 3 d be accepted.

The boss is to have thickness of not less than 0,25 d when the diameter shaft propeller is calculated according Pt C, Ch 1, Sec 7, [2.2.3] ~~and not less than 0,35 d, when the diameter of the propeller shaft is calculated according to Pt C, Ch 1, Sec 7, [2.2.4].~~

When the brackets are connected by means of palms, the latter are to have thickness not less than 0,2 dp and are to be connected to the hull by means of bolts with nuts and lock nuts on the internal hull structures, which are to be suitably stiffened to the satisfaction of the Society.

The thickness of the plating in the vicinity of the connection is to be increased by 50%.

In the case of metal hulls and brackets of the same material, the connection between bracket and hull is to be carried out by means of welding.

The brackets are to be continuous through the plating and to be connected internally to suitable transverse or longitudinal structures.

The plating in way of the bracket connection is to be suitably increased and connected to the arm bracket with full penetration welding.

2.2 Single arm brackets

2.2.1 *(1/1/2026)*

Single arm shaft brackets are to have a section modulus at ship plating level, in cm^3, of not less than:

$W = (30 / R_{ma}) \ 10^{-3} \ l \ d^2_{so} \ (n \ d_{so})^{0,5}$

where:

l : length of the arm, in m, measured from the shell plating to the centreline of the shaft boss,

n : shaft revolutions per minute,

d_{so} : rule diameter, in mm, of the propeller shaft, for carbon steel material, using R_m = 400 N/mm^2

R_{ma} : minimum tensile strength, in N/mm^2, of arms, with appropriate metallurgical temper.

Boss thickness and length are to be calculated as for the double arm brackets.

The cross sectional area of the boss is not to be less than 60% of the cross sectional area at the shell.

3 Sailing yacht appendages and component fastenings

3.1 Keel and keel connection

3.1.1 *(1/7/2025)*

The scantling of the sailing keel indicated in this paragraph is based on the assumption that the yacht is operated by sail only in deep waters far from shore; in particular the scenario of the grounding and pounding considered here are assumed occurring only when the yacht is propelled by the propulsion engine and not by the sails.

The ballast may be internal or external to the hull.

In the first case, the ballast is to be permanently secured, by clips or equivalent means, to the resistant structures of the hull (floors, frames, etc) but in no case to the plating, on which it is never to bear, so as not to shift even during rolling or pitching.

In the second case, the connection to the hull is to be effected by means of bolts long enough to incorporate the height of the ballast, either wholly or in part; such bolts are to pass through the hull, with a head (or nut and lock nut) at one end and a nut and lock nut at the other, towards the inside of the hull. The surface of the ballast keel head is to be flush with the surface of the hull, the bolt holes are to be fashioned with equipment designed to achieve an almost complete absence of play between bolt and hole, and the locking of the nuts is to be uniform. The nuts are to rest on plates or large washers and to be left uncovered so that they may be easily examined.

The load cases indicated below have to be considered.

The following design loads are for fixed, lifting and canting keel.

The below loads apply to lifting keel in fully up fixed or fully down fixed position. Lifting and lowering have to be performed only in calm waters, at zero speed and overground. For canting keel the assessment is to be performed at different angles, at least 4 angular positions.

The following cases may be assessed separately.

The material factor k is to be taken as follows:

$$k_1 = \left(\frac{235}{R_{eH}}\right)^n$$

where:

n : coefficient to be taken equal to:

- n = 0,75 for $R_{eH} > 235$ N/mm^2
- n = 1,00 for $R_{eH} \leq 235$ N/mm^2.

It is to be verified that the keel and its connection to the hull are strong enough to withstand heeling, punding (vertical) and the grounding (longitudinal) loads. It is assumed that the conventional loads are the following:

a) Longitudinal load (grounding) loads acting in the aft direction and parallel to the longitudinal hull axis. The load is to be applied to the bottom edge of the keel with boat in upright situation and canting keel in 0° and maximum degree.

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The water-jet drive supporting structures are to be able to withstand the loads induced by the propulsion system in the following conditions:

- maximum thrust ahead
- maximum thrust at the maximum lateral inclination
- maximum reverse thrust (astern speed).

The foregoing loads are to be provided by the water-jet drive Manufacturer and adequately documented.

All hull openings are to be adequately reinforced and to have well rounded corners.

The thickness of the plating in the vicinity of the duct entrance is to be locally increased as stated in [5.2.3].

The Manufacturer is to assess the need to arrange suitable means of protection at the duct opening in order to prevent the ingress of foreign bodies which may damage the internal mechanism.

7 Crane support arrangements

7.1 General

7.1.1 Crane foundations shall be designed considering the worst combinations of the following loadings:

- maximum load capacity
- the weight of the crane itself;
- wind;
- crane accelerations resulting from the vessel's heel and trim.

Insert plates are to be provided in the deck in way of the crane foundation; in order to avoid concentration of forces, these insert plates are to have suitable dimensions (in respect of the dimensions of the foundation), be suitably prepared and have round corners. The thickness of these inserts is to be in accordance with the Designer's calculations.

A drawing of this arrangement with all the forces acting and the detail of the connection to the deck is to be sent for approval.

8 Sterntubes

8.1 General

8.1.1 *(1/1/2026)*

The sterntube thickness is considered by the Society on a case by case basis. In no case, however, may it beless than the thickness of the side plating adjacent to the sternframe. Where the materials adopted for the sterntube and the plating adjacent to the sternframe are different, the sterntubethickness is to be at least equivalent to that of the plating.

SECTION 3 EQUIPMENT

1 General

1.1

1.1.1 The anchoring equipment required in [6] is intended for temporary mooring of a yacht within or near a harbour, or in a sheltered area.

The equipment is therefore not designed to hold a yacht off fully exposed coasts in rough weather or to stop a yacht which is moving or drifting. In such conditions the loads on the anchoring equipment increase to such a degree that its components may be damaged or lost owing to the high energy forces generated.

The anchoring equipment required in [6] is deemed suitable to hold a yacht in good holding ground where the conditions are such as to avoid dragging of the anchor. In poor holding ground the holding power of the anchors will be significantly reduced.

It is assumed that under normal circumstances a yacht will use one anchor only.

2 Anchors

2.1

2.1.1 Anchors are to be manufactured in accordance with Pt D, Ch 4, Sec 1.

2.1.2 The mass, per anchor, given in Table 1 applies to "high holding power" anchors. When use is made of normal type anchors, the mass shown in the table is to be multiplied by 1,33.

When "very high holding power" anchors are used, the mass of the anchors may be equal to 70% of that shown in Table 1 for stockless anchors.

The actual mass of each anchor may vary by + or - 7% with respect to that shown in Table 1, provided that the total mass of the two anchors is at least equal to the sum of the masses given in the table.

When 2 anchors are required:

The second anchor is intended as a spare and it is not necessary to carry it as a bower anchor provided that, in the event of the loss of the first anchor, the spare anchor can be readily removed from its position and arranged as a bower anchor.

In this case, the first anchor is to be equipped with at least 70% of the length of chain indicated in table, and the spare anchor with at least 70% of the required length.

In case the second ("spare") anchor is fitted in place at the bow and ready for use, the chain length for each anchor is to be at least the total length of the chain reported in the Table 1 divided by the number of anchors.

When only 1 anchor is required (EN less than 110) and a second is foreseen as a spare, this spare anchor has to have a mass of at least 70% of the main anchor.

For EN < 280 a maximum of a 90% of the chain length fitted on the spare anchor may be replaced by wire or fiber rope.

The replacement of one anchor fit in place with two anchors both fit in place and used simultaneously is acceptable only in case of EN less than 110.

The anchor required may be replaced by two anchors having each a mass of at least 60% of the mass of the required anchor; the length of each chain line shall not be less than 50% of the total length indicated in the table.

2.1.3 ~~The diameters refer to Grade Q1 steel chain cables; where Grade Q2 or Q3 steel studless chain cables are used, the diameters may be reduced guaranteeing the same breaking load as the chain cable corresponding to Grade Q1. (see Pt D, Ch 4, Sec 1, Tab 9); where Grade Q2 or Q3 steel with stud chain cables are used, the diameters may be reduced guaranteeing as per Tab 1.~~

For HHP and VHHP anchors, grade Q1 chain cables are preferably not to be used and Grade Q2 or Q3 chain cables are generally to be used; in this case the reduction of chain diameter for VHHP may be possible only for chain with stud as per Tab 1.

Studless chain cables are not allowed.

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8 Sailing yachts

8.1

8.1.1 For sailing yachts (with or without auxiliary engine), the value of EN is to be calculated using the formula given in [7.1].

Table 1 *(1/1/2026)*

EN		Stockless bower anchors		Chain cables for anchors				Mooring lines		
A<EN<B		No.	Mass per anchor (kg)	Diameter (mm)				No.	Length of each line (m)	Breaking load kN
A	B			Total length	Grade Q1 steel	Grade Q2 steel	Grade Q3 steel			
70	90	1	144	254	14	10	8	2	42	26
90	110	1	180	296	16	12	10	2	50	31
110	130	2	217	~~296~~248	18	14	12	2	62	35
130	150	2	253	~~338~~248	20	16	16	3	70	35
150	175	2	289	~~338~~275	22	18	18	3	74	39
175	205	2	343	~~338~~275	24	20	18	3	77	43
205	240	2	397	303	26	22	20,5	3	80	47
240	280	2	469	330	28	24	22	4	85	51
280	320	2	541	357,5	30	26	24	4	90	55
320	360	2	614	375,5	32	28	24	4	95	59
360	400	2	686	385	34	30	26	4	100	62
400	450	2	776	385	36	32	28	4	105	70
450	500	2	866	412,5	38	34	30	4	110	78
500	550	2	956	412,5	40	34	30	4	110	86
550	600	2	1047	440	42	36	32	4	130	98
600	660	2	1155	440	44	38	34	4	130	105
660	720	2	1263	440	46	40	36	4	130	118
720	780	2	1371	467,5	48	42	36	4	130	126
780	840	2	1480	467,5	50	44	38	4	140	138
840	910	2	1588	467,5	52	46	40	4	140	150
910	980	2	1714	495	54	48	42	4	140	160
980	1060	2	1841	495	56	50	44	4	140	173
1060	1140	2	1985	495	58	50	46	4	140	184

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

1 Subdivision, integrity of hull and superstructure (Sec 1)

1.1 Number of watertight bulkheads

1.1.1 Openings in watertight bulkheads and decks

With reference to Sec 1, [5.1.2].

The details relevant to these electrical penetrations devices and their installation on board may be only checked on board.

The collision bulkhead may be penetrated by more than two pipes provided that the passages are located inside a suitable metallic plate.

Such plate is to be installed above the maximum water line in the central position of the bulkhead and the relevant dimensions are to be the minimum compatible with the bore of pipes.

In any case such dimension are to be not more than an equivalent area of 22500 mm^2.

The relevant pipes are to be fitted with valves as above stated.

1.1.2 With reference to Sec 1, [5.1.3].

As far as the collision bulkhead is concerned, in general a maximum of two pipes may pass through the collision bulkhead below the freeboard deck. Such pipes are to be fitted with suitable valves operable from above the freeboard deck and the valve chest is to be secured at the bulkhead inside the fore peak. Such valves may be fitted on the after side of the collision bulkhead provided that they are readily accessible under all service conditions. All valves are to be of steel, bronze or other approved ductile material. As a general rule, no access is to be fitted in the collision bulkhead. Special consideration will be given in the case of yachts of particular design, provided the access is positioned as far above the design waterline as possible and its closing appliances are watertight.

For GRP yachts the collision bulkhead may be penetrated by more than two pipes provided that the passages are located inside a suit-able metallic plate. Such plate is to be installed above the maximum water line in the central position of the bulkhead and the relevant dimensions are to be the minimum compatible with the bore of pipes.

In any case such dimensions are to be not more than an equivalent area of 22500 mm^2.

The relevant pipes are to be fitted with valves as above stated.

1.1.3 With reference to Sec 1, [5.1.4].

The strength of watertight bulkheads is to be in conformity with Ch 2, Ch 3 and Ch 4, according to the hull material. Doors in watertight bulkhead has to be sliding type. the Society may accept approved hinged doors provided that for such doors an audible and visual alarm is fitted on the bridge indicating when the door is open. The doors are to be kept closed at sea and marked accordingly.

1.1.4 *(1/7/2025)*

With reference to Sec 1, [5.1.5].

Compartment below the freeboard deck may have access openings to other internal compartments with watertight hinged doors provided that:

a) after flooding through the shell opening of the space containing the shell opening, the resultant waterline is below the sills of the internal openings in that space; or

b) bilge alarms are fitted in the compartment containing the shell opening, with a visual and audible warning both on the bridge and locally; and

c) any hinged door opens into the compartment containing the shell opening; and

d) "open" door alarms, both visual and audible fitted on the bridge; and

e) the door shall be fitted with a single closing mechanism; and

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1.4 Stern and side doors below the weather deck

1.4.1 Stern and side doors below the weather deck

As an alternative to Sec 1, [5.4.1] what below in [1.4.1] to [1.4.3] may be applied.

Side/shell doors (structure, hinges, and pins) are to comply with the requirements given in Appendix 3, alterna-tive arrangement may be accepted provided that the shell openings have adequate means of closure fitted with proper gaskets, and adequate securing devices and all the following conditions are satisfied:

a) The garage is not accessible during navigation so it does not contain essential services (it has no access to ther spaces or if access are forseen they are watertight, with open door alarm sounding on the bridge, and kept closed during navigation)

b) The volume of the compartment is not included in the reserve of buoyancy in the intact stability or it has a sill height of at least 600mm from the design waterline or the lower edge of the side/stern door at the heel angle up to 40° (or another downflooding angle if less) in the intact stability is not submerged.

c) The unit satisfy the damage stability criteria with the garage flooded - or it is self draining (in 3 minutes or less).

d) In any case at the completion of the installation the doors are to be checked by a "hose test". The hose test is to be carried out at a minimum pressure in the hose of not less than 2,0 105 Pa, and the nozzle is to be applied at a maximum distance of 1,5 m. The nozzle diameter is to be not less than 12 mm. Spraying shall continue for at least 5 min. After this duration, the ingress of water shall not eceed 0,02 l.

1.4.2 In the other cases the side/shell door is to be designed and tested in accordance with Pt B, Ch 1, App 3.

1.4.3 As far as the side/stern doors actuating cylinders they have to be designed and type approved or individually tested in accordance with Pt C, Ch 1, Sec 3 as Class I, except in case the above conditions from a) to d) are satisfied and the cylinders are provided with carter protection when only the design in acc with Pt C, Ch 1, Sec 3 is required.

1.5 Bulwarks and guardrails or guardline

1.5.1 General

With reference to Sec 1, [5.12.1].

The minimum section modulus of the top rail is to be in any case more than 3 cm^3 for stanchions spaced up to 1,5m and 5 cm^3 for stanchions spaced up to 2,2 m if the top rail is connected to the glazing. If the top rail is not connected to the glazing the minimum section modulus may be reduced to 2 cm^3 if the stanchions are spaced up to 1,5m and 3 cm^3 if the stanchions are spaced up to 2,2m. The minimum section modulus of the stanchions is to be in any case more than 3 cm^3 (2 cm^3 are acceptable for stanchions height up to 500 mm).

1.6 Freeing ports

1.6.1 Additional reductions to what required in Sec 1, [5.13.1] may be evaluated for short range.

1.7 Cofferdam arrangement

1.7.1 With reference to Sec 1, [5.15.1] other solutions may be adopted if deemed acceptable by the Society on a case by case basis.

2 Hull outfitting (Sec 2)

2.1 Rudders

2.1.1 With reference to Sec 2, [1.1] rudders with blade made of composite material may be accepted.

Rudder blade may be built in composite provided that what below is satisfied.

Such rudders are to have, in particular:

- stock and mainpiece, in solid or tubular bar, made of hull steel or light alloy, and mainpiece arms, of the same material, structurally connected to the mainpiece; the use of rudder stock made of composite will be evaluated on a case by case basis;
- blade made of a single plate or composed of two preformed plates, made of composite material, complying with the requirements of Chapter 4 and filled with light material;
- in case of the glass reinforced the plastic the mass per unit surface, m, in kg/m^2, of the glass reinforcement of the material, m = 0,6Vb, where V is the maximum speed in knots and b is the width, in metres, of the rudder, if the latter

has a rectangular contour; for rudders with non-rectangular contours, b = A/h is to be taken, where h is the rudder height, in m, in way of the centreline of pintles. The thickness of the plate is, in any case, to be not less than 5 mm. In case of carbon fiber or composite other than glass reinforced plastic direct calculations have to be sent. The admissible values of strength have to be taken from Ch 4, Sec 1, Tab 1 for keel, bottom plating.

2.2 Steering gear

2.2.1 Types of steering gear

Remote controlled steering gear of one of the following types:

- tiller, chain or rope with or without tackles, rudder wheel;
- tiller; hydraulic actuator of the tiller and associated piping; valves and hydraulic pump controlled by rudder wheel;
- the above apparatus, with the addition of an electric pump feeding the actuator through distributor and gyro-pilot follow-up link.

2.2.2 Steering gear of remote controlled type with rope or chain

The rudder tiller, or quadrant, is to have:

- hub of height $h \geq D_T$, in mm, and thickness $t \geq 0,4\ D_T$, in mm;
- section modulus Z, in cm^3, in way of the connection to the hub, given by the following formula:

$$Z \geq 0,15 \cdot \frac{D_T^3}{1000} \cdot \frac{a-b}{a}$$

where:

D_T : Rule diameter, in mm, of the rudder stock subject to torque only;

a : length, in mm, of the tiller, measured from the rudder stock to the point of connection of rope or chain to the stock;

b : $0,5\ D_T + t$, in mm.

The tiller-stock coupling is to be of the type with square section, or with cylindrical section and key, and the tiller hub is to be bolted, in particular:

- the hub bolts are to have diameter d_b, in mm, not less than the value given by the formula:

$$d_b = \frac{0,4D}{2n^{0,5}}$$

  where n is the number of bolts on each side of the hub; in any case the diameter d_b is to be not less than 12 mm;
- the coupling key is to have rounded edges, length, in mm, equal to the hub thickness, thickness, in mm, equal to $0,17\ D_T$ and section area, in mm^2, equal to $0,25\ D_T^2$.

The chain or rope connected to the rudder tiller, in general, shall have breaking load CR in kN not less than the value given by the formula:

$CR = 0.1\ d_s^3 / L$

Where L (in mm) and ds are defined in Pt C, Ch 1, Sec 10, [2.2.3]

The chain or rope shall run as straight as possible and driving pulley shall have pitch diameter not less than 16 times the diameter of the chain or rope and in no case less than 45mm. Such pulley and the connections of any tackles shall be securely fastened to the hull.

The rudder wheel and windlass shall be securely fastened to a column or equivalent support provided for the purpose, and it shall be possible, in general, to rotate the rudder up to the maximum side angle with no more than 5 turns of the rudder wheel.

Alternative arrangements will be subject of special consideration by the Society.

2.3 Propeller shaft brackets

2.3.1 Double arm brackets *(1/1/2026)*

The boss is to have:

- length between 3 d and 4 d, where d is the diameter of the shaft propellers defined in Sec 2, [2.1.1] calculated according to the formula in Pt C, Ch 1, Sec 7, [2.2.3], including the relaxations in Pt C, Ch 1, App 1, [2.1.1] based on the effective material mechanical characteristics

- thickness of not less than 0,25 d, when d is calculated according to Pt C, Ch 1, Sec 7, [2.2.3], including the relaxations in Pt C, Ch 1, App 1, [2.1.1]
- thickness of not less than 0,35 d, when d is calculated according to Pt C, Ch 1, App 1, [2.2.2].

3 Equipment (Sec 3)

3.1 Equipment number

3.1.1 As an alternative to Sec 3, Tab 1 the following Tab 1 may be applied.

Table 1

EN		Stockless bower anchors		Chain cables for anchors					Mooring lines		
A<EN≤B		No.	Mass per anchor (kg)	Total length (m)	Diameter (mm)				No.	Length (m)	Breaking load kN
A	B				Studless chain cable	Chain cables with stud					
						Grade Q1 steel	Grade Q2 steel	Grade Q3 steel			
50	70	1	100	165	11	-	-	-	2	42	26
70	90	1	120	192,5	12,5	11	-	-	2	50	31
90	110	1	140	192,5	12,5	11	-	-	2	62	35
110	130	2	160	220	14,5	14	12,5	-	3	70	35
130	150	2	180	220	14,5	14	12,5	-	3	74	39
150	175	2	200	220	17,5	16	14	11	3	77	43
175	205	2	230	220	17,5	16	14	11	3	80	47
205	240	2	260	220	19	17,5	16	12,5	4	85	51
240	280	2	310	220	19	17,5	16	12,5	4	90	55
280	320	2	360	247,5	20,5	19	17,5	14	4	95	59
320	360	2	410	247,5	22	20,5	17,5	14	4	100	62
360	400	2	460	247,5	24	22	19	16	4	105	70
400	450	2	520	275	-	22	19	16	4	110	78
450	500	2	580	275	-	24	20,5	17	4	110	86
500	550	2	640	275	-	26	22	20,5	4	130	98
550	600	2	700	302,5	-	26	22	20,5	4	130	105
600	660	2	770	302,5	-	28	24	22	4	130	118
660	770	2	840	302,5	-	30	26	24	4	130	126
720	780	2	910	330	-	30	26	24	4	140	138
780	840	2	980	330	-	32	28	24	4	140	150
840	910	2	1060	357,5	-	32	28	24	4	140	160
910	980	2	1150	357,5	-	34	30	26	4	140	173
980	1060	2	1260	357,5	-	36	32	28	4	140	184

3.1.2 *(1/1/2026)*

The diameters in Tab 1 for stud less steel chain cables refer to Grade Q1 ; where Grade Q2 or Q3 steel studless chain cables are used, the diameters may be reduced guaranteeing the same breaking load as the chain cable corresponding to Grade Q1 (see Pt D, Ch 4, Sec 1, Tab 10).

3.1.3 As an alternative to Sec 3, [6.1] what below may be applied.

Windlasses are to be power driven and suitable for the size of chain cable and is to have the characteristics below.

The windlass is to be fitted in a suitable position in order to ensure an easy lead of the chain cables to and through the hawse pipes; the deck in way of the windlass is to be suitably reinforced.

A suitable stopping device is to be fitted in order to prevent the anchor from shifting due to movement of the yacht.

3.1.4 With reference to Sec 3, the following requirements need not to be applied: [6.2], [6.3] and [6.4].

4 Non structural fuel tank (Sec 4)

4.1 General

4.1.1 With reference to Ch 1, Sec 4 special consideration may be done.

5 Loads (Sec 5)

5.1 General

5.1.1 With reference to Ch 1, Sec 5. Special consideration may be done in case of planning yachts.

6 Rudders (Sec 6)

6.1 General

6.1.1 With reference to Sec 6, [2.1.2], n_t yacht's type coefficient may be taken equal to 0.55.

6.1.2 *(1/1/2026)*

With reference to Sec 6, [2.1.2], λ coefficient in case of sailing vessel has to be taken equal to h^2/A_T even if it is more than 2.

6.1.3 With reference to Sec 6, [7.3.4] web thickness, the minimum thickness for web frame may be 6 mm.

7 Watertight doors: design and testing criteria (App 4)

7.1 General

7.1.1 With reference to App.4 [1.9.3] hinged doors may be accepted provided that there is an audible and visual alarm on the bridge indicating when the door is open. The doors are to be kept closed at sea and marked accordingly.

A time delay for the alarm may be accepted.Pt C, Ch 1, App 1, [5.5].

8 Tanks and Tank testing (App 5)

8.1 General

8.1.1 With reference to Sec 1, [5.14.1] for GRP tanks see Ch 4, Sec 1, [6.3].

8.1.2 With reference to App 5, the requirements given in Tab 1 to structurally test tanks to 2.4 meters above the top of the tank do not apply. Instead, the minimum test pressure for structural testing is to be taken as 0.3D + 0.76 metres above the top of the tank where the top of the tank is the deck forming the top of the tank, excluding any hatchways and D is the depth of the ship. The minimum test pressure need not be taken greater than 2.4 metres above the top of the tank.

9 Through hull outfitting

9.1 General

9.1.1 For composite vessels reference is to be made to Pt C, Ch 1, App 1, [5.5].

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

1 Subdivision, integrity of hull and superstructure (Sec 1)

1.1

1.1.1 With reference to Sec 1, [2.2.1] collision bulkhead.

The required maximum distance stated in [2.2.1] a) no need to be satisfied.

1.1.2 With reference to Sec 1, [2.2.1] side and stern doors

Stern and side doors are to meet the requirements of ISO Standard 12216 as for appliances to be fitted on area I. No need to apply the rest if the requirements.

1.1.3 With reference to Sec 1, [5.5.3] Hatches on the weather deck

The requirements of ISO Standard 12216 apply.

1.1.4 With reference to Sec 1, [5.6.2] glazing

For windows In Zone 1c, and 2c with short side of less than 300mm fitted the use of other material may be taken into consideration taking into account ISO 12216.

For glazing with short side of less than 300mm no need that they are not easy openable type but an indication of open windows is to be shown in a continuously manned position, or suitable indication saying that the glazing is to be always closed during navigation and outside from the harbour opened only under the responsibility of the Master.

1.1.5 With reference to Sec 1, [5.6.4] glazing

Windows fitted in zones 1a and 2a (for any dimensions of the window) and for zones 1b,1c,2b and 2c (only for window with short side of less than 300mm) what required by ISO 12216 as far as the deadlights may be applied.

1.1.6 With reference to Sec 1, [5.6.7] –glazing

With reference to Tab 3 the value for L = 24 m to be used.

1.1.7 *(1/12026)*

With reference to Sec 1, [5.6.7] glazing

Windows fitted in zones 1a and 2a (for any dimensions of the window) and for zones 1b,1c,2b and 2c (only for window with short side of less than 300mm) what required by ISO 12216 as far as the pressure may be applied.

1.1.8 With reference to Sec 1, [5.6.8] glazing

For windows fitted in superstructure not contributing to buoyancy and in area 1a or 2a for any dimensions and in zone 1b, 2b, 1c and 2c only if the shortest side is less than 300mm the value of σ_C for strengthened glass may be assumed equal to 200 MPa with γ equal to 4 and t_o may be multiplied by $\psi^{0,5}$.

Where ψ = 1,102 - 0,0004b for rectangular windows, and

ψ = 1,102 - 0,0004d for circular windows

ψ is to be taken not less than 0,33 and not more than 1.

1.1.9 Sec 1, [5.6.9] needs not to be applied

1.1.10 With reference to Sec 1, [5.6.14] d) 1) glazing

In zone 1c and 2c if the shorter side of the window is less than 300mm as far as the type of connection in zone 1c and 2c what foreseen by ISO 12216 may be used.

1.1.11 *(1/1/2026)*

With reference to Sec 1, [5.6.15] a) 6) glazing

The distance of the portlight from the windows sides is not less than one third of the diameter of the portlight if it is circular or one third of the shorter side of the portlight if it is rectangular.

1.1.12 With reference to Sec 1, [5.6.15] a) 8) glazing

The storm cover is not required

1.1.13 With reference to Sec 1, [5.6.15] a) 10) glazing

No need that the portlights are to be of a not readily openable type if fitted on the hull if the window has shortest side of less than 300 mm.

1.1.14 With reference to Sec 1, [5.6.15] a) 11) glazing

When is required portlight with shortest side of less than 300mm tested separately, a certification in accordance to ISO 12216 is acceptable.

When the fixed window is fitted in the superstructure not contributing to buoyancy the hydrostatic test may be replaced by a hose test carried out at a pressure of at least 350 kPa, at a distance of maximum 1 m from the glazing for at least 5 minutes without passage of water.

1.1.15 With reference to Sec 1, [5.6.15] c) glazing

No need to verify the maximum deflection

1.1.16 With reference to Sec 1, [5.6.18] assessing procedure

As an alternative to TASNEEF Type approval sidescuttles certified in compliance with Standard ISO 12216 and bearing the "CE" mark may be accepted.

1.1.17 With reference to Sec 1, [5.7] skylights

The requirements of ISO STANDARD 12216 are to be applied.

1.1.18 With reference to Sec 1, [5.8] outer doors

The breath of the negative sill may be reduced to 200mm.

The requirements of ISO Standard 12216 apply.

1.1.19 With reference to Sec 1, [5.12.1] bulwark

No need that stanchions and top rail are to be able to withstand the a load of at least 1 kN in the most critical point.

The weather loads may be reduced of 50% and for deck not accessible during navigations further reductions may be evaluated.

1.1.20 With reference to Sec 1, [5.13.1] water freeing arrangement

The requirements of ISO STANDARD 11812 are to be complied with.

1.1.21 With reference to Sec 1, [5.13.3] Cockpits and cockpits drainage

Recesses and their means for discharge outboard are to be in compliance to ISO STANDARD 11812.

2 Rudder

2.1

2.1.1 With reference to Sec 6, [2.1.2] n_t yacht's type coefficient may be taken equal to 0.2.

2.1.2 With reference to Sec 6, [7.3.4] the minimum thickness for web frame may be 5 mm.

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APPENDIX 4 WATERTIGHT DOORS AND HATCHES: DESIGN AND TESTING CRITERIA

1 Watertight doors: design and testing criteria

1.1 Field of application

1.1.1 These requirements apply to the design, manufacturing and testing of watertight doors and associated manoeuvring systems.

They are essentially intended for sliding doors, but they are also applicable, as far as for the scantling and hydraulic test are concerned, to hinged doors.

As regards matters not explicitly dealt with in this Section the additional requirements given in Pt C for electrical systems are also to be applied.

1.2 Documentation to be submitted

1.2.1 Prior to starting the actual construction, the Manufacturer shall submit to the Society for approval the following drawings, diagrams and specifications, in triplicate:

a) Constructional drawings of the doors and associated accessories (guides, wedges, seals, frame, etc.); the drawings shall contain the constructional details of the components employed and shall indicate, inter alia, the type and characteristics of the materials employed, and the welding details and, for each door, the scantling hydrostatic head and the position on board foreseen for the door itself.

b) Diagrammatic plans of the hydraulic plant for the manoeuvring system. These plans shall indicate all the necessary information for their interpretation and verification and, in particular, the working and design pressures, the delivery of the pumps, the materials employed for the piping and fittings, and the dimensions of the pipes.

c) Constructional drawings of the manoeuvring hydraulic cylinders and of the pressure vessels. These drawings shall be complete with all dimensions and shall indicate, inter alia, the materials employed and any necessary information for their interpretation and verification.

d) Functional diagrams of power circuits, of control circuits from the navigating bridge, of signalling and alarm circuits, including specification of the type and characteristics of the equipment and specification of the electrical protection.

1.3 Scantlings of watertight bulkhead in way of watertight doors

1.3.1 Frames

When the frame is connected to the bulkhead by means of rivets or bolts, a thin heat-resisting seal is to be inserted between the frame and the bulkhead shell to assure watertightness.

Each side of the frame section is to have a moment of inertia J in cm^4, about the axis, through the centre of gravity, parallel to the door plane, not less than that given by the following formula:

$J = 27AB^3h$

where:

A = minor side of the clear door opening on the bulkhead, in m;

B = major side of the clear door opening on the bulkhead, in m;

h = water head resulting from the stability scantling, in m, measured from the door sill; this head is not to be taken less than 2 m.

Any stiffener on the bulkhead, fitted in way of the frame and surrounding the whole opening, together with the attached plating of the bulkhead, may be included in the calculation of the moment of inertia of the frame.

1.3.2 Bulkhead stiffeners

The bulkhead shell around the door opening is to be suitably reinforced by means of stiffeners, both vertical and horizontal.

The distance of such stiffeners from the outer edge of the door frame is generally to be not greater than 300 mm or less than 150 mm, and their scantlings are to be as required for the stiffeners of a watertight subdivision bulkhead, without taking into account the door frame and considering the door in closed position.

In way of the structure of connection of the door manoeuvring cylinder to the bulkhead, suitable local stiffeners are to be fitted, and the thickness of the bulkhead shell is to be increased, or a fastening plate is to be fitted.

1.4 Scantlings of watertight subdivision doors

1.4.1 The scantlings of the door shell and stiffeners, both horizontal and vertical, are to be in conformity with the requirements of Ch 2, Sec 10 for steel bulkheads.

1.5 Seals and wedges of sliding watertight doors

1.5.1 Seals

In general, door seals are to be of metallic material.

However, non-metallic materials may be employed, provided they are suitable for the application.

1.5.2 Wedges

The total number of fixed wedges on the door and on the frame, as well as their scantlings and shape, is to ensure a tightness of the seal such that the water leakage rate during the test does not exceed that stated in [9].

1.6 Sliding guides and wheels of watertight doors

1.6.1 The guides are to have such a shape as to avoid the lodging of dust, dirt, etc. which could prevent the door from closing.

Guides consisting of a flat vertical bar on which grooved wheels roll for door movement may be considered as satisfying such requirement.

The scantlings of such guides and of the shoulder of the associated grooved wheels are to be such as to ensure a stiffening guaranteeing the closure of the door when subjected to a water head of 1 m.

1.7 Connection of the manoeuvring cylinder to the door

1.7.1 In way of the structure of connection of the manoeuvring cylinder to the door, a fastening plate having approximately the same thickness as the door is to be fitted.

Other types of connection may be considered on a case-by-case basis by the Society.

1.8 Manoeuvring systems of watertight doors

1.8.1 General

The requirements of this Section apply to the manoeuvring systems of watertight doors which are required to be power-operated sliding type.

As far as other types of watertight doors are concerned, the acceptance of the relevant manoeuvring system will be considered in each case by the Society.

In these Rules, watertight sliding doors are intended to mean those doors whose manoeuvring is done by means of (electrical or hydraulic) power systems.

1.9 Type, manufacturing and system characteristics

1.9.1 In general, reference is to be made to the applicable requirements for Passenger Ships, as defined in SOLAS Chapter II-1.

Hand operation from above the bulkhead deck and a hydraulic accumulator may be omitted if each door is provided with a dedicated power-pack electrically driven via the emergency switchboard, and control voltage from an emergency battery, and each door may be operated manually locally. Edge strips which stop the door closing on contact are not permitted.

1.9.2 The following requirements apply:

It shall be possible to open and close the door by hand at the door itself from both sides, both by power and by the above-mentioned hand-operated mechanism.

Power systems for power-operated watertight sliding doors shall be separate from any other power system.

Flexible hoses in non-metallic material installed on systems of watertight doors fitted on fire-resistant bulkheads shall be recognised by the Society as fire-resistant.

The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service.

A single failure in the electrical or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening.

Watertight door controls, including hydraulic piping and electrical cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimise the likelihood of them being involved in any damage which the ship may sustain.

As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water and, in particular:

a) electric motors, associated circuits and control components are to be protected to IPX7 standard

b) door position indicators and associated circuit components are to be protected to IPX8 standard

c) door movement warning signals are to be protected to IPX6 standard.

Other arrangements for the enclosures of electrical components may be fitted provided the Society is satisfied that an equivalent protection is achieved. The water pressure testing of the enclosures protected to IPX8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.

1.9.3 Hinged doors may be accepted if installed on infrequently used openings in watertight compartments, where a crew member will be in immediate attendance when the door is open at sea. Audible and visual alarms are to be fitted in the wheelhouse.

~~In any case, for yachts less than 500 GT, hinged doors may be accepted provided that there is an audible and visual alarm on the Bridge indicating when the door is open. The doors are to be kept closed at sea and marked accordingly. A time delay for the alarm may be accepted.~~

1.10 Workshop testing

1.10.1 Testing of watertight doors

The hydraulic test is aimed at ascertaining the good watertightness of the door when it is subjected to the water head taken for the determination of the scantlings, which is not to be taken less than 2 m.

The test is considered to be satisfactory if the water leakage rate q, l/h, through the door, evaluated in a period not shorter than 1 h, does not exceed the quantity given by the following formula:

$q = h^3 (p+4,57) / 109$

where p is the perimeter of the door clear opening, m, and h is the water head taken for the determination of the scantlings, as defined in [3.1].

However, in the case of doors where the water head taken for the determination of the scantling does not exceed 6,10 m, the q value may be taken equal to 22,5 l/h if this value is greater than that calculated by the above-mentioned formula.

In special cases the Society may allow the hydraulic test to be carried out on board, with an agreed case-by-case test procedure.

During the tests, it is to be ascertained with a practical test that the door manoeuvring devices and systems are such as to allow the closure of the door with the ship listed by 15° on either side. The test may be carried out on board.

Moreover, the correct closure of the door, subjected to a water head of 1 m, is also to be ascertained with a practical test.

1.10.2 Testing of the manoeuvring systems

The testing of the manoeuvring systems consists of the following operations:

a) verification of compliance with the approved drawings;

b) testing of valves, pressure vessels (cylinders, tanks, accumulators, etc.), pumps, piping and associated fittings and electrical components in accordance with the relevant Rules;

c) hydrostatic pressure test of the system, at 1,5 times the maximum working pressure;

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Part B

Hull and Stability

Chapter 4

REINFORCED PLASTIC HULLS

SECTION 13 STRUCTURAL ADHESIVES

1 General

1.1

1.1.1 Structural adhesives are to be used according to the Manufacturer's specifications. The details of the structural adhesives are to be enclosed in the list required in Ch 1, Sec 1, [3.1.1].

The above-mentioned information is to include the material data sheet containing all the details of the structural adhesive.

The process for the application of the adhesive is to be submitted and is to include:

- The maximum bond line thickness;
- Surface preparation and cleanliness of the surface to be bonded;
- Handling, mixing, application and curing requirements of the structural adhesive;
- Non-destructive test methods and acceptability criteria for any defects found;
- Remedial work in order to rectify excessive unevenness of the faying surface or local undulations;
- Details relevant to the level of training required for the personnel involved in the application of structural adhesives.

Details listed in the material data sheet are to be specified in the construction plan submitted for approval.

1.1.2 For hull for which structural adhesives are used, a special class notation will be assigned as indicated in Part A.

1.2

1.2.1 *(1/1/2026)*

The structural adhesives are to have the following properties:

a) The adhesive is to be compatible with the lamination resin;

b) It is recommended that the elastic modulus of the adhesive is should be compatible with the elastic modulus of the GRP skin: this means that the ratio between the two elastic moduli shall be such as to avoid stress concentration in the skin substrate when a longitudinal shear force is applied to the joint;

c) The mechanical properties of the adhesive are to be rapidly achieved. That means no use of screws or bolts is necessary to hold the substrate together while the adhesive cures;

d) A greater safety factor (ratio of failure strain to actual strain) than the one of the adjacent structure is to result;

e) The minimum shear strength obtained from a lap-shear test is to be not less than 7 N/mm^2. All failures of test samples are to be either cohesive or fibre tear.

f) The type approval of structural materials is issued by the Society subject to the satisfactory outcome of the following test carried out on the basis of a testing scheme agreed with the Society:

   1) Lap-shear static test to be performed according to ASTM D3165 Standard using FRP substrates; the shear strength is to be achieved on:
      - 5 samples at the room temperature of 23° C;
      - 5 samples at the room temperature of 23° C after exposure to 5 cycles of laboratory ageing according to ASTM D1183 Standard;

      Requirements to be complied with: the average of the results obtained after conditioning according to ASTM D1183 is to be not less than 85% of the average of the results without conditioning.

   2) Peel-static test to be performed according to ASTM D3807 Standard using FRP substrates; the strength properties are to be achieved on:
      - 5 samples at the room temperature of 23° C;
      - 5 samples at the room temperature of 23° C after exposure to 5 cycles of laboratory ageing according to ASTM D1183 Standard.

      Requirements to be complied with: the average of the results obtained after conditioning according to ASTM D1183 is to be not less than 85% of the average of the results without conditioning.

3) Lap-shear fatigue dynamic test to be performed according to ASTM D3166 Standard using substrates that can be metallic; the shear strength is to be achieved on:

   • 5 samples at the room temperature of 23 °C after exposure to 2 cycles of laboratory ageing according to ASTM D1183 Standard.

   Requirements to be complied with: the sample shall withstand without breaks the fatigue tests carried out at a frequency declared by the Manufacturer normally not less than 10 Hz, generally applying a sinusoidal load of with maximum 50% and minimum of 5% of the static shear strength for 1,000,000 cycles.

The use of standards different from those mentioned above is be evaluated by the Society.

Before carrying out the Lap shear static test and the Peel-static test that have to be carried out on FRP substrates the Manufacturer has to make sure through calculation that the adhesive will fail before the substrate.The FRP substrate is to have a minimum Gc of 0.6 and biaxial 0/90 or unidirectional fibres to be used. The force during the lap shear test is to be applied parallel to the length of the samples.

The test can be considered satisfactory if the substrate fails after reaching 7 MPa of shear strength; if failure occurs before reaching this value, the test is to be considered failed.

For adhesive used only for the gluing of glazing different testing criteria and conditions may be agreed with TASNEEF.

The validity of the type approval is to be in accordance with Pt. A, Ch. 2, App 3 [5.2.4].

~~For the renewal of the type approval of structural adhesives at least the Lap Shear static test and Peel-static test are to be ca~~rried out as required in 1) and 2). The Lap Shear Fatigue test may be required if deemed necessary by the Society.

2 Design criteria for bonded connection

2.1

2.1.1 In general the shear stress at the inner surface of the plating is to be calculated by direct calculations according to the requirements of Ch 1, Sec 5. In general, the calculation of the flange connection between the internal reinforcement and the plating is to be carried out as indicated in this paragraph.

A typical stiffener/plating connection is shown in the following Fig 1:

The linear load due to the bending moment calculated at the inner surface plating can be obtained from the following formula:

$$Q_p = \frac{P \times (E \times A)_p \times Y_p}{(E \times I)_{sp}}$$

where:

Q_p : is the linear load in N/mm applied to the inner surface of the plating and due to the bending moment ;

P= 500 x p x s x S: is the total load in N applied to the panel of dimension (Sxs) and due to the design pressure as calculated according to items Ch 1, Sec 5, [5.3] and Ch 1, Sec 5, [5.4];

$ExA=E_p$ x b x t_p ;

where:

E_p: is the inplane elastic modulus of the plating in N/mm^2;

b: is the width of the plate associated with the stiffener, in mm;

t_p : is the thickness of the associated plate, in mm ;

Y_p: is the distance from the centroid of the associated plate to the neutral axis, in mm;

$(ExI)_{sp}$:is the flexural rigidity of the composite element (stiffener and plating) combined around the neutral axis, in N/mm^2;

The shear stress for the jointing adhesive for plating can be calculated with the following formula:

It is to be verified that t_p is not greater than 20% of the nominal bond shear strength as indicated by the Manufacturer's adhesive. For guidance, Tab 1 indicates some data regarding the nominal shear strength and the allowable design stress for certain structural adhesives.

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Part C

Machinery, Systems and Fire Protection

Chapter 1

MACHINERY

SECTION 2 DIESEL ENGINES

1 General

1.1 Application

1.1.1 *(1/1/2025)*

Diesel engines listed below are to be designed, constructed, installed, tested and certified in accordance with the requirements of this Section, under the supervision and to the satisfaction of the Society's Surveyors and in accordance with the relevant Table of Pt A, Ch 2, App 3:

a) main propulsion engines

b) engines driving electrical generators and other auxiliaries essential for safety and navigation, when they develop a power of 110 kW and over.

All other engines are to be designed and constructed according to sound marine practice, with the equipment required in [4.3.4], [4.5.2], [4.7.2] [4.7.3], [4.7.5] and [4.7.8] and delivered with the relevant works' certificate (see Pt D, Ch 1, Sec 1, [4.2.3]).

Additional requirements for control and safety systems for dual fuel engines supplied with high pressure methane gas are given in App 2 of TASNEEF Rules for the Classification of Ships.

Additional requirements for internal combustion engines supplied with low pressure natural gas are given in App 12 and App 17 of TASNEEF Rules for the Classification of Ships.

In addition to the requirements of this Section, those given in Sec 1 apply.

1.2 Type approval certificate

1.2.1

For each type of engine that is required to be certified, a type approval certificate is to be obtained by the engine designer.

The type approval process consists of:

- drawing and specification approval,
- conformity of production,
- approval of type testing programme,
- type testing of engines,
- review of the obtained type testing results,
- evaluation of the manufacturing arrangements,
- issue of a type approval certificate upon satisfactorily meeting the Rule requirements.

1.3 Engine certificate

1.3.1

Each diesel engine manufactured for a shipboard application per [1.1.1] is to have an engine certificate:

The certification process consists of:

- the engine builder/licensee obtaining design approval of the engine application specific documents, if any, by submitting a comparison list of the production drawings to the previously approved engine design drawings referenced in [1.2.1]
- forwarding the relevant production drawings and comparison list for the use of the Surveyors at the manufacturing plant and shipyard if necessary
- engine's components testing and engine works trials
- the issuance of an engine certificate upon satisfactorily meeting the Rule requirements.

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No.	Item
28	Counterweights (if not integral with crankshaft), including fastening
29	Connecting rod with cap
30	Crosshead
31	Piston rod
32	Piston, assembly **(7)**
33	Piston head
34	Camshaft drive, assembly **(7)**
35	Flywheel
36	Arrangement of foundation (for main engines only)
37	Fuel oil injection pump
38	Shielding and insulation of exhaust pipes and other parts of high temperature which may be impinged as a result of a fuel system failure, assembly
39	Construction and arrangement of dampers
	For electronically controlled engines, assembly drawings or arrangements of:
40	• Control valves
41	• High-pressure pumps
42	• Drive for high pressure pumps
43	• Valve bodies, if applicable
44	Operation and service manuals **(8)**
45	Test program resulting from FMEA (for engine control system) **(9)**
46	Production specifications for castings and welding (sequence)
47	Type approval certification for environmental tests, control components **(10)**
48	Quality requirements for engine production

(1) For comparison with Society requirements for material, NDT and pressure testing as applicable.
(2) For approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.
(3) Details of the system so far as supplied by the engine manufacturer such as: main dimensions, operating media and maximum working pressures.
(4) All engines.
(5) The documentation to contain specifications for pressures, pipe dimensions and materials.
(6) Only for engines of a cylinder diameter of 200 mm or more or a crankcase volume of 0.6 m^3 or more.
(7) Including identification (e.g. drawing number) of components.
(8) Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance.
(9) Required for engines that rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves.
(10) Documents modified for a specific application are to be submitted to the Classification Society for information or approval, as applicable. See [3.2], App 9 App 12 of TASNEEF Rules for the Classification of Ships and App 10 App 12 of TASNEEF Rules for the Classification of Ships.

4 Design and construction

4.1 Materials and welding

4.1.1 Crankshaft materials

In general, crankshafts are to be of forged steel having a tensile strength not less than 400 N/mm^2 and not greater than 1000 N/mm^2.

The use of forged steels of higher tensile strength is subject to special consideration by the Society in each case.

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4.7 Control and monitoring

4.7.1 General

In addition to those of this item [4.7], the general requirements given in Chapter 3 apply.

In the case of yachts with automation notations, the requirements in Part F, Chapter 2 also apply.

4.7.2 Alarm

The lubricating oil system of diesel engines with a power equal to or in excess of 37 kW is to be fitted with alarms to give audible and visual warning in the event of an appreciable reduction in pressure of the lubricating oil supply.

4.7.3 Governors of main and auxiliary engines

Each engine, except the auxiliary engines for driving electric generators for which [4.7.5] applies, is to be fitted with a speed governor so adjusted that the engine does not exceed the rated speed by more than 15%.

4.7.4 Overspeed protective devices of main and auxiliary engines

In addition to the speed governor, each

- main propulsion engine having a rated power of 220kW and above, which can be declutched or which drives a controllable pitch propeller, and
- auxiliary engine having a rated power of 220kW and above, except those for driving electric generators, for which [4.7.6] applies

is to be fitted with a separate overspeed protective device so adjusted that the engine cannot exceed the rated speed n by more than 20%; arrangements are to be made to test the overspeed protective device.

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

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

4.7.5 Governors for auxiliary engines driving electric generators

a) Auxiliary engines intended for driving electric generators are to be fitted with a speed governor which prevents transient frequency variations in the electrical network in excess of ±10% of the rated frequency with a recovery time to steady state conditions not exceeding 5 seconds, when the maximum electrical step load is switched on or off.

   When a step load equivalent to the rated output of a generator is switched off, a transient speed variation in excess of 10% of the rated speed may be acceptable, provided this does not cause the intervention of the overspeed device as required by [4.7.4].

b) At all loads between no load and rated power, the permanent speed variation is not to be more than 5% of the rated speed.

c) Prime movers are to be selected in such a way that they meet the load demand within the yacht's mains and, when running at no load, can satisfy the requirement in item a) above if suddenly loaded to 50% of the rated power of the generator, followed by the remaining 50% after an interval sufficient to restore speed to steady state. Steady state conditions (see Note 1) are to be achieved in not more than 5 s.

Note 1: Steady state conditions are those at which the envelope of speed variation does not exceed ±1% of the declared speed at the new power.

d) Application of the electrical load in more than 2 load steps can only be allowed if the conditions within the yachts mains permit the use of those auxiliary engines which can only be loaded in more than 2 load steps (see Fig 1 on 4-stroke diesel engines expected maximum possible sudden power increase) and provided that this is already allowed for in the designing stage.

   This is to be verified in the form of system specifications to be approved and to be demonstrated at yacht's trials. In this case, due consideration is to be given to the power required for the electrical equipment to be automatically switched on after blackout and to the sequence in which it is connected.

   This also applies to generators to be operated in parallel and where the power is to be transferred from one generator to another, in the event that any one generator is to be switched off.

e) Emergency generator sets must satisfy the governor conditions as per items a) and b), even when:

   1) their total consumer load is applied suddenly, or

   2) their total consumer load is applied in steps, provided that:

      - the total load is supplied within 45 seconds of power failure on the main switchboard, and
      - the maximum step load is declared and demonstrated, and
      - the power distribution system is designed such that the declared maximum step loading is not exceeded, and

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4.7.8 Alarms and safeguards for emergency reciprocating I.C. engines *(1/12026)*

a) These requirements apply to reciprocating I.C. engines, which use distillate marine fuels covered by ISO 8217:20~~17~~24, required to be immediately available in an emergency (i.e. emergency generating set engine, emergency fire pump engine, etc.) and capable of being controlled remotely or automatically operated.

b) Information demonstrating compliance with these requirements is to be submitted to the Society. The information is to include instructions to test the alarm and safety systems.

c) The alarms and safeguards are to be fitted in accordance with Tab 6. It is the responsibility of the Manufacturer to set the alarms and safeguards so that they activate when the controlled parameter deviates from normal values but before reaching hazardous conditions.

d) The safety and alarm systems are to be designed to 'fail safe'. The characteristics of the 'fail safe' operation are to be evaluated on the basis not only of the system and its associated machinery, but also the complete installation, as well as the yacht.

e) Regardless of the engine output, if shutdowns additional to those specified in Tab 6, except for the overspeed shutdown, are provided, they are to be automatically overridden when the engine is in automatic or remote control mode during navigation.

f) The alarm system is to function in accordance with Part F, Chapter 2 with the additional requirement that grouped alarms are to be arranged on the bridge.

g) In addition to the fuel oil control from outside the space, a local means of engine shutdown is to be provided.

h) Local indications of at least those parameters listed in are Tab 6 to be provided within the same space as the reciprocating I.C engines and are to remain operational in the event of failure of the alarm and safety systems.

4.7.9 Summary tables

Diesel engines are to be equipped with monitoring equipment as detailed in Tab 4 and Tab 5, for main propulsion and auxiliary services, respectively.

For yachts with short range navigation, the acceptance of a reduction in the monitoring equipment required in Tab 4 and Tab 5 may be considered.

The alarms are to be visual and audible.

The indicators are to be fitted at a normally attended position (on the engine or at the local control station).

It is the responsibility of the Manufacturer to set the alarms and safeguards so that they activate when the controlled parameter deviates from normal values but before reaching hazardous conditions.

In the case of diesel engines required to be immediately available in an emergency and capable of being controlled remotely or automatically operated, Tab 6 applies.

Table 4 : Monitoring of main propulsion diesel engines *(1/1/2025)*

Symbol convention H = High, HH = High high, G = group alarm L = Low, LL = Low low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			Main Engine			Auxiliary	
Identification of system parameter	Alarm	Indication	Slow-down	Shut-down	Control	Stand by Start	Stop
Fuel oil pressure after filter (engine inlet)		local					
Leakage from high pressure pipes where required	H						
Lubricating oil to main bearing and thrust bearing pressure **(5)**	L	local					
	LL			X			
Lubricating oil to cross-head bearing pressure when separate **(5)**	L	local					
	LL			X			

(1) Not required, if the coolant is oil taken from the main cooling system of the engine
(2) Where outlet flow cannot be monitored due to engine design, alternative arrangement may be accepted
(3) For engines of 220 kW and above
(4) Indication is required after each cylinder, for engines of 500 kW/cylinder and above
(5) To ensure independency of safety functions from control and monitoring functions, a separate sensor is to be installed for each row of the table.

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5 Arrangement and installation

5.1 Starting arrangements

5.1.1 Mechanical air starting *(1/1/2026)*

a) Air starting the main and auxiliary engines is to be arranged such that the necessary air for the first charge can be produced on board the yacht without external aid.

b) The total capacity of air receivers is to be sufficient to provide, without replenishment, not less than 12 consecutive starts alternating between ahead and astern of each main engine of the reversible type, and not less than 6 consecutive starts of each main non-reversible type engine connected to a controllable pitch propeller or other device enabling the start without opposite torque.

When other users such as auxiliary engine starting systems,low-pressure compressed air systems (see Sec 10, [14.3.2.b)]) control systems, whistle etc. are connected to the starting air receivers of main propulsion engines, their air consumption is also to be taken into account.

Regardless of the above, for multi-engine installations the total number of starts required to be provided from the starting air receivers is indicated in Tab 7, valid when all the air receivers may be used to start all propulsion engines; if each engine or group of engines connected to a shaft is fitted with dedicated air receivers, the minimum number of starts for each group of engines connected to the same shaft is 12 for reversible engines and 6 for non-reversible engines.

In case of Diesel-electric or turbine-electric propulsion, the minimum number of total consecutive starts required to be provided from the starting air receivers is to be determined from the following equation:

$S = 6 + N (N - 1)$

where

S : total number of consecutive starts

N : number of engines. (need not to be greater than 3).

c) If other compressed air systems, such as control air, are supplied from the same starting air receivers, the total capacity of the receivers is to be sufficient for continued operation of these systems after the air necessary for the required number of starts has been used.

d) The main starting air arrangements for main propulsion or auxiliary diesel engines are to be adequately protected against the effects of backfiring and internal explosion in the starting air pipes. To this end, the following safety devices are to be fitted:

- An isolating non-return valve, or equivalent, at the starting air supply connection to each engine.
- A bursting disc or flame arrester:
  - in way of the starting valve of each cylinder, for direct reversing engines having a main starting air manifold
  - at least at the supply inlet to the starting air manifold, for non-reversing engines.

The bursting disc or flame arrester above may be omitted for engines having a bore not exceeding 230 mm.

Other protective devices will be specially considered by the Society.

The requirements of this item d) do not apply to engines started by pneumatic motors.

e) Compressed air receivers are to comply with the requirements of Sec 5. Compressed air piping and associated air compressors are to comply with the requirements of Sec 10.

5.1.2 Electrical starting

a) Where main internal combustion engines are arranged for electrical starting, at least two separate batteries are to be fitted.

The arrangement is to be such that the batteries cannot be connected in parallel.

Each battery is to be capable of starting the main engine when in cold and ready to start condition.

The combined capacity of batteries is to be sufficient to provide within 30 min, without recharging, the number of starts required in [5.1.1] (b) in the event of air starting.

b) Electrical starting arrangements for auxiliary engines are to have two separate storage batteries or may be supplied by two separate circuits from main engine storage batteries when these are provided. In the case of a single auxiliary engine, one battery is acceptable. The combined capacity of the batteries is to be sufficient for at least three starts for each engine.

c) The starting batteries are only to be used for starting and for the engine's alarm and monitoring. Provision is to be made to maintain the stored energy at all times.

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SECTION 7 MAIN PROPULSION SHAFTING

1 General

1.1 Application

1.1.1 This Section applies to shafts, couplings, clutches and other shafting components transmitting power for main propulsion.

For shafting components in engines, turbines, gears and thrusters, see Sec 2, Sec 4, Sec 5, Sec 6 and Sec 12, respectively; for propellers, see Sec 8.

For vibrations, see Sec 9.

Additional requirements for navigation in ice are given in Part F, Chapter 9.

[4] is applicable when requested in accordance with the relevant Table of Pt A, Ch 2, App 3.

1.2 Documentation to be submitted

1.2.1 The Manufacturer is to submit to the Society the documents listed in Tab 1 for approval.

Plans of power transmitting parts and shaft liners listed in Tab 1 are to include the relevant material specifications.

2 Design and construction

2.1 Materials

2.1.1 General

The use of other materials or steels having values of tensile strength exceeding the limits given in [2.1.2], [2.1.3] and [2.1.4] will be considered by the Society in each case.

2.1.2 Shaft materials

In general, shafts are to be of forged steel having tensile strength, R_m, between 400 and 930 N/mm^2.

Where shafts may experience vibratory stresses close (i.e. higher than 80%) to the permissible stresses for transient operation, the materials are to have a specified minimum ultimate tensile strength (R_m) of 500 N/mm^2. Otherwise, materials having a specified minimum ultimate tensile strength (R_m) of 400 N/mm^2 may be used.

Table 1 : Documentation to be submitted

No.	Document (drawings, calculations, etc.)
1	Shafting arrangement **(1)**
2	Thrust shaft
3	Intermediate shafts
4	Propeller shaft
5	Shaft liners, relevant manufacture and welding procedures, if any
6	Couplings and coupling bolts
7	Flexible couplings **(2)**
8	Sterntube
9	Details of sterntube glands
10	Oil piping diagram for oil lubricated propeller shaft bearings

No.	Document (drawings, calculations, etc.)
11	Shaft alignment calculation, see also [3.3]

(1) This drawing is to show the entire shafting, from the main engine coupling flange to the propeller. The location of the thrust block, and the location and number of shafting bearings (type of material and length) are also to be shown.

(2) The Manufacturer of the elastic coupling is also to submit the following data:

- allowable mean transmitted torque (static) for continuous operation
- maximum allowable shock torque
- maximum allowable speed of rotation
- maximum allowable values for radial, axial and angular misalignment

In addition, when the torsional vibration calculation of main propulsion system is required (see Sec 9), the following data are also to be submitted:

- allowable alternating torque amplitude and power loss for continuous operation, as a function of frequency and/or mean transmitted torque
- static and dynamic stiffness, as a function of frequency and/or mean transmitted torque
- moments of inertia of the primary and secondary halves of the coupling
- damping coefficient or damping capability
- properties of rubber components
- for steel springs of couplings: chemical composition and mechanical properties of steel employed.

2.1.3 Couplings, flexible couplings, hydraulic couplings

Non-solid-forged couplings and stiff parts of elastic couplings subjected to torque are to be of forged or cast steel, or nodular cast iron.

Rotating parts of hydraulic couplings may be of grey cast iron, provided that the peripheral speed does not exceed 40m/s.

2.1.4 Coupling bolts

Coupling bolts are to be of forged, rolled or drawn steel.

2.1.5 Shaft liners

Liners are to be of metallic corrosion resistant material complying with the applicable requirements of Part D and with the approved specification, if any; in the case of liners fabricated in welded lengths, the material is to be recognised as suitable for welding.

In general, they are to be manufactured from castings.

For small shafts, the use of liners manufactured from pipes instead of castings may be considered.

Where shafts are protected against contact with seawater not by metal liners but by other protective coatings, the coating procedure is to be approved by the Society.

2.1.6 Sterntubes

Sterntubes are to comply with the requirements of Pt B, Ch 1, Sec 2, [8].

2.2 Shafts - Scantling

2.2.1 General

For the check of the scantling, the methods given in [2.2.2] and [2.2.3] apply for intermediate shafts and propeller shafts, respectively. As an alternative, the direct stress calculation method as per [2.2.4] may be applied.

Transitions of diameters are to be designed with either a smooth taper or a blending radius. For guidance, a blending radius equal to the change in diameter is recommended.

2.2.2 Intermediate and thrust shafts

The minimum diameter of intermediate and thrust shafts is not to be less than the value d, in mm, given by the following formula:

$$d = F \cdot k \cdot \left[\frac{P}{n \cdot (1 - Q^4)} \cdot \frac{560}{R_m + 160} \right]^{1/}$$

where:

Q :
- in the case of solid shafts: Q = 0
- in the case of hollow shafts: Q = ratio of the hole diameter to the outer shaft diameter in the section concerned.

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SECTION 10 PIPING SYSTEM

1 General

1.1 Application

1.1.1

a) General requirements applying to all piping systems are contained in:

- [2] for their design and construction
- [3] for the welding of steel pipes
- [4] for the bending of pipes
- [5] for their arrangement and installation
- [17] for their certification, inspection and testing.

b) Specific requirements for piping systems and machinery piping systems are given in Articles [6] to [16].

[17] is applicable when requested in accordance with the relevant Table of Pt A, Ch 2, App 3.

1.2 Documentation to be submitted

1.2.1 Documents

The documents listed in Tab 1 are to be submitted.

1.2.2 Additional information

The information listed in Tab 2 is also to be submitted.

Table 1 : Documents to be submitted (1/7/2025)

No.	I/A **(1)**	Document **(2)**
1	A	Drawing showing the arrangement of the sea chests and side valves
2	A	Diagram of the bilge and ballast systems (in and outside machinery spaces)
3	A	Specification of the central priming system intended for bilge pumps, when provided
4	A	Diagram of the scuppers and sanitary discharge systems
5	A	Diagram of the air, sounding and overflow systems
6	A	Diagram of cooling systems (sea water and fresh water)
7	A	Diagram of fuel oil system
8	A	Drawings of the fuel oil tanks not forming part of the yacht‘s structure
9	A	Diagram of the lubricating oil system
10	A	Diagram of the hydraulic systems intended for essential services or located in machinery spaces
11	A	Diagram of the compressed air system
12	A	Diagram of the hydraulic and pneumatic remote control systems
13	A	Diagram of the remote level gauging system
14	A	Diagram of the exhaust gas system
15	A	Diagram of drip trays and gutterway draining system
16	A	Drawings and specification of valves and accessories, where required in [2.6]

(1) A = to be submitted for approval;
I = to be submitted for information.

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

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13.6.3 Monitoring

Alarms and safeguards for hydraulic power installations intended for essential services, except steering gear, for which the provisions of Sec 11 apply, are to be provided in accordance with Tab 30.

Note 1: Some departures from Tab 30 may be accepted by the Society in the case of yachts with a restricted navigation notation.

Note 2: Tab 30 does not apply to steering gear.

13.7 Construction of hydraulic oil piping systems

13.7.1 Materials

a) Pipes are to be made of seamless steel. The use of welded steel pipes will be given special consideration by the Society.

b) Casings of pumps, valves and fittings are to be made of steel or other ductile material.

Table 29 : Hydraulic oil systems

Symbol convention H = High, HH = High high, G = group alarm L = Low, LL = Low low, I = individual alarm X = function is required, R = remote	Monitoring		Automatic control				
			System			Auxiliary	
Identification of system parameter	Alarm	Indication	Slow-down	Shut-down	Control	Stand by Start	Stop
Pump pressure	L						
Service tank level	L **(1)**						

(1) The low level alarm is to be activated before the quantity of lost oil reaches 100 litres or 50 % of the circuit volume , whichever is the less.

14 Compressed air systems

14.1 Application

14.1.1 This Article applies to compressed air systems intended for essential services, and in particular to:

- starting of engines,
- control and monitoring.

14.2 Principle

14.2.1 General

a) Compressed air systems are to be so designed that the compressed air delivered to the consumers:
   - is free from oil and water,
   - does not have an excessive temperature.

b) Compressed air systems are to be so designed as to prevent overpressure in any part of the systems.

14.2.2 Availability

a) Compressed air systems are to be so designed that, in the event of failure of one air compressor or one air receiver intended for starting, control purposes or other essential services, the air supply to such services can be maintained.

b) The compressed air system for starting main engines and auxiliary engines for essential services is to be so arranged that it is possible to ensure the initial charge of air receiver(s) without the aid of a power source outside the yacht.

14.3 Capacity and availability of compressed air for essential services

14.3.1 Application (1/1/2026)

The requirements in this Article apply to the supply of compressed air required by essential services onboard ships other than the supply of compressed air for engine starting.

14.3.2 Requirements (1/1/2026)

a) The arrangements for the supply of compressed air to essential services are to ensure that sufficient compressed air to satisfy the total demand of the essential services is available at all times during normal operation, during maintenance, and in the event of a failure of the compressed air system.

b) Where compressed air is supplied from the engine starting air system, either continuously in normal operation, or periodically during maintenance or in the event of a failure of the compressed air system, the required compressed air demand is not to reduce the capacity and availability of the engine starting air required by Sec 2, [5.1.1].

14.4 Design of starting air systems

14.4.1 Initial charge of starting air receivers

a) Where, for the purpose of [14.2.2], an emergency air compressor is fitted, its driving engine is to be capable of being started by hand-operated devices. Independent electrical starting batteries may also be accepted.

b) A hand compressor may be used for the purpose of [14.2.2] only if it is capable of charging within one hour an air receiver of sufficient capacity to provide 3 consecutive starts of a propulsion engine or of an engine capable of supplying the energy required for operating one of the main compressors.

14.4.2 Number and capacity of air compressors

a) Where main and auxiliary engines are arranged for starting by compressed air, two or more air compressors are to be fitted with a total capacity sufficient to supply within one hour, the receivers being at atmospheric pressure, the quantity of air needed to satisfy the provisions of Sec 2, [5.1.1]. This capacity is to be approximately equally divided between the number of compressors fitted, excluding the emergency compressor fitted in pursuance of [14.3.1].

b) At least one of the compressors is to be independent of the engines for which starting air is supplied and is to have a capacity of not less than 50% of the total required in a).

14.4.3 Number and capacity of air receivers

a) Where main engines are arranged for starting by compressed air, at least two air receivers are to be fitted of approximately equal capacity and capable of being used independently.

b) The total capacity of air receivers is to be sufficient to provide without replenishment the number of starts required in Sec 2, [5.1.1]. It is also to take into account the air delivery to other consumers, such as control systems, whistle, etc., which are connected to the air receivers.

14.4.4 Air supply for starting the emergency generating set

Starting air systems serving main or auxiliary engines may be used for starting the emergency generator under the conditions specified in Sec 2, [5.1.3].

14.5 Design of control and monitoring air systems

14.5.1 Air supply

a) The control and monitoring air supply to essential services is to be available from two sources of a sufficient capacity to allow normal operation with one source out of service.

b) At least one air vessel fitted with a non-return valve is to be provided for control and monitoring purposes.

c) Pressure reduction units used in control and monitoring air systems intended for essential services are to be duplicated, unless an alternative air supply is provided.

d) Failure of the control air supply is not to cause any sudden change of the controlled equipment which may be detrimental to the safety of the yacht.

14.5.2 Pressure control

Arrangements are to be made to maintain the air pressure at a suitable value in order to ensure satisfactory operation of the installation.

14.5.3 Air treatment

In addition to the provisions of [14.8.3], arrangements are to be made to ensure cooling, filtering and drying of the air prior to its introduction in the monitoring and control circuits.

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SECTION 16 TESTS ON BOARD

1 General

1.1 Application

1.1.1 This Section covers board tests, both at the moorings and during sea trials. Such tests are additional to the workshop tests required in the other Sections of this Chapter.

1.2 Purpose of board tests

1.2.1 Shipboard tests are intended to demonstrate that the main and auxiliary machinery and associated systems are functioning properly, in particular in respect of the criteria imposed by the Rules. The tests are to be witnessed by a Surveyor.

1.3 Documentation to be submitted

1.3.1 A comprehensive list of the board tests intended to be carried out by the yard is to be submitted to the Society.

For each test, the following information is to be provided:

- scope of the test
- parameters to be recorded.

2 General requirements for board tests

2.1 Trials at the moorings

2.1.1 Trials at the moorings are to demonstrate the following:

a) satisfactory operation of the machinery in relation to the service for which it is intended

b) quick and easy response to operational commands

c) safety of the various installations, as regards:
   - the protection of mechanical parts
   - the safeguards for personnel

d) accessibility for cleaning, inspection and maintenance.

Where the above features are not deemed satisfactory and require repairs or alterations, the Society reserves the right to require the repetition of the trials at the moorings, either wholly or in part, after such repairs or alterations have been carried out.

2.2 Sea trials

2.2.1 Scope of the tests

Sea trials are to be conducted after the trials at the moorings and are to include the following:

a) demonstration of the proper operation of the main and auxiliary machinery, including monitoring, alarm and safety systems, under realistic service conditions

b) check of the propulsion capability when one of the essential auxiliaries becomes inoperative

c) detection of dangerous vibrations by taking the necessary readings when required

d) checks either deemed necessary for classification or requested by the interested parties and which are possible only in the course of navigation in open sea.

2.2.2 Exemptions

Exemption from some of the sea trials may be considered by the Society in the case of s having a sister yacht for which the satisfactory behaviour in service is demonstrated.

3.3.9 Engines driving auxiliaries

a) 100% power (MCR) at corresponding speed n0: at least 30 min

b) Approved intermittent overload: testing for duration as approved. board generating sets, account is to be taken of the times needed to actuate the generator's overload protection system.

3.3.10 Torsional vibrations

Barred speed range

Where a barred speed range is required, passages through this barred speed range, both accelerating and decelerating, are to be demonstrated. The times taken are to be recorded and are to be equal to or below those times stipulated in the approved documentation, if any. This also includes when passing through the barred speed range in reverse rotational direction, especially during the stopping test.

Note 1: Applies both for manual and automatic passing-through systems.

The yacht's draft and speed during all these demonstrations is to be recorded. In the case of a controllable pitch propeller, the pitch is also to be recorded.

The engine is to be checked for stable running (steady fuel index) at both upper and lower borders of the barred speed range. Steady fuel index means an oscillation range less than 5% of the effective stroke (idle to full index).

3.4 Tests of gas turbines

3.4.1 Main propulsion turbines

Main turbines are to be subjected during dock trials and subsequent sea trials to the following tests:

- operation at rated rpm for at least 3 hours
- reversing manoeuvres.

During the various operations, the pressures, temperatures and relative expansion are not to assume magnitudes liable to endanger the safe operation of the plant.

During the trials all safety, alarm, shut-off and control systems associated to the turbine are to be tested or properly simulated.

3.4.2 Auxiliary turbines

Turbines driving electric generators or auxiliary machines are to be run for at least 1 hours at their rated power and for 30 minutes at 110% of rated power.

During the trials all safety, alarm, shut-off and control systems associated to the turbine are to be tested or properly simulated.

3.5 Tests of electric propulsion system

3.5.1 Dock trials

a) The dock trials are to include the test of the electrical production system, the power management and the load limitation.

b) A test of the propulsion plant at a reduced power, in accordance with dock trial facilities, is to be carried out. During this test, the following are to be checked:
   - Electric motor rotation speed variation
   - Functional test, as far as practicable (power limitation is to be tested with a reduced value)
   - Protection devices
   - Monitoring and alarm transmission including interlocking system.

c) Prior to the sea trials, an insulation test of the electric propulsion plant is to be carried out.

3.5.2 Sea trials *(1/1/2026)*

Testing of the performance of the electric propulsion system is to be effected in accordance with an approved test program.

This test program is to include at least:

a) Speed rate of rise

b) Endurance test:
   - 41 hours at 100% rated output power
   - ~~2~~1 hours at the maximum continuous output power normally used at sea

- 10 minutes at maximum astern running power, a reduced time may be agreed with the Surveyor but in any case the ability of astern running capability is to be demonstrated

c) Check of the crash astern operation in accordance with the sequence provided to reverse the speed from full ahead to full astern, in case of emergency. During this test, all necessary data concerning any effects of the reversing of power on the generators are to be recorded, including the power and speed variation

d) Test of functionality of electric propulsion, when manoeuvring and during the turning test

e) Test of power management performance: reduction of power due to loss of one or several generators to check, in each case, the power limitation and propulsion availability.

3.6 Tests of gears

3.6.1 Tests during sea trials

During the sea trials, the performance of reverse and/or reduction gearing is to be verified, both when running ahead and astern.

In addition, the following checks are to be carried out:

- check of the bearing and oil temperature
- detection of possible gear hammering, where required by Sec 9, [3.6.1]
- test of the monitoring, alarm and safety systems.

3.6.2 Check of the tooth contact

a) Prior to the sea trials, the tooth surfaces of the pinions and wheels are to be coated with a thin layer of suitable coloured compound.

Upon completion of the trials, the tooth contact is to be inspected. The contact marking is to appear uniformly distributed without hard bearing at the ends of the teeth and without preferential contact lines.

The tooth contact is to comply with Tab 1.

b) The verification of tooth contact at sea trials by methods other than that described above will be given special consideration by the Society.

c) In the case of reverse and/or reduction gearing with several gear trains mounted on roller bearings, manufactured with a high standard of accuracy and having an input torque not exceeding 20 000 N·m, the check of the tooth contact may be reduced at the Society's discretion.

Such a reduction may also be granted for gearing which has undergone long workshop testing at full load and for which the tooth contact has been checked positively.

In any case, the teeth of the gears are to be examined by the Surveyor after the sea trials. Subject to the results, additional inspections or re-examinations after a specified period of service may be required.

Table 1 : Tooth contact for gears

Heat treatment and machining	Percentage of tooth contact	
	across the whole face width	of the tooth working depth
quenched and tempered, cut	70	40
• quenched and tempered, shaved or ground • surface-hardened	90	40

3.7 Tests of main propulsion shafting and propellers

3.7.1 Shafting alignment

Where alignment calculations are required to be submitted in pursuance of Sec 7, [3.3.1], the alignment conditions are to be checked on board as follows:

a) shafting installation and intermediate bearing position, before and during assembling of the shafts:
- optical check of the relative position of bushes after fitting
- check of the flanged coupling parameters (gap and sag)
- check of the centring of the shaft sealing glands

b) engine (or gearbox) installation, with floating :
- check of the engine (or gearbox) flanged coupling parameters (gap and sag)

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

1 General Requirements (Sec 1)

1.1 Fuels

1.1.1 With reference to Sec 1, [2.9] with reference to the use of fuel oil having flash points of less than 43°C the arrangement is considered by the Society on a case by case basis.

1.2 Communications

1.2.1 With reference to Sec 1, [3.8.1] these requirements may be relaxed at the Society's discretion, in any case at least one fixed means of voice communication is to be provided for communicating orders from the wheelhouse to the position in the machinery space or in the control room from which the speed and the direction of the thrust of the propellers are controlled.

2 Shafting arrangement (Sec 7)

2.1 Propeller shaft

2.1.1 *(1/1/2025)*
With reference to Sec 7, [2.2.3] as an alternative kp may be taken as 1,04.

2.2 Intermediate and propeller Shafts made of Corrosion resisting material

2.2.1 With reference to Sec 7, [2.2.3] for yachts of less than 300GT as an alternative [2.-2.2] may be applied.
Proposal to use the formula in [2.2.2] for yachts between 300GT and 500GT will be evaluated on a case by case base by the Society.

2.2.2 Corrosion-resistant shaft materials *(1/7/2025)*
For corrosion-resistant material, such as Aquamet 17, Aquamet 22, Nickel copper alloy - monel K 500, stainless steel type 316 and duplex steels, the following alternative formula can be used instead of that stated in item [2.2.2] and [2.2.3] to calculate the minimum diameter of the intermediate and propeller shafts:

$D = K_m [P / (n \times R_t)]^{1/3}$

where:

k_m : Material factor (see Tab 1);
D : Rule diameter of the intermediate and propeller shafts (mm);
P : Maximum service power (kW);
N : Shaft rational speed, in r.p.m., corresponding to P;
R_t : Yield strength in torsional shear (N/mm^2) (see Tab 1).

Shafts for which the scantling is determined according to the previous formula are to comply with the criteria listed in items a) to f), irrespective of the shaft material

a) Torsional and lateral shaft vibration analysis carried out according to Sec 8 is to be submitted to the Society. If requested by the Society axial shaft vibration analysis is also to be submitted for approval;
b) the span between two consecutive supports of the shaft is to be not more than the value given by the formula as indicated in [2.2.3];
c) the ratio between shaft diameter and propeller diameter is to be, in general, not more than 14:1;
d) the length of the cone shaft is to be verified in order to check that the sectional area of the key is not less than the value in mm^2 given by the formula given in [2.2.5];

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3 Propellers

3.1 Propeller blade thickness

3.1.1 With reference to Sec 8 the value of propeller thicknesses in Sec 8, [2.2], [2.3] and [2.4] may be multiplied by 0.88.

4 Shaft vibrations

4.1 General

4.1.1 With reference to Sec 9, shaft vibrations are required only when the formula in [2.1.2] is applied to shafts made of corrosion resisting material.

5 Piping

5.1 Conditions of use of metallic materials

5.1.1 With reference to Sec 10, Tab 4: Conditions of use of metallic materials in piping systems.

Aluminium and aluminium alloys may be accepted in the engine spaces provided that they are suitably protected against the effect of heat for the following services:

- flammable oil systems
- sounding and air pipes of fuel oil tanks
- fire-extinguishing systems
- bilge system
- scuppers and overboard discharges.

Outside the engine spaces, proposals for the use of aluminium and aluminium alloy pipes may be accepted considering the fire risk of the compartment where such pipes are fitted.

In addition, for the above services in engine spaces the minimum thickness of such pipes is to be not less than 4 mm.

For scuppers and overboard discharges the above insulation and the above required thickness may be omitted provided that they are fitted at their ends with closing means operated from a position above the main deck.

5.2 Use of welded and threaded metallic joints

5.2.1 With reference to Sec 10, Tab 15: Use of welded and threaded metallic joints in piping systems

a) Sleeve tapered threaded joint are acceptable on pipes of class II and III with outside diameter of not more than 80mm.

b) Sleeve parallel threaded joint are acceptable on pipes of class III with outside diameter of not more than 80mm.

5.3 Mechanical Joints

5.3.1 With reference to Sec 10, Tab 16: Application of mechanical joints.

For scuppers, slip-on joints may be accepted if they are located in an easily accessible position provided that the scuppers are fitted at their ends with closing means operated from a position above the main deck; the relevant fire resistance will be considered on the basis of the fire risk of the compartment where they are fitted. As an alternative, closing means operated from a position above the main deck are not required if the slip-on joints are fitted above the water level of maximum immersion and additional supporting devices for the scupper pipe are fitted near the ends of the slip-on joint.

5.4 Flexible hoses

5.4.1 With reference to Sec 10, [2.5.1]: Flexible hoses.

Only for yachts on composite material of less than 300 GT in short range navigation hydraulic oil for not essential systems in machinery space and outside of machinery spaces and also for essential systems only outside the machinery spaces of category A the Society may evaluate on a case by case basis, taking into account the probability and consequences of failure due to the position and the arrangement, the use of flexible hoses for long lengths or even the entire length of the system.

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5.5 Through hull fitting

5.5.1 When on composite vessels the passage through the hull of sea inlets and overboard discharges is designed with a metallic cylindrical system, provided with flanges fixed or screwed, or a short pipe is fitted between the side valve and the hull, and directly welded to the plating, the minimum wall thickness of the stem/pipe is indicated in Tab 3.

A different wall thickness may be considered by the Society on a case-by-case basis, provided that it complies with recognised standards.

Where the through hull fittings are built in metals resistant to corrosion, or are protected against corrosion by means of coating, etc., thickness may be reduced at the discretion of the Society (as reference see Tab 4, Tab 5 and Tab 6.

The through hull fitting is to be type approved based on strength test agreed with the Society.

Table 3 : Thickness for through hull outfitting

External diameter (mm)	Minimum wall thickness (mm)
20	2,0
21,3 - 25,0	3,2
26,9 - 33,0	3,2
38,0 - 44,5	7,6
48,3	7,6
51,0 - 63,5	7,6
70,0	7,6
76,1 - 82,5	7,6
88,9 - 108,0	7,8
114,3 - 127,0	8,8
133,0 - 139,7	9,5
152,4 - 168,3	11
177,8	12,7
193,7	12,7
219,1	12,7
244,5 - 273,0	12,7
298,5 - 368,0	12,7
406,4 - 457,2	12,7

5.6 Level Gauges

5.6.1 With reference to Sec 10, [2.8.2]: Level Gauges.

Cylindrical gauges may be used provided they are fitted with self-closing valves at their lower end as well as at their upper end if the latter is below the maximum liquid level.

In the case of tanks not subject to filling by power pumps, with the exception of fuel oil service tanks, the valves need not be of the self-closing type. Such valves are, however, to be readily accessible and instruction plates are to be fitted adjacent to them specifying that they are to be kept closed.

5.7 Welding of steel piping

5.7.1 With reference to Sec 10, [3]: Welding of steel piping as an alternative what below may be applied:

a) Welded joints on class III piping systems are to be in conformity with sound marine practice.

b) Welded joints on class I and II piping systems are to be specially considered by the Society.

c) The location of welded joints is to be such that as many as possible can be made in a workshop. The location of welded joints to be made on board is to be so determined as to permit their joining and inspection in satisfactory conditions.

5.8 Bilge system

5.8.1 With reference to Sec 10, [6.2.2] a): Number and distribution of bilge suctions, for yachts of less than 300 GT the direct suction from the machinery space of category A is not mandatory.

5.8.2 With reference to Sec 10, [6.5.1]: Number and arrangement of pumps, for short range yachts, the second bilge pump and suction pipes may be portable.

5.8.3 With reference to Sec 10, [6.6.1] a) and [6.6.3] a) special consideration may be done in case of sailing yachts.

5.8.4 With reference to Sec 10, [6.6.1] d) as an alternative what below may be applied.

In no case is the actual internal diameter to be:

- more than 5 mm smaller than that obtained from the formula given in a) or b), or
- less than 40 mm.

5.8.5 With reference to Sec 10, [6.6.3] a) as an alternative what below may be applied:

d_1 is not to be less than 25 mm and need not exceed 100 mm.

5.9 Scupper and sanitary discharges

5.9.1 With reference to Sec 10, Tab 23 in case of use of material other than steel the value given in Tab 4 or Tab 5 or Tab 6 according to the material of the pipe may be applied.

Table 4 : Minimum thickness of scupper and discharge pipes led to the shell for copper and copper alloys

External diameter (mm)	Copper		Copper alloy	
	normal thickness (mm)	substantial thickness (mm)	normal thickness (mm)	substantial thickness (mm)
8	1,0		0,8	
12	1,2		1,0	
25	1,5	3,5	1,2	3
50	2,0	4	1,5	3
88,9	2,5	4,3	2,0	3,5
114	3,0	6	2,5	5
133	3,0	6,5	2,5	5,5
193,7	3,5	7	3,0	6
273	4,0	7,5	3	6
Note 1: Intermediate sizes may be determined by interpolation.				

Table 5 : Minimum thickness of scupper and discharge pipes led to the shell for stainless steel

External diameter of the pipe d (mm)	Stainless Steel	
	normal thickness (mm)	substantial thickness (mm)
8,0	0,8	
12	1,0	
25,0	1,2	2,5
50,0	1,5	3
88,9	2,0	3,5
114	2,5	5
133,0	2,5	5,5
193,7	3,0	6
273,0	3,5	6,5
Note 1: Intermediate sizes may be determined by interpolation.		

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5.15 Exhaust Gas System

5.15.1 With reference to Sec 10, [15.3]: Materials this paragraph is to be applied considering [5.1].

6 Steering System (Sec 11)

6.1 Design and construction

6.1.1 With reference to Sec 11, [2] the Society may accept an arrangement whereby the two steering gears units share common mechanical components (tiller, quadrant, rudder actuators) provided that any defect can be isolated so that steering capability can be maintained or speedily regained.

6.1.2 For planning hulls with conventional rudders the possibility to accept a reduction of the steering angle is based on the possibility to assure adequate manoeuvrability conditions at lower speed.

6.1.3 Hand operation

Hand operation of steering gear is permitted when it requires an effort less than 160 N.

6.1.4 During the sea trials the capability of the auxiliary steering gear, including hand operated systems are to be tested.

6.1.5 ~~Hydraulic power supply~~

~~Hydraulic power installations supplying steering gear may also supply other equipment at the same time provided that the operation of the steering gear is not affected:~~

a) ~~by the operation of this equipment, or~~

b) ~~by any failure of this equipment or of its hydraulic supply piping.~~

6.1.6 Alarm and Indications

With reference to Sec.11 [2.7] what follows is acceptable.

a) Alarm and Indication: Control system [2.7.3] b) is not mandatory.

b) Alarm and Indication: Control system [2.7.5] is not mandatory.

c) Summary Table: Failures listed in [2.7.3] b) is not mandatory.

6.1.7 With reference to Sec 11, [2.5.6]: "Hydraulic reservoir" the storage means may consist of a readily accessible drum, of sufficient capacity to refill one power actuating system if necessary.

6.1.8 *(1/7/2025)*

With reference to Sec 11, [3.2.3]: "Omission of the auxiliary actuating system", the duplication of the power unit is not required.

7 Anchor Windlass

7.1 General

7.1.1 Sec 15 is not mandatory.

8 Plastic Pipes (App 3)

8.1 General

8.1.1 With reference to App 3, Tab 1 what follow may be considered:

a) when Fuel lubricating or hydraulic oil are located in accommodation spaces service space and control stations or on open decks they may be L2.

b) Bilge lines located in accommodation spaces service space and control stations or on open decks that may be L2.

8.1.2 App 3, [2.3.2] is applicable as far as it is practicable and reasonable.

8.1.3 With reference to App 3, [3.6.2] the valve required may be omitted if the penetration is fitted at a distance more than B/3 from the sides and above the design waterline, or somehow protected with watertight divisions from minor hull damages.

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Part C

Machinery, Systems and Fire Protection

Chapter 2

ELECTRICAL INSTALLATIONS

SECTION 7 STORAGE BATTERIES, CHARGERS, UNINTERRUPTIBLE POWER SYSTEMS AND FUEL CELLS

1 Constructional requirements for batteries

1.1 General

1.1.1 The requirements of this Article apply to permanently installed storage batteries (not to portable batteries).

1.1.2

Storage batteries may be of the lead-acid or nickel-alkaline type, due consideration being given to the suitability for any specific application.

The use of batteries other than Lead-acid or alkaline batteries is allowed subject to the compliance of the battery system and its installation to the requirements given in App 2.

Storage batteries of satisfactorily proven design (e.g. silver/zinc) may be accepted provided they are suitable for board use to the satisfaction of the Society.

1.1.3 Cells are to be assembled in suitable crates or trays equipped with handles for convenient lifting.

1.2 Vented batteries

1.2.1 Vented batteries are those in which the electrolyte can be replaced and freely releases gas during periods of charge and overcharge.

1.2.2 Vented batteries are to be constructed to withstand the movement of the yacht and the atmosphere (salt mist, oil etc.) to which they may be exposed.

1.2.3 Battery cells are to be so constructed as to prevent spilling of electrolyte at any inclination of the battery up to 40° from the vertical.

1.2.4 It is to be possible to check the electrolyte level and the pH.

1.3 Valve-regulated sealed batteries

1.3.1 Valve-regulated sealed batteries are batteries whose cells are closed under normal conditions but which have an arrangement which allows the escape of gas if the internal pressure exceeds a predetermined value. The cells cannot normally receive addition to the electrolyte.

Note 1: The cells of batteries which are marketed as “sealed” or “maintenance free” are fitted with a pressure relief valve as a safety precaution to enable uncombined gas to be vented to the atmosphere; they should more properly be referred to as valve-regulated sealed batteries. In some circumstances the quantity of gas vented can be up to 25% of the equivalent vented design. The design is to take into consideration provision for proper ventilation.

1.3.2 Cell design is to minimise risks of release of gas under normal and abnormal conditions.

1.4 Tests on batteries

1.4.1 The battery autonomy is to be verified on board in accordance with the operating conditions.

2 Constructional requirements for chargers

2.1 Characteristics

2.1.1 Chargers are to be adequate for the batteries for which they are intended and provided with a voltage regulator.

2.1.2 In the absence of indications regarding its operation, the battery charger is to be such that the completely discharged battery can be recharged to 80% capacity within a period of 10 hours without exceeding the maximum permissible charging current. A charging rate other than the above (e.g. fully charged within 6 hours for batteries for starting of motors) may be required in relation to the use of the battery.

2.1.3 For floating service or for any other condition where the load is connected to the battery while it is on charge, the maximum battery voltage is not to exceed the safe value of any connected apparatus.

Note 1: Consideration is to be given to the temperature variation of the batteries.

2.1.4 The battery charger is to be designed so that the charging current is set within the maximum current allowed by the manufacturer when the battery is discharged and the floating current to keep the battery fully charged.

2.1.5 Trickle charging to neutralise internal losses is to be provided. An indication is to be provided to indicate a charging voltage being present at the charging unit.

2.1.6 Protection against reversal of the charging current is to be provided.

2.1.7 Battery chargers are to be constructed to simplify maintenance operation. Indications are to be provided to visualise the proper operation of the charger and for troubleshooting.

2.2 Tests on chargers

2.2.1 Battery chargers are to be subjected to tests in accordance with Tab 1.

Type tests are the tests to be carried out on a prototype charger or the first of a batch of chargers, and routine tests are the tests to be carried out on subsequent chargers of a particular type.

2.2.2

When requested in Part A ch.2 App.3 the tests of battery chargers of 50 kVA and over intended for essential services are to be attended by a Surveyor of the Society.

Note 1: An Alternative Certification Scheme may be agreed by the Society with the Manufacturer whereby the attendance of the Surveyor will not be required as indicated above.

3 Uninterruptible power system (UPS) units ~~as alternative and/or transitional power~~

3.1 Application

3.1.1 *(1/1/2026)*

These requirements appy to ~~for~~ UPS units for the following cases: ~~apply~~

a) when providing an alternative power supply as an accumulator battery in terms of being an independent power supply for the emergency services defined in Sec 3, [3.7.3] d) ~~or transitional power supply to services as defined in Sec 3, [2.3] and [3.7] and when providing an alternative power supply to primary essential services as defined in Sec 1, [3.3.1]~~.

b) when providing an alternative power supply or transitional power supply to any other emergency services as defined in Sec.3 [3.7]

c) where required, constituting a means of continuous and uninterruptible power supply to essential services as defined in Sec 1 [3.2] to [3.4].

d) when providing power supply in accordance with conditions specified and mandated by FSS Code Chapter 9, 2.2.2 to 2.2.4.

~~A UPS unit complying with these requirements may provide an alternative power supply as an accumulator battery in terms of being an independent power supply for services defined in Sec 3, [3.7.3] d) and primary essential services as defined in Sec 1, [3.3.1].~~

3.1.2 *(1/1/2026)*

These requirements may be referenced to UPS units for other cases than in [3.1.1], and the application of requirements is at the discretion of the Society.

3.2 Definitions

3.2.1 *(1/1/2026)*

Uninterruptible Power System (UPS) - combination of convertors, switches and energy storage ~~means~~, devices (such as, ~~for example~~ batteries, constituting a power system for maintaining continuity of load power in case of AC input power failure (IEC 62040-3).

~~**Off-line**~~ **Double Conversion** ~~**UPS unit**~~ **topology** - a UPS ~~unit~~ topology comprises an AC to DC converter, generally a rectifier, and a DC to AC converter, generally an inverter. When the AC input power is out of UPS pre-set tolerances, the UPS enters stored energy mode ~~where under normal operation the output load is powered from the bypass line (raw mains) and only transferred to the inverter if the bypass supply fails or goes outside preset limits. This transition will invariably result in a brief (typically 2 to 10 ms) break in the load supply~~ (Refer to Annex B to IEC 62040-3).

Line interactive ~~**UPS unit**~~ **topology**- a~~n off-line~~ UPS ~~unit~~ topology comprises bidirectional AC to DC power conversion, generally through a bidirectional converter and an AC power interface. When AC input power voltage or frequency is out of UPS pre-set tolerances, the UPS runs in stored energy mode ~~where the bypass line switches to stored energy power when the input power goes outside the preset voltage and frequency limits~~ (Refer to Annex B to IEC 62040-3).

~~**On-line**~~ **Standby** ~~**UPS unit**~~ **topology**- a UPS ~~unit~~ topology comprises a battery charger, a DC to AC converter, generally a unidirectional inverter and a UPS switch. When the AC input power is out of UPS pre-set tolerances, the UPS operates in stored energy mode ~~where, under normal operation, the output load is powered from the inverter and will therefore continue to operate without a break in the event of the supply input failing or going outside preset limits~~ (Refer to Annex B to IEC 62040-3).

Energy storage device - system consisting of a single or multiple devices designed to provide power to the UPS inverter/converter (IEC 62040-3).

AC input power failure - variation in the AC input power which could cause the UPS to operate in stored energy mode (IEC 62040-3).

Bidirectional converter - converter which has the functions of both a rectifier and an inverter, and which can reverse the flow of power from AC to DC and vice-versa (IEC 62040-3).

Figure 1 (1/1/2026)

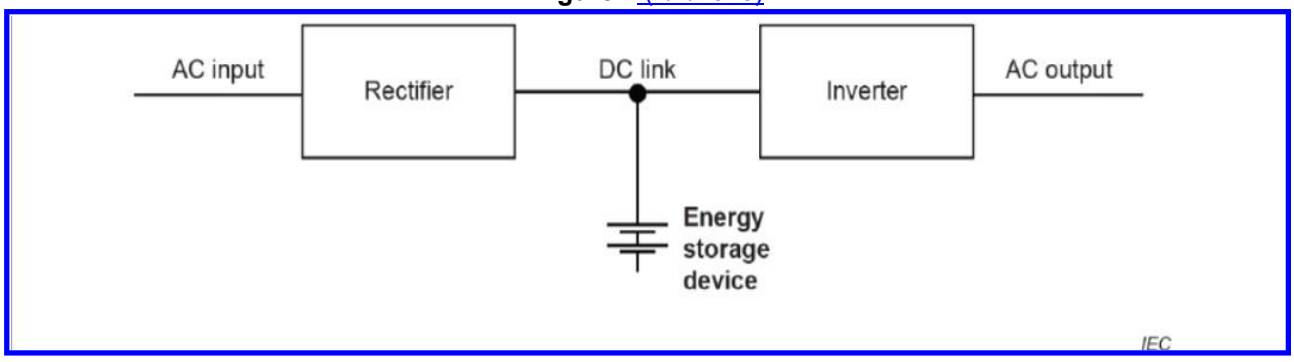


Figure 2 (1/1/2026)

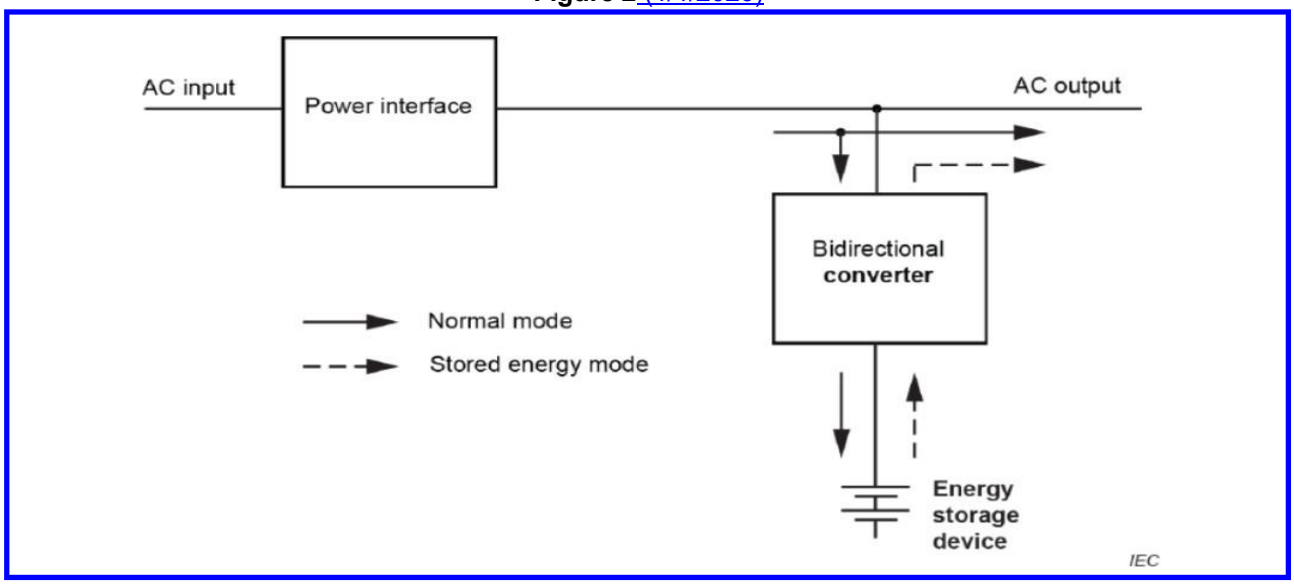
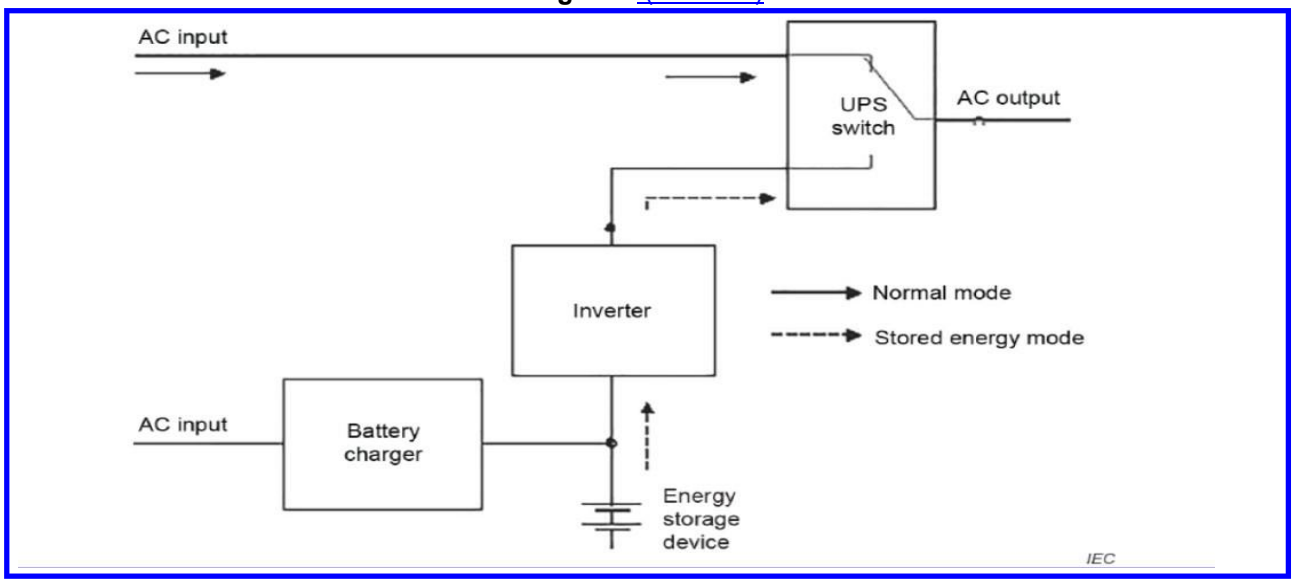


Figure 3 (1/1/2026)



3.3 Design and construction

3.3.1 *(1/1/2026)*

UPS units are to be constructed in accordance with IEC 62040-1 + AMD1 + AMD2, IEC 62040-2, IEC 62040-3, IEC 62040-4 and/or IEC 62040-5-3, as applicable, or an acceptable and relevant national or international standard.

3.3.2

The operation of the UPS is not to depend upon external services.

3.3.3 *(1/1/2026)*

The ~~type~~ configuration and topology of UPS unit employed, ~~whether off-line, line-interactive or on-line~~, is to be appropriate to the power supply requirements of the connected load equipment.

3.3.4 *(1/1/2026)*

~~An external bypass is to be provided~~.When external bypass is provided, bypass transfer switch is to be arranged to protect the load against power disturbances or interruption arising from inrush or fault current (Refer to Annex C to IEC 62040-3).

3.3.5 *(1/1/2026)*

The UPS unit is to be monitored and audible and visual alarm is to be given in ~~a normally attended location~~ a continuously manned station(s) for:

- power supply failure (voltage and frequency) to the connected load,
- earth fault,
- operation of a battery protective device,
- when the battery is being discharged, ~~and~~
- when the bypass is in operation ~~for on-line UPS units.~~in case an external bypass is provided, and
- any other fault and abnormal conditions of the UPS unit, as applicable.

3.4 Location

3.4.1 *(1/1/2026)*

The UPS unit for emergency services in paragraphs [3.1.1] and [3.1.2] ~~providing an alternative power supply or transitional power supply to services as defined in Sec 3, [2.3] and [3.7]~~ is to be suitably located for use in an emergency.

3.4.2 *(1/1/2026)*

UPS units using valve regulated sealed batteries may be located in compartments with normal electrical equipment, provided the ventilation arrangements are in accordance with the requirements of IEC 62040-1 + AMD1 + AMD2, IEC 62040-2, IEC 62040-3, IEC 62040-4 and/or IEC 62040-5-3, as applicable, or an acceptable and relevant national or international standard.

3.5 Performance

3.5.1

The output power is to be maintained for the duration required for the connected emergency services.

3.5.2

No additional circuits are to be connected to the UPS unit without verification that the latter has adequate capacity. The UPS battery capacity is, at all times, to be capable of supplying the designated loads for the time specified in the regulations.

3.5.3

On restoration of the input power, the rating of the charge unit is to be sufficient to recharge the batteries while maintaining the output supply to the load equipment.

3.6 Testing and survey

3.6.1 *(1/1/2026)*

When required in Pt A, Ch 2, App 3 UPS units of 50 kVA and over are to be surveyed by the Society during manufacturing and testing in accordance with [3.6.2].

3.6.2 *(1/1/2026)*

Appropriate testing is to be carried out to demonstrate that the UPS unit is suitable for its intended environment. This is expected to include, as a minimum, the following tests:

- Functionality, including operation of alarms in [3.3.5];
- Temperature rise;
- Ventilation rate;
- Battery capacity.

3.6.3

Where the supply is to be maintained without a break following a power input failure, this is to be verified after installation by means of a practical test.

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SECTION 8 SWITCHGEAR AND CONTROLGEAR ASSEMBLIES

1 Constructional requirements for main and emergency switchboards

1.1 Construction

1.1.1

Construction is to be in accordance with IEC Publication 60092-302-2.

1.1.2

Switchboard manufactured and tested to standards other than those specified in [1.1.1] will be accepted provided they are in accordance with an acceptable international or national standard of an equivalent or higher safety level.

1.1.3 Where the framework, panels and doors of the enclosure are of steel, suitable measures are to be taken to prevent overheating due to the possible circulation of eddy currents.

1.1.4 Insulating material for panels and other elements of the switchboard is at least to be moisture-resistant and flame-retardant.

1.1.5 Switchboards are to be of dead front type, with enclosure protection according to Sec 3, Tab 2.

1.1.6 Switchboards are to be provided with insulated handrails or handles fitted in an appropriate position at the front of the switchboard. Where access to the rear is necessary for operational or maintenance purposes, an insulated handrail or insulated handles are to be fitted.

1.1.7 Where the aggregate capacity of generators connected to the main busbars exceeds 100 kVA, a separate cubicle for each generator is to be arranged with flame-retardant partitions between the different cubicles. Similar partitions are to be provided between the generator cubicles and outgoing circuits.

1.1.8 Instruments, handles or push-buttons for switchgear operation are to be placed on the front of the switchboard. All other parts which require operation are to be accessible and so placed that the risk of accidental touching of live parts, or accidental making of short-circuits and earthings, is reduced as far as practicable.

1.1.9 Where it is necessary to make provision for the opening of the doors of the switchboard, this is to be in accordance with one of the following requirements:

a) opening is to necessitate the use of a key or tool (e.g. when it is necessary to replace a lamp or a fuse-link)

b) all live parts which can be accidentally touched after the door has been opened are to be disconnected before the door can be opened

c) the switchboard is to include an internal barrier or shutter with a degree of protection not less than IP2X shielding all live parts such that they cannot accidentally be touched when the door is open. It is not to be possible to remove this barrier or shutter except by the use of a key or tool.

1.1.10 All parts of the switchboard are to be readily accessible for maintenance, repair or replacement. In particular, fuses are to be able to be safely inserted and withdrawn from their fuse-bases.

1.1.11 Hinged doors which are to be opened for operation of equipment on the door or inside are to be provided with fixing devices for keeping them in open position.

1.1.12 Means of isolation of the circuit-breakers of generators and other important parts of the installation are to be provided so as to permit safe maintenance while the main busbars are alive.

1.1.13 Where components with voltage exceeding the safety voltage are mounted on hinged doors, the latter are to be electrically connected to the switchboard by means of a separate, flexible protective conductor.

1.1.14 All measuring instruments and all monitoring and control devices are to be clearly identified with indelible labels of durable, flame-retardant material.

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1.7.8 The secondary windings of instrument transformers are to be earthed.

1.7.9 Each a.c. generator not operated in parallel is to be provided with:

- 1 voltmeter
- 1 frequency meter
- 1 ammeter in each phase or 1 ammeter with a selector switch to enable the current in each phase to be read
- 1 three-phase wattmeter in the case of generators rated more than 50 kVA.

1.7.10 Each a.c. generator operated in parallel is to be provided with:

- 1 three-phase wattmeter
- 1 ammeter in each phase or 1 ammeter with a selector switch to enable the current in each phase to be read.

1.7.11 For paralleling purposes the following are to be provided:

- 2 voltmeters
- 2 frequency meters
- 1 synchroscope and synchronising indicating lamps or equivalent means.

A switch is to be provided to enable one voltmeter and one frequency meter to be connected to each generator before the latter is connected to the busbars.

The other voltmeter and frequency meter are to be permanently connected to the busbars.

1.7.12 Each secondary distribution system is to be provided with one voltmeter.

1.7.13 Switchboards are to be fitted with means for monitoring the insulation level of insulated distribution systems as stipulated in Sec 3, [3.2.1].

1.7.14 The main switchboard is to be fitted with a voltmeter or signal lamp indicating that the cable between the shore-connection box and the main switchboard is energised (see Sec 3, [3.8.7]).

1.7.15 For each d.c. power source (e.g. convertors, rectifiers and batteries), one voltmeter and one ammeter are to be provided, except for d.c. power sources for starting devices (e.g. starting motor for emergency generator).

2 Constructional requirements for distribution boards

2.1 Construction

2.1.1

Distribution boards are to be constructed, insofar as applicable, as specified for main and emergency switchboards.

2.1.2 All parts which require operation in normal use are to be placed on the front.

2.1.3 Distribution switchboards which are provided with two or more supply circuits arranged for automatic standby connection are to be provided with positive indication of which of the circuits is feeding the switchboard.

3 Testing

3.1 General

3.1.1

The following switchgear and control gear assemblies are to be subjected to the tests specified from [3.2] to [3.4] and surveyed by the society during testing:

a) main switchboard;

b) emergency switchboard;

c) distribution boards supplied by generating sets not forming part of the main source of electrical power and intended to distribute electrical energy to yacht's services or to the main switchboard at sea.;

d) high voltage assemblies;

3.1.2 The manufacturer is to issue the relative test reports providing information concerning the construction, serial number and technical data relevant to the switchboard, as well as the results of the tests required.

3.1.3 The tests are to be carried out prior to installation on board.

3.1.4
The test procedures are as specified in IEC Publication 60092-302-2.

3.2 Inspection of equipment, check of wiring and electrical operation test

3.2.1 It is to be verified that the switchboard:

- complies with the approved drawings
- maintains the prescribed degree of protection
- is constructed in accordance with the relevant constructional requirements, in particular as regards creepage and clearance distances.

3.2.2 The connections, especially screwed or bolted connections, are to be checked for adequate contact, possibly by random tests.

3.2.3 Depending on the complexity of the switchboard it may be necessary to carry out an electrical functioning test. The test procedure and the number of tests depend on whether or not the switchboard includes complicated interlocks, sequence control facilities, etc. In some cases it may be necessary to conduct or repeat this test following installation on board.

3.3 High voltage test

3.3.1 The test is to be performed with alternating voltage at a frequency between 45 and 65 Hz of approximately sinusoidal form.

3.3.2 The test voltage is to be applied:

- between all live parts connected together and earth
- between each polarity and all the other polarities connected to earth for the test.

During the high voltage test, measuring instruments, ancillary apparatus and electronic devices may be disconnected and tested separately in accordance with the appropriate requirements.

3.3.3 The test voltage at the moment of application is not to exceed half of the prescribed value. It is then to be increased steadily within a few seconds to its full value. The prescribed test voltage is to be maintained for ~~5 seconds (1 minute for high voltage assemblies)~~ 1 minute. The overcurrent relay shall not trip when the output current is less than 100mA. The high-voltage transformer used for the test shall be so designed that, when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current shall be at least 200 mA.

3.3.4 The value of the test voltage for main and auxiliary circuits is given in Tab 2 and Tab 3.

Table 2 : Test voltages for main circuits (based on IEC 61439-1)

Rated insulation voltage U_i V	Test voltage c.a (r.m.s.) V
$U_i \leq 60$	1000
$60 < U_i \leq 300$	1500
$300 < U_i \leq 660$	1890
$660 < U_i \leq 800$	2000
$800 < U_i \leq 1000$	22~~0~~00

Table 3 : Test voltage for auxiliary circuits

Rated insulation voltage U_i V	Test voltage c.a (r.m.s.) V
$U_i \leq 12$	250
$12 < U_i \leq 60$	500
$U_i > 60$	See Tab.2

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Part C

Machinery, Systems and Fire Protection

Chapter 4

FIRE PROTECTION, DETECTION AND EXTINCTION

SECTION 1 GENERAL REQUIREMENTS

1 Definitions

1.1 Application

1.1.1 This Chapter is applicable, in general, in case the Society does not carry out the compliance activity to an Administration Safety Code deemed considered as an equivalent standard.

1.1.2 In case of matters not delegated to class by the Administration (i.e. means of escape) the approval of the Flag Administration may be accepted on a case by case base.

1.1.3 The Rules of an Administration recognized acceptable by the Society may be considered alternative to this chapter with the exception of the following paragraph that have to applied in any case:

- Pt C, Ch 4, Sec 6, [2.1.1] for newbuilding yachts

1.2 Definitions

1.2.1 The definition used in this chapter are those contained in SOLAS and other IMO publications. In addition some other definitions are reported here below.

1.2.2 Not readily ignitable

When the surface thus described will not continue to burn for more than 20 seconds after removal of a suitable impinging test flame.

1.2.3 Standard fire test

A test in which the representative specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding to the standard time-temperature curve in accordance with the Fire Test Procedures Code. The dimensions of the specimens may be agreed with the Society.

For composite structures, considering that:

a) the absolute temperature is not to reach the Heat Deflection Temperature during the fire test;

b) the increase of temperature above the ambient temperature is to measured according to the IMO FTP Code; and

c) the ambient temperature may influence the test results since the increase of the sample temperature during a fire resistance test is normally independent from the ambient temperature

the fire resistance tests to evaluate the acceptance of the proposed insulation are to be carried out measuring the temperature increase above a standard ambient temperature normally set at 30°C.

For composite constructions the criteria for the acceptance of a fire test have to be clearly reported in the certificate. Lamination support not identical to the one tested may be accepted based on the following general principles:

In case of monolithic structure:

a.1 the thicker lamination thickness tested covers all the thinner ones

a.2 the lower HDT tested covers all the greater ones

In case of sandwich constructions:

b.1 the thinner skin thickness tested covers all the thicker ones

b.2 the thicker core thickness tested covers all the thinner ones

b.3 the lower core density tested covers all the higher ones

b.4 the lower HDT tested covers all the greater ones

The previously mentioned rules will equally be applicable to other fibre types used to reinforce plastics.

1.2.4 Public spaces

Portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

1.2.5 Battery charging station

A permanently (fixed) integrated element of the vessel electrical plant for the recharging of plug-in equipment. A fixed charging station provides electrical conversion, monitoring, or safety functionality. Standard electrical sockets or outlets are not to be considered fixed charging stations.

1.2.6 Storage spaces/boxes/cabinets for lithium batteries *(1/1/2026)*

A permanently (fixed) integrated space of the vessel or a permanently installed box for the storage of toys or vehicles or similar appliances containing lithium batteries or related spare or removed batteries.

2 Documentation to be submitted

2.1

2.1.1 The Interested Party is to submit to the Society the documents listed in Tab 1.

Table 1 : Documentation to be submitted

No	I/A **(1)**	Document **(2)**
1	A	Structural fire protection, showing the method of construction and the purpose of the various spaces of the yacht
2	A	Natural and mechanical ventilation systems showing the penetrations of class divisions, location of dampers, means of closing, arrangements of air conditioning rooms
3	A	Means of escape
4	A	Automatic fire detection systems and manually operated call points
5	A	Location of fire pumps and fire mains (with indication of pump head and capacity), hydrants and fire hoses
6	A	Arrangement of fixed fire-extinguishing systems **(2)**
7	A	Fire-fighting mobile equipment and firemen's outfits
8	A	Electrical diagram of fixed fire-extinguishing systems and fire pumps
9	A	Electrical diagram of power control and position indication circuits for fire doors
10	I	General arrangement plan
11	A	Sprinkler systems or equivalent systems, if any **(2)**
12	A	Electrical diagram of the sprinkler systems, if any
13	A	General arrangement plan relevant to the vehicle spaces showing the fire systems, ventilation systems and other safety systems adopted for such spaces

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

(2) Plans are to be schematic and functional and to contain all information necessary 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.

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.

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SECTION 2 FIRE PREVENTION

1 Engine space arrangement

1.1

1.1.1 The boundary of the engine space is to be arranged in order to contain the fire-extinguishing medium so that it cannot escape.

1.1.2 Combustible materials and flammable liquid excluding fuel oil necessary for the propulsion engines are not to be stowed in the engine space.

1.1.3 Machinery spaces of category A and engine spaces are to be ventilated to prevent the build-up of explosive gases.

1.1.4 For yachts with wooden hulls, particular attention is to be paid in order to adopt adequate means to avoid oil absorption into the structures.

1.1.5 In order to contain the oil, it may be acceptable to fit a drip tray in way of the engine. The use of the engine bearers as a means of containment of the oil may be accepted provided that they are of sufficient height and have no limber holes.

Efficient means are to be provided to ensure that all residues of persistent oils are collected and retained on board for discharge to collection facilities ashore.

1.1.6 Means are to be adopted for the storage, distribution and utilisation of fuel oil in order to minimise the risk of fire.

1.1.7 Fuel oil, lubricating oil and other flammable liquids are not to be stored in fore peak tanks.

1.1.8 Fuel oil tanks situated within, or adjacent to, the boundaries of category A machinery spaces are not to contain fuel oil having a flashpoint of less than 60ºC.

1.1.9 Every fuel oil pipe which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom is to be fitted with a cock or valve directly on the tank. Such cock or valve is to be capable of being closed locally and from a safe position outside the space in which such tanks are fitted in the event of fire occurring in the space (see also Ch 1, Sec 9, [9.6.3]).

1.1.10 Means are to be provided to stop fuel transfer pumps, fans and separators from outside the machinery space.

2 Liquid petroleum gas for domestic purposes

2.1

2.1.1 Where gaseous fuel is used for domestic purposes, the arrangements for the storage, distribution and utilisation of the fuel is to be such that, having regard to the hazards of fire and explosion which the use of such fuel may entail, the safety of the yacht and the persons on board is preserved. The installation is to be in accordance with App 1 or other recognised national or international standards.

Hydrocarbon gas detectors and carbon monoxide detectors are to be provided.

2.1.2 Open flame gas appliances fitted on board for cooking, heating or any other purpose are to be in compliance with recognised international standards.

2.1.3 Materials which are fitted close to open flame cooking and heating appliances are to be non-combustible, except that the exposed surfaces of these materials are to be protected with a finish having a class 1 surface spread of flame rating when tested in accordance with ASTM D 635.

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6 Batteries charging station

6.1

6.1.1 *(1/1/2026)*

Batteries charging: movable/~~P~~portable batteries, of a type other than Lead and Nickel-Cadmium batteries (including batteries fitted on onboard ~~equipment~~, toys, or vehicles or similar appliances etc.), during the charging process shall be placed in a well ventilated area onboard which is either an open deck, or in a continuously manned area or an area which is covered by a gas, smoke and heat detection system and an automatic fixed fire extinguishing system.

In all other cases the relevant requirements of Pt C, Ch 2, App 4 will be applied on a risk assessment base.

6.1.2 *(1/1/2026)*

Storage spaces/boxes/cabinets for the storage of toys or vehicles or similar appliances containing lithium batteries or related spare or removed batteries have to be verified in accordance to a national or international standard recognized acceptable by the Society.

In all other cases the relevant requirements of Pt C, Ch 2, App 4 will be applied on a risk assessment base.

SECTION 3 FIRE CONTAINMENT

1 Structure

1.1 General

1.1.1 The purpose of these provisions is to contain a fire in the space of origin.

For this purpose, the following functional requirements are to be met:

- the yacht is to be subdivided by thermal and structural boundaries as required by these Rules
- thermal insulation of boundaries is to have due regard to the fire risk of the space and adjacent spaces
- the fire integrity of the division is to be maintained at openings and penetrations.

2 Forms of construction - fire divisions

2.1

2.1.1 When fire divisions are required in compliance with these Rules, they are to be constructed in accordance with the following requirements.

2.1.2 Fire divisions using steel equivalent, or alternative forms of construction, may be accepted if it can be demonstrated that the material by itself, or due to non-combustible insulation provided, has fire resistance properties equivalent to those divisions required by these Rules.

2.1.3 Insulation is to be such that the temperature of the structural core does not rise above the point at which the structure would begin to lose its strength at any time during the applicable exposure to the standard fire test. For A class divisions, the applicable exposure is 60 minutes, and for B class divisions, the applicable exposure is 30 minutes.

2.1.4 For aluminium alloy structures, the insulation is to be such that the temperature of the structural core does not rise more than 200ºC above the ambient temperature at any time during the applicable fire exposure.

2.1.5 For composite structures, the insulation is to be such that the temperature of the laminate does not rise more than the minimum temperature of deflection under load of the resin at any time during the applicable fire exposure. The temperature of deflection under load is to be determined in accordance with a recognised international standard.

2.1.6 Insulation need only be applied on the side that is exposed to the greater fire risk; inside the engine room, a division between two such spaces is, however, to be insulated on both sides unless it is a steel division.

2.1.7 Special attention is to be given to the fixing of fire door frames in bulkheads constructed of materials other than steel. Measures are to be taken to ensure that the temperature of the fixings when exposed to fire does not exceed the temperature at which the bulkhead itself loses strength.

2.2 Equivalent fire division accepted without the exposure to the standard fire test

2.2.1 When fire divisions are required according to these Rules, the following may be accepted without the fire test.

Table 1

Type of material	B15 Class Division	A-30 Class Division
Composite material	• two 25 mm layers of non-combustible high density mineral wool suitably alternated. The mineral wool is to have a minimum volumetric mass of 100 kg/m3. The outer surface of the mineral wool is to be suitably protected against any splashing from fuel oil or other flammable liquid, or • reinforced plastic of thickness not less than 13 mm with a final layer of self-extinguishing laminates (for a thickness not less than 1,5 mm)	• two 30 mm layers of non-combustible high density mineral wool suitably alternated. The mineral wool is to have a minimum volumetric mass of 130 kg/m^3. The outer surface of the mineral wool is to be suitably protected against any splashing from fuel oil or other flammable liquid.
Aluminium alloy plate		5,5 mm aluminium alloy plate thickness insulated with 80 mm of non-combustible high density mineral wool. The mineral wool is to have a minimum volumetric mass of 100 kg/m3. The outer surface of the mineral wool is to be suitably protected against any splashing from fuel oil or other flammable liquid.
Steel plate		4,0 mm steel plate thickness insulated with 50 mm of non-combustible high density mineral wool. The mineral wool is to have a minimum volumetric mass of 100 kg/m^3. The outer surface of the mineral wool is to be suitably protected against any splashing from fuel oil or other flammable liquid.

3 Class divisions

3.1 Class divisions

3.1.1 With reference to the classification of the various spaces referred to here, the following definitions are to be considered:

a) Control stations
- Spaces containing emergency sources of power and lighting
- Wheelhouse and chartroom
- Spaces containing the vessel's radio equipment
- Fire-extinguishing rooms
- Fire control rooms and fire-recording stations
- Control room for propulsion machinery when located outside the machinery space
- Spaces containing centralised fire alarm equipment

b) Corridors and lobbies
- Guest and crew corridors and lobbies

c) Accommodation spaces
- Cabins, dining rooms, lounges, offices, pantries containing no cooking appliances (other than equipment such as microwave cookers and toasters), and similar spaces

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3.5 Openings in A class divisions

3.5.1 *(1/1/2026)*

The construction of all doors and door frames in A class divisions, with the means of securing them when closed, is to provide resistance to fire as well as the passage of smoke and flame, as far as practical, equivalent to that of the bulkheads in which the doors are situated. Such doors and door frames are to be constructed of steel or other equivalent material. Steel watertight sliding doors built in accordance to SOLAS II-1 need not be insulated.

3.5.2 Fire doors in galley boundaries and stairway enclosures, other than power-operated watertight doors and those which are normally locked, are to satisfy the following requirements:

a) the doors are to be self-closing and be capable of closing with an angle of inclination of up to 3,5Âº opposing closure;

b) the approximate time of closure for hinged fire doors is to be no more than 40 seconds and no less than 10 seconds from the beginning of their movement with the yacht in the upright position. The approximate uniform rate of closure for sliding doors is to be no more than 0,2 m/s and no less than 0,1 m/s with the yacht in the upright position;

c) the doors, except those for emergency escape trunks, are to be capable of remote release from the continuously manned central control station, either simultaneously or in groups and are also to be capable of release, individually, from a position at the door. Release switches are to have an on-off function to prevent automatic resetting of the system;

d) hold-back hooks not subject to central control station release are prohibited;

e) a door closed remotely from the central control station is to be capable of being reopened from both sides of the door by local control. After such local opening, the door is to automatically close again;

f) indication is to be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;

g) the release mechanism is to be so designed that the door will automatically close in the event of disruption of the control system or central power supply;

h) local power accumulators for power-operated doors are to be provided in the immediate vicinity of the doors to enable the doors to be operated after disruption of the control system or central power supply at least ten times (fully opened and closed) using the local controls;

i) disruption of the control system or central power supply at one door is not to impair the safe functioning of the other doors

j) remote-released sliding or power-operated doors are to be equipped with an alarm that sounds at least 5s but no more than 10s after the door being released from the central control station and before the door begins to move and continues sounding until the door is completely closed;

k) a door designed to reopen upon contacting an object in its path is to reopen not more than 1m from the point of contact;

l) double-leaf doors equipped with a latch necessary for their fire integrity are to have a latch that is automatically activated by the operation of the doors when released by the system;

m) the components of the local control system are to be accessible for maintenance and adjusting;

n) power-operated doors are to be provided with a control system of an approved type which is to be able to operate in case of fire and is to be in accordance with the Fire Test Procedures Code. This system is to satisfy the following requirements:

This system is to satisfy the following requirements:

- the control system is to be able to operate the door at a temperature of at least 200ºC for at least 60min, served by the power supply;
- the power supply for all other doors not subjected to fire is not to be impaired; and
- at temperatures exceeding 200ºC the control system is to be automatically isolated from the power supply and is to be capable of keeping the door closed up to at least 945ºC.

3.6 Openings in B class divisions

3.6.1 Doors and door frames in B class divisions and means of securing them are to provide a method of closure which has resistance to fire as far as practical equivalent to that of the divisions, except that a ventilation opening may be permitted in the lower portion of such doors.

When such an opening is in or under a door, the total net area of the opening(s) is not to exceed 0,05m2. When such an opening is cut in a door it is to be fitted with a grill made of non-combustible material. Doors are to be noncombustible or of substantial construction.

3.6.2 Where B class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc, or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements are to be made to ensure that the fire resistance is not impaired.

3.7 Windows and portlights

3.7.1 *(1/1/2026)*

All windows and portlights in bulkheads within accommodation spaces, service spaces and control stations are to be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted. Windows are not to be fitted in machinery space boundaries, but windows are allowed in the bulkheads dividing an engine control room and an engine room if the engine control room is contained inside the engine room boundaries.

3.8 Details of construction

3.8.1 Where the structure or A class divisions are required to be insulated, it is to be ensured that the heat from a fire is not transmitted through the intersections and terminal points of the divisions or penetrations to uninsulated boundaries.

Where the insulation installed does not achieve this, arrangements are to be made to prevent this heat transmission by insulating the horizontal and vertical boundaries or penetrations for a distance of 450 mm.

3.8.2 Without impairing the efficiency of the fire protection, the construction of ceilings and bulkheads is to allow a fire patrol to detect any smoke originating in concealed and inaccessible places, except where there is no risk of fire originating in such places.

3.8.3 When gaseous fuel is used for domestic purposes, the arrangements for the storage, distribution and utilisation of the fuel are to be such that, having regard to the hazards of fire and explosion which the use of such fuel may entail, the safety of the vessel and the persons on board are preserved.

In particular, open flame gas appliances provided for cooking, heating or any other purposes are to comply with the requirements of EC directive 90/396/EEC or equivalent and the installation of open flame gas appliances is to comply with the appropriate provisions of Section 2, [2.1].

4 Ventilating systems

4.1 General

4.1.1 Ventilation fans for machinery spaces and enclosed galleys are to be capable of being stopped and main inlets and outlets of the ventilation system closed from outside the spaces being served. This position is not to be readily cut off in the event of a fire in the spaces served.

4.1.2 Ventilation ducts serving category A machinery spaces, galleys, spaces containing vehicles or craft with fuel in their tanks, or lockers containing fuel tanks are not to cross accommodation spaces, service spaces or control stations unless the trunking is constructed of steel (minimum thickness 4mm). The ducting within the accommodation is to be fitted with fire insulation to A-60 to a point at least 5m from the machinery space or galley.

4.1.3 *(1/1/2026)*

Where the trunking passes from the machinery space of Cat A or galley into the accommodation, automatic fire dampers are to be provided in the deck or bulkhead within the accommodation. The automatic fire dampers are also to be manually operable from outside the machinery space or galley.

4.1.4 The requirements in [4.1.2] and [4.1.3] also apply to ventilation ducts for accommodation spaces passing within category A machinery spaces.

4.1.5 Storerooms containing highly flammable products are to be provided with ventilation arrangements that are separate from other ventilation systems. Ventilation is to be arranged to prevent the build-up of flammable vapours at high and low levels. The inlets and outlets of ventilators are to be positioned so that they do not draw from or vent into an area which would cause undue hazard, and are to be fitted with spark arresters.

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SECTION 5 MEANS OF ESCAPE

1 General

1.1

1.1.1 The purpose of this Section is to provide means of escape so that persons on board can safely and swiftly escape to the liferaft embarkation deck. For this purpose, the following functional requirements are to be met:

- safe escape routes are to be provided
- escape routes are to be maintained in a safe condition, clear of obstacles; and
- additional aids for escape are to be provided as necessary to ensure accessibility, clear marking and adequate design for emergency situations.

1.2 General requirements

1.2.1 Stairways, ladders and corridors serving all spaces normally accessible are to be arranged so as to provide ready means of escape to a deck from which embarkation into survival craft may be effected. The arrangement of the vessel is to be such that all compartments are provided with a satisfactory means of escape.

2 Means of escape from accommodation

2.1

2.1.1 Means of escape are to be provided so that persons onboard can safely and swiftly escape to the liferaft embarkation deck. For the accommodation, two means of escape from every restricted space or group of spaces are to be provided.

2.1.2 The normal means of access to the accommodation and service spaces below the open deck is to be arranged so that it is possible to reach the open deck without passing through a galley, engine room or other space with a high fire risk, wherever practicable.

2.1.3 Where accommodation arrangements are such that access to compartments is through another compartment, the second escape route is to be as remote as possible from the main escape route. This may be through hatches of adequate size leading to the open deck or separate space to the main escape route.

2.1.4 The two means of escape are to be arranged in such a way that a single hazardous event will not cut off both escape routes.

2.1.5 Exceptionally one of the means of escape may be dispensed with, due regard being paid to the nature and location and dimension of spaces and to the number of persons who might normally be accommodated or employed there where in any position the person inside is not more than 5 metres from the exit or for the spaces that may be visited only occasionally In addition efficient fire detectors are to be provided as necessary to give early warning of a fire emergency which could cut off that single means of escape. The escape route is not to pass through a space with fire risk such as a machinery space, galley or space containing flammable liquids

3 Means of escape from machinery spaces

3.1

3.1.1 Means of escape from ~~Category A~~ machinery spaces *(1/1/2026)*

Category A machinery spaces on motor vessels are to be provided with a minimum of two means of escape. Other machinery spaces are to also have at least two means of escape as widely separated as possible, except where the small size of the machinery space makes it impracticable

Means of escape from engine room giving direct access to accommodation (cabins, living room, etc) are not allowed.

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SECTION 8 FIRE APPLICATIONS

1 Fire applications

1.1 General requirements

1.1.1 Fire appliances are to be in conformity with Tab 1 and with the requirements of this Section.
The stowage position of fire appliances is to be clearly marked.

1.1.2 The capacity and quantity of the medium are to be in compliance with Tab 2.

Table 1 : Fire appliances

Num	Appliances	Number and specifications
1	Provision of water jet	1 Sufficient to reach any part of the vessel
2	Primary power-driven fire pump	1 The pump is to be driven by the propulsion engines or other different engines
3	Additional independent power-driven fire pump	1 The pump, power source and sea connection are not to be fitted in the same space as the pump listed in item [2]. The capability of this pump is to be not less than 80% of the capability of the pump listed in item [2].
4	Fireman & hydrants	The number of hydrants and the arrangement of the fireman are to be capable of supplying at least one water jet to any point of the yacht with a single length of hose.
5	Hoses - with jet/spray nozzles each fitted with a shut-off facility	at least 2
6	Portable fire extinguishers	At least one portable fire extinguisher is to be fitted for each deck. The type of medium and quantity are to comply with the following items.
7	Fire extinguishers for a machinery space other than cat. A containing internal combustion type machinery	The following appliances are to be provided: a) one portable fire extinguisher type D-II; b) one portable fire extinguisher type F-II.
8	Fire extinguishers in machinery space of category A	a) a fixed fire-extinguishing system in conformity with the requirements of item [3] b) one portable fire extinguisher type D-II; c) one portable fire extinguisher type F-II.
9	Fire extinguishers and appliances in other service spaces	**Radio room or wheelhouse:** 1 portable fire extinguisher type F-II near radio equipment or electrical apparatus; **Galley:** 1 portable fire extinguisher type E-II fitted near the exit; 1 fire blanket **Storerooms:** 1 portable fire extinguisher type E-II fitted near the exit Fire extinguishers of CO_2 type are not permitted in the storerooms

Num	Appliances	Number and specifications
10	Fire extinguisher in sleeping accommodation	1 portable fire extinguisher type E-II for each accommodation space occupied by 4 persons or more close to the entrance and 1 portable fire extinguisher type E-I for each accommodation space occupied by less than 4 persons close to the entrance. In any case 1 portable fire extinguisher for each deck, within 10m of any position within an accommodation or service space. Fire extinguishers of CO2 type are not permitted in accommodation spaces.
11	Fire extinguishers in corridors	1 portable fire extinguisher type D-II for each corridor more than of 5 meter in length and 1 portable fire extinguisher type E-I for each corridor of less than 5 meter. The fire extinguishers required in this row may be the same required in row 10 for accommodation spaces provided that they satisfy both the requirements. Fire extinguishers of CO2 type are not permitted in corridors.
12	Fireman outfit's	1 for yachts of more than 300 GT.

Table 2 : Type and medium capacity

Type	Foam (litres)	Carbon dioxide (kg)	Dry chemical powder (kg)
D-II	9	-	-
E-II	9	5	4
F-II	-	5	4
E-I	6	2	1

2 Fire-extinguishing system

2.1 Fire pumps

2.1.1 Number of fire pumps

Two power-driven fire pumps are to be provided, one of which may be driven by the propulsion system.

2.1.2 The two pumps are to be installed in two different spaces together with their own source of power and sea connection.

2.1.3 Bilge sanitary and general service pumps may be accepted as fire pumps.

2.2 Provision of water jet

2.2.1 When discharging at full capacity through 2 adjacent fire hydrants, the pump is to be capable of maintaining a water pressure of 0.2N/mm^2 at any hydrant, provided the fire hose can be effectively controlled at this pressure.

2.3 Pump capacity

2.3.1 The power-driven fire pump is to have a capacity of:

$2,5 \times \{1+ 0,066 \times (L(B+D))^{0,5}\}^2$ m^3/hour

where:

L is the length

B is the greatest moulded breadth

D is the moulded depth measured to the bulkhead deck amidship.

When discharging at full capacity through 2 adjacent fire hydrants, the pump is to be capable of maintaining a water pressure of 0.2N/mm^2 at any hydrant, provided the fire hose can be effectively controlled at this pressure.

2.3.2 The second fire pump is to have a capacity of at least 80% of that required by [2.3.1] and be capable of input to the fire main. A permanent sea connection, external to the machinery space, is to be provided. 'Throw-over' sea suctions are not acceptable.

2.3.3 Each centrifugal fire pump is to be provided with a non-return valve in the connection to the fire main.

2.3.4 All the mechanical pumps are to be of the self-priming type. If centrifugal pumps are fitted, they are to be provided with a non-return valve in the connection with the fire main.

2.3.5 ~~Each centrifugal fire pump is to be provided with a non-return valve in the connection to the fire main.~~

2.4 Fire main and hydrants

2.4.1 A fire main, water service pipes and fire hydrants are to be fitted.

2.4.2 The fire main and water service pipe connections to the hydrants are to be sized for the maximum discharge rate of the pump(s) connected to the main.

2.4.3 The fire main, water service pipes and fire hydrants are to be constructed such that they will:

a) not be rendered ineffective by heat;

b) not readily corrode; and

c) be protected against freezing.

2.4.4 The fire main is to have no connections other than those necessary for fire fighting or washing down.

2.4.5 Fire hydrants are to be located for easy attachment of fire hoses, protected from damage and distributed so that a single length of the fire hoses provided can reach any part of the yacht.

2.4.6 Fire hydrants are to be fitted with valves that allow a fire hose to be isolated and removed when a fire pump is operating.

2.4.7 When a fire main is supplied by 2 pumps, 1 in the machinery space and 1 elsewhere, provision is to be made for isolation of the fire main within the machinery space and for the second pump to supply the fire main and hydrants external to the machinery space. Isolation valves are to be manually operated and fitted outside the machinery space in a position easily accessible in the event of a fire.

2.5 Fire hoses

2.5.1 *(1/7/2025)*

Fire hoses are not to exceed 20 metres in length.

2.5.2 Fire hoses and associated tools and fittings are to be kept in readily accessible and known locations close to hydrants or connections on which they will be used. Hoses supplied from a powered pump are to have jet/spray nozzles (incorporating a shut-off facility) of diameter 19 mm, 16 mm or 12 mm depending on the fire-fighting purposes.

2.5.3 At least one hydrant is to have one hose connected at all times. For use within accommodation and service spaces, proposals to provide a smaller diameter of hoses and jet/spray nozzles will be specially considered.

3 Fixed fire-extinguishing system

3.1

3.1.1 A fixed fire-extinguishing system is to be provided in machinery spaces of category A and in all other machinery spaces containing a fuel oil settling tank or fuel oil unit.

3.1.2

The system is to be in compliance with the IMO FSS CODE and with the requirements given in Annex 2 if carbon dioxide is used as fire extinguishing medium. Systems using other extinguishing medium (e.g. FM200, Novec 1230) may be accepted if certified in accordance with IMO requirements.

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Part D

Materials and Welding

Chapter 4

MISCELLANEOUS EQUIPMENT

SECTION 2 VARIOUS FINISHED PRODUCTS

1 Cast copper alloy propellers and propellers blades

1.1 Application

1.1.1 The requirements of this Article are applicable to the manufacture, inspection and repair procedures of cast copper alloy propellers, blades and bosses.

1.1.2 Where the use of alternative alloys is proposed, particulars of chemical composition, mechanical properties and heat treatment are to be submitted for approval.

1.1.3 The requirements of this Article may also be used for the repair of propellers damaged in service, subject to prior agreement with the Society.

1.2 Manufacture

1.2.1 All propellers and propeller components are to be manufactured by foundries approved by the Society; the conditions for approval are indicated in the TASNEEF “Rules for the approval of Manufacturers of materials”.

1.2.2 These castings are to be manufactured and tested in accordance with the appropriate requirements of Chapter 1 and Chapter 2 and the specific requirements of this Article.

1.2.3 Pouring

The pouring must be made into dried moulds using degassed liquid metal. The pouring is to be controlled so as to avoid turbulences of flow. Special devices and/or procedures must prevent slag flowing into the mould.

1.2.4 Stress relieving

Subsequent stress relieving heat treatment may be performed to reduce the residual stresses. For this purpose, the manufacturer shall submit a specification containing the details of the heat treatment to the Society for approval. For stress relieving temperatures and holding times see Tab 4 and Tab 7.

1.3 Quality of castings

1.3.1 Freedom from defects

All castings must have a workmanlike finish and are to be free from surface or internal defects which would be prejudicial to their proper application in service. Minor casting defects which may still be visible after machining, such as small sand and slag inclusions, small cold shots and scabs, are to be trimmed off by the Manufacturer in accordance with [1.12].

1.3.2 Removal of defects

Casting defects which may impair the serviceability of the castings, e.g. major non-metallic inclusions, shrinkage cavities, blow holes and cracks, are not permitted. They may be removed by one of the methods described in [1.12] and repaired within the limits and restrictions for the severity zones. Full description and documentation are to be available for the surveyor.

1.4 Condition of supply

1.4.1 At the option of the Manufacturer, castings may be supplied in the “as cast” or heat treated condition.

1.5 Dimensions, dimensional and geometrical tolerances

1.5.1 The verification of dimensions, the dimensional and geometrical tolerances is the responsibility of the Manufacturer. The report on the relevant examinations is to be submitted to the Surveyor, who may require checks to be made in his presence.

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~~**Figure 7 : Shape of indications** *(1/7/2021)*~~

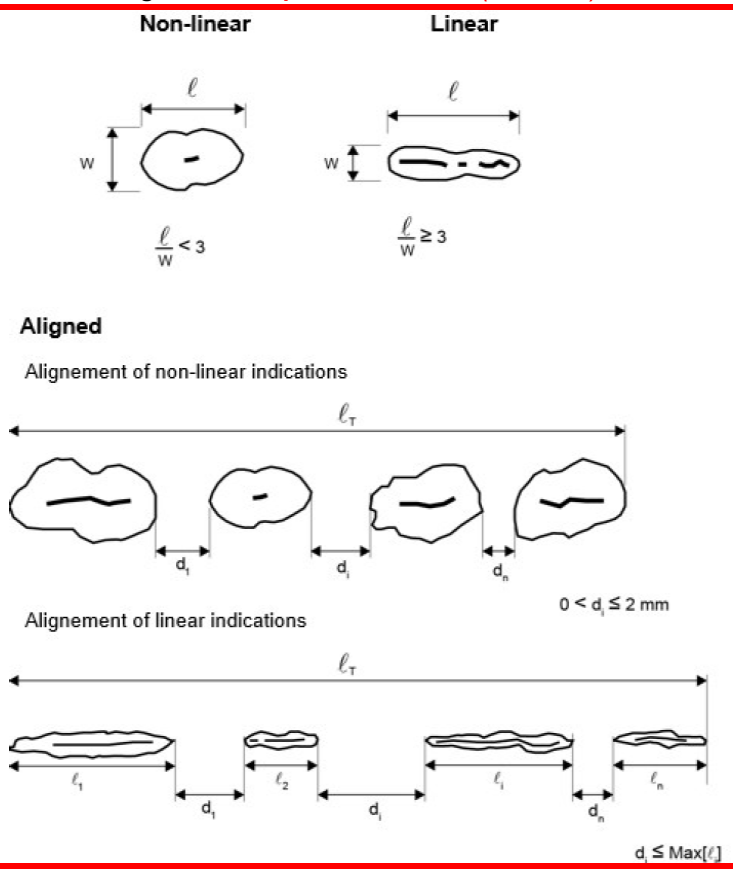

Figure 7 : Shape of indications *(1/1/2026)*

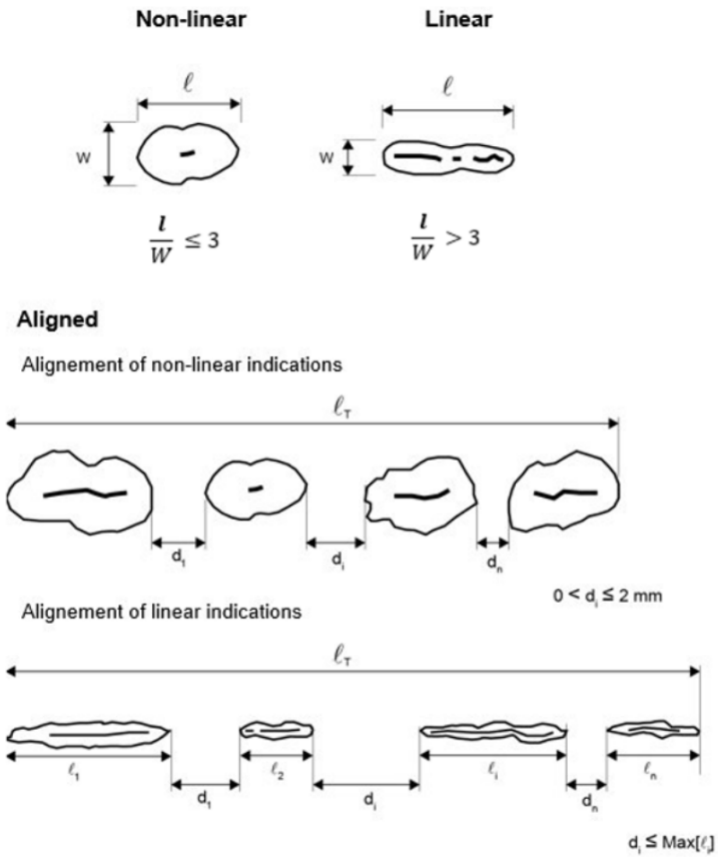

Table 3 : Allowable number and size of relevant indications in a reference area of 100 cm² depending on severity zones(1) *(1/1/2026)*

Severity zones	Max. total number of indications	Type of indication	Max. number of each type **(1) (2)**	Max. acceptable value for ~~"a" or~~ "l" of indications, in mm
A	7	Non-linear	5	4
		Linear	2	3
		Alligned	2	3
B	14	Non-linear	10	6
		Linear	4	6
		Alligned	4	6
C	20	Non-linear	14	8
		Linear	6	6
		Alligned	6	6

(1) Singular non-linear indications less than 2 mm for zone A and less than 3 mm for the other zones are not considered relevant.

(2) The total number of non-linear indications may be increased to the maximum total number, or part thereof, represented by the absence of linear or aligned indications.

Areas which are prepared for welding are independent of their location always to be assessed according to zone A. The same applies to the welded areas after being finished machined and/or grinded.

1.12 Repair of defects

1.12.1 General

Indications exceeding the acceptance standard of items Tab 3, cracks, shrinkage cavities, sand, slag and other non-metallic inclusions, blow holes and other discontinuities which may impair the safe service of the propeller are defined as defects and are to be repaired.

1.12.2 Repair procedures

In general the repairs are to be carried out by mechanical means, e.g. by grinding, chipping or milling. Welding may be applied, subject to the agreement of the Society, if the relevant requirements detailed hereafter are satisfied.

1.12.3 After milling or chipping, grinding is to be applied for such defects which are not to be welded. Grinding is to be carried out in such a manner that the contour of the ground depression is as smooth as possible in order to avoid stress concentrations or to minimize cavitation corrosion. Complete elimination of the defective material is to be verified by liquid penetrant testing.

1.12.4 Localised pores on the end face or bore of a propeller boss, which themselves do not affect the strength of the casting, can be filled with a suitable plastic filler after the appropriate preparation of the defective area. The foundry is to keep records and details of all castings which have been rectified.

1.12.5 Repair of defects in zone A

In zone A, repair welding will generally not be allowed unless specially approved by the Society.

In some cases the propeller designer may submit technical documentation to propose a modified zone A based on detailed hydrodynamic load and stress analysis for consideration by the Society.

Grinding can be carried out to an extent which maintains the blade thickness of the approved drawings.

The possible repair of defects which are deeper than those referred to above will be specially considered by the Society.

1.12.6 Repair of defects in zone B

In zone B, defects that are not deeper than d_B = (t/40), in mm (where t is the minimum local thickness in mm according to the Rules) or 2 mm, whichever is the greater, are to be removed by grinding. Those defects that are deeper than allowable for removal by grinding may be repaired by welding.

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f) additional optional marks such as file number and code of the local inspection office, Surveyor's personal stamp.

Special marking and certification procedures may be agreed upon for supplies by Manufacturers granted the use of an alternative testing procedure.

2.4.2 The testing documentation indicated in Ch 1, Sec 1, [4.2.1] is required and is to include all the information, as appropriate.

The testing or works' certificate of the material used is to be enclosed with the testing documentation.

Where applicable, the reports relevant to the non-destructive examination, pressure test and heat treatment are to be enclosed with the testing documentation.

2.4.3 Before signing the Society's inspection certificate, the Surveyor is to be provided by the Manufacturer with a written declaration stating that the bottles have been manufactured by a process approved by the Society, they comply with the applicable requirements and they have been satisfactorily tested in accordance with the Society's Rules.

3 Cast steel propellers and propeller blades

3.1 Application

3.1.1 The requirements of this Article are applicable to the manufacture, inspection and repair procedure of cast steel propellers, blades and bosses.

3.1.2 Where the use of alternative alloys is proposed, particulars of chemical composition, mechanical properties and heat treatment are to be submitted for approval.

3.1.3 These requirements may also be used for the repair and inspection of propellers which become damaged during service, subject to prior agreement with the Society.

3.2 Manufacture

3.2.1 All propellers and propeller components are to be manufactured by foundries approved by the Society; the conditions for aTASNEEFval are indicated in the TASNEEF "Rules for the approval of Manufacturers of materials".

3.2.2 These castings are to be manufactured and tested in accordance with the appropriate requirements of Chapter 1 and Chapter 2 and the specific requirements of this Article.

3.3 Quality of castings

3.3.1 Freedom from defects

All castings are to have a workmanlike finish and are to be free from surface and internal defects which would be prejudicial to their proper application in service.

Minor casting defects which may still be visible after machining such as small sand and slag inclusions, small cold shuts and scabs shall be trimmed off by the manufacturer in accordance with [3.12].

3.3.2 Removal of defects

Casting defects which may impair the serviceability of the castings, e.g. major non-metallic inclusions, shrinkage cavities, blow holes and cracks, are not permitted. They may be removed by one of the methods described in [3.12] and repaired within the limits and restrictions for the severity zones. Full description and documentation is to be available for the surveyor.

3.4 Condition of supply

3.4.1 Martensitic castings are to be supplied in the austenitized and tempered condition. Austenitic castings are to be solution treated.

3.5 Dimensions, dimensional and geometrical tolerances

3.5.1 The verification of dimensions, the dimensional and geometrical tolerances is the responsibility of the Manufacturer. The report on the relevant examinations is to be submitted to the Surveyor, who may require checks to be made in his presence.

3.5.2 Static balancing is to be carried out on all propellers in accordance with the approved drawings.

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The metal arc welding with electrodes or filler wire used in the procedure tests is to be used. The welding consumables are to be stored and handled in accordance with the Manufacturer's recommendations.

Slag, undercuts and other imperfections are to be removed before depositing the next run.

The martensitic steels are to be furnace re-tempered after weld repair. Subject to prior approval, however, local stress relieving may be considered for minor repairs.

On completion of heat treatment the weld repairs and the adjacent material are to be ground smooth. All weld repairs are to be submitted to liquid penetrant testing.

Table 10 : Allowable number and size of indications depending on severity zones

Severity zone	Max. total number of indications	Indication type	Max. number for each type **(1) (2)**	Max. dimension of indication (mm)
A	7	Non - linear	5	4
		Linear	2	3
		Aligned	2	3
B	14	Non - linear	10	6
		Linear	4	6
		Aligned	4	6
C	20	Non - linear	14	8
		Linear	6	6
		Aligned	6	6

(1) Single non-linear indications less than 2mm in Zone A and less than 3mm in other zones may be disregarded.

(2) The total number of non-linear indications may be increased to the maximum total number, or part thereof, represented by the absence of linear or aligned indications.

3.12.9 Repair documentation

The foundry is to maintain records of inspections, welding and any subsequent heat treatment, treaceable to each casting.

Before welding is started, full details of the extent and location of the repair, the proposed welding procedure, heat treatment and subsequent inspection procedures are to be submitted to the Society for approval.

3.13 Identification and marking

3.13.1 The Manufacturer is to adopt a system for the identification of all castings, which enable the material to be traced to its original cast. The Surveyor is to be given full facilities for so tracing the castings when required. Each finished casting propeller is to be marked by the Manufacturer at least with the following particulars:

a) Manufacturer's mark

b) grade of cast material or corresponding abbreviated designation

c) heat number, casting number or another mark enabling the full history of the casting to be traced back

d) number of the Society's certificate

e) ice class symbol where applicable

f) skew angle for high skew propellers.

3.13.2 *(1/1/2026)*

When the casting has been accepted the Society's stamp is to be put on with the date of the final inspection of the casting.

3.14 Document and certification

3.14.1 The Manufacturer is to supply the Surveyor with an inspection certificate containing the following details for each casting which has been accepted:

a) Purchaser's name and order number

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Part E

Service Notations

Chapter 2

Pleasure > 24m LLL < 500GT

SECTION 2 MACHINERY - ALTERNATIVES, RELAXATIONS, ADDITIONAL CONSIDERATIONS TO THE REQUIREMENTS SET IN PT C, CH 1

1 Diesel Engine

1.1 Pleasure Duty engines

1.1.1 *(1/1/2025)*

With reference to Pt C, Ch 1, Sec 2, [1.6], in addition to medium and light duty, the pleasure duty as defined below may be assigned. The same relaxations foreseen for light and medium duty apply also to pleasure duty. The parameters for pleasure duty are:

- 500 <= O_{AMAX} <= 1000
- 50<= O_{PMAX} <=100
- Ic >= 0.2
- O_{AMIN} = 500

2 Gears

2.1 Pleasure Duty gears

2.1.1 *(1/1/2025)*

With reference to Pt C, Ch 1, Sec 6, [1.3], in addition to medium and light duty, the pleasure duty as defined below may be assigned.The same relaxations foreseen for light and medium duty apply also to pleasure duty. The parameters for pleasure duty are those in [1.1.1] and with reference to Pt C Ch 1 Sec 6 Tab.2 the safety coefficient to be used are:

- K_A = 1.1
- S_H = 1,0
- S_F = 1,1
- L_{h10a23} (following ISO 281-1) >= 3000h

3 Propeller

3.1 Drawing approval

3.1.1 With reference to Pt C, Ch 1, Sec 8, [1.3], for propeller with diameter of less than 1.5m the approval of the drawing is not required.

4 Piping

4.1 Use of welded and threaded metallic joints

4.1.1 As an alternative to full application of Pt C, Ch 1, Sec 10, Tab 15, use of welded and threaded metallic joints in piping systems,what follow may be applied.

For yachts of less than 300GT: .

- sleeve parallel threaded joint are acceptable on pipes of class III with outside diameter of not more than 60mm if conveying fluid having flash point of more than 60°C
- sleeve tapered threaded joint are acceptable on pipes of class II and III with outside diameter of not more than 60mm if conveying fluid having flash point of more than 60°C.

4.2 Flexible hoses

4.2.1 The requirements Pt C, Ch 1, Sec 10, [2] may be applied as far as it is practicable and at least what required in Tab 1 is to be applied. In Tab 1 are reported the minimum requirements applicable to piping for each system depending on the location.

4.3 Bilge system

4.3.1 With reference to Pt C, Ch.1, Sec.10 [6.5.1] Number and arrangement of pumps, the second pump and suction may be portable.

4.3.2 As an alternative to the portable emergency pump a suitable number of submergible pumps one of each watertight compartment may be accepted.

4.3.3 The total number of pumps for bilge and fire system may be 2 provided that the two pumps are fixed independently powered, located in two different spaces, point c) above is satisfied and the requirement of both the systems are satisfied.

4.3.4 As an alternative to Pt C, Ch.1, Sec.10 [6.5.4] what below may be applied:

Capacity of pumps

a) The capacity of each pump or group of pumps is not tobe less than:

   $Q = 0{,}0058\ d^2$where:

   Q : Minimum capacity of each pump or group of pumps, in m^3/h

   d : Internal diameter, in mm, of the bilge main as defined in [4.3.5].

b) If the capacity of one of the pumps or one of the groups of pumps is less than the Rule capacity, the deficiency may be compensated by an excess capacity of the other pump or group of pumps; as a rule, such deficiency is not permitted to exceed 30% of the Rule capacity.

c) Where an ejector is used in lieu of a driven pump, its suction capacity is not to be less than the required capacity of the pump it replaces.

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Requirements for each service and locations (1)		
System	Machinery space or other spaces with fire risk	Spaces without fire risk
Drinking water, black water and drainage of air-conditioning systems	Metallic hoses, flexible hoses. Flexible hoses shall comply with the following requirements: • the requirements of Pt B, Ch 1, Sec 1, [5.3] are to be complied with. • for piping not connected to the sea through the side of the hull, flexible hoses can be accepted, certified suitable for the service by the manufacturer in compliance with national or international recognized standards. For piping connected to the sea through the side of the hull, flexible hoses certified fire resistant in compliance with ISO 15540/15541 can be accepted, provided that they are certified suitable for the service by the manufacturer • for yachts of not more than 300 GT, the requirements for the scuppers are applicable to piping connected to the sea through the side of the hull. In any case, the hoses are to be certified suitable for use by the manufacturer. • reference is to be made to (2).	Metallic hoses, flexible hoses. Flexible hoses shall comply with the following requirements: • the requirements of Pt B, Ch 1, Sec 1, [5.3] are to be complied with • for piping not connected to the sea through the side of the hull, flexible hoses can be accepted, certified suitable for the service by the manufacturer in compliance with national or international recognized standards. • for yachts of not more than 300 GT, the requirements for the scuppers are applicable to piping connected to the sea through the side of the hull. • in any case, the hoses are to be certified suitable for use by the manufacturer. Reference is to be made to (2).

(1) End connections different from the crimped type may be adopted only for Class III piping

(2)

a) All systems provided with external discharge through the side of the hull are to be fitted with a metallic valve on the side of the hull.

b) The above valve may be omitted provided that:

- for non-sailing yachts, the side discharge is positioned at a point 300 mm above the maximum waterline or a point corresponding to an angle of heel more than 7°, whichever is greater;
- for sailing yachts, the sea discharge is positioned at a point corresponding to an angle more than 30° or more than the angle corresponding to the intersection of the deck with the side, whichever is the lesser;
- for non-sailing yachts, a metallic branch or a branch of material equivalent to that of the hull (i.e. GRP) is fitted from the passage through the hull at a point 300 mm above the maximum waterline or a point corresponding to an angle of heel of 7°, whichever is the greater.

c) In any case, an adequate non-return valve is to be fitted where it is ascertained that under operating conditions the yacht may assume an angle of heel for which the ingress of water cannot be avoided.

d) Where joints are provided between the metallic branch and non-metallic pipe, they are to be adequate for the purpose. If joints with clamps are fitted, they are to be made of stainless steel. At least two clamps are to be fitted for each joint end. In general, the clamps are to be no less than 12 mm in width and are not to be dependent on spring tension to remain fastened.

4.3.5 As an alternative to Pt C, Ch 1, Sec 10, [6.6.1] what below may be applied:

Bilge main line

The diameter of the bilge main is to be calculated according to the following formula:

$d = 0,0085L + 25$

where:

d : Internal diameter of the bilge main, in mm, to be assumed not less than 32 mm

L : Rule length of the yacht, in m.

4.3.6 As an alternative to Pt C, Ch 1, Sec 10, [6.6.3] what below may be applied:

Branch bilge suction pipes

The internal diameter, in mm, of pipes situated between distribution boxes and suctions in holds and machinery spaces is not to be less than the diameter given by the following formula:

$d = 0,085L_1 + 25$

where:

L_1 : Length of the compartment, in m.

4.3.7 *(1/7/2025)*
What required in Pt C, Ch 1, Sec 10, [6] may be applied as far as it is practicable and taking into account Tab 1.

4.4 Scuppers and Sanitary discharges

4.4.1 What required in Pt C, Ch 1, Sec 10, [8] may be applied as far as it is practicable and taking into account Tab 1.

4.5 Air pipes, sounding and overflow pipes

4.5.1 As an alternative to Pt C, Ch 1, Sec 10, [9.1.3]d) what follows may be applied.
Air pipes fitted on the side of the vessel may be accepted provided that the pipe is raised to a point close to the main deck. In any case, means are to be adopted to prevent oil spillage.

4.5.2 *(1/7/2025)*
With reference to Pt C, Ch 1, Sec 10, [9.4] may be applied as far as it is practicable and taking into account Tab 1.

4.6 Fuel oil System

4.6.1 What required in Pt C, Ch 1, Sec 10, [11] may be applied as far as it is practicable and taking into account Tab 1.

4.7 Lubricating oil System

4.7.1 What required in Pt C, Ch 1, Sec 10, [12] may be applied as far as it is practicable and taking into account Tab 1.

4.8 Hydraulic oil System

4.8.1 What required in Pt C, Ch 1, Sec 10, [13] may be applied as far as it is practicable and taking into account Tab 1.

4.9 Compressed air System

4.9.1 *(1/1/2026)*
What required in Pt C, Ch 1, Sec 10, [14] may be applied as far as it is practicable and taking into account Tab 1.

4.10 Exhaust Gas System

4.10.1 What required in Pt C, Ch 1, Sec 10, [15] may be applied as far as it is practicable and taking into account Tab 1.

4.11 Certification, Inspection and Testing on Piping

4.11.1 What required in Pt C, Ch 1, Sec 10, [17] may be applied as far as it is practicable and relaxations may be agreed with the Society.

5 Steering System

5.1 Control of the steering gear

5.1.1 As an alternative to Pt C, Ch 1, Sec 11, [2.2.1]. Control of the main steering gear may be according to what follows.

a) Control of the main steering gear is to be provided on the navigation bridge.

b) Where the main steering gear is arranged so that the main steering gear comprises two or more power units, two independent control systems are to be provided, both operable from the navigation bridge. This does not require duplication of the steering wheel or steering lever.

5.1.2 As an alternative to Pt C, Ch 1, Sec 11, [2.2.1]. Control of the auxiliary steering gear may be according to what follows.

a) Control of the auxiliary steering gear is to be provided in the steering gear compartment or at the local steering control position.

b) If the auxiliary steering gear is power operated, its control system is also to be independent of that of the main steering gear.

5.2 Rudder angle indication

5.2.1 As an alternative to Pt C, Ch 1, Sec 11, [2.7.4]. The angular position of the rudder is to be:

a) indicated on the navigating bridge, if the main steering gear is power operated

b) recognisable in the steering gear compartment, as applicable, or at the local steering control station.

6 Tests on board

6.1 Main propulsion engines driving fixed propellers

6.1.1 *(1/1/2026)*

With reference to Pt C, Ch 1, Sec 16, [3.3.5] a) for yachts having gross tonnage less than 300 GT, the duration of the test can be reduced to 30 minutes, provided, however, that the TASNEEF surveyor in charge of the checks considers this duration exhaustive.

7 Plastic pipes

7.1 General

7.1.1 As an alternative to Pt C, Ch 1, App 3 the requirements set in [4] and App.1 may be applied.

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SECTION 4 FIRE PROTECTION - ALTERNATIVES , RELAXATIONS, ADDITIONAL CONSIDERATIONS TO THE REQUIREMENTS SET IN PT C, CH 4

1 General

1.1 Application

1.1.1 This Alternatives, Relaxations, Additional consideration to Pt C, Ch 4, Sec 1 to Sec 9 are in addition to those of Pt C, Ch 4, App 1.

2 Fire containment

2.1 Class divisions

2.1.1 *(1/1/2026)*

With reference to Pt C, Ch 4, Sec 3 as an alternative to [3.1.2] to [3.1.5] and [2.1.1] of Pt C, Ch.4, App 1 what below may be applied.

For yachts exceeding 300 GT built of composite material ~~and~~ alluminium and wood, category A machinery spaces are to be totally enclosed by B-15 class boundaries.

For the foregoing yachts, galleys are to be totally enclosed by B-0 class boundaries (bulkheads, side shell and deck heads). Windows within the exterior hull or superstructure within this boundary are not expected to meet "B-0" standards. It is not necessary to extend the fire insulation below the minimum waterline.

For yachts of less than 300GT, and for yachts made of steel of any GT what above is not mandatory.

With reference to Pt C, Ch 4, Sec 3, [3.1.8] and [3.7.1], the Society may evaluate the possibility to accept a window on the bulkhead dividing the engine control room not located inside the engine room and the engine room itself provided that its dimension is less than 0,5m2 and it is certified with A-60 fire class.

2.1.2 *(1/1/2025)*

Pt C, Ch 4, Sec 3, [3.2.3] is not mandatory.

2.1.3 With reference to Pt C, Ch 4, Sec 3 as an alternative to [4.1.2] and [2.2.1] of Pt C, Ch 4, App 1 what below may be applied.

For yachts exceeding 300 gross tonnage, ventilation ducts serving category A machinery spaces, galleys, spaces containing vehicles or craft with fuel in their tanks, or lockers containing fuel tanks are not to cross accommodation spaces, service spaces or control stations unless the trunking is constructed of steel (minimum thickness 4 mm) or the walls are equivalent to B-15 class divisions for machinery spaces and B-0 class divisions for galleys to a point at least 5 metres from the space concerned.

Where the trunking passes from the machinery space or galley into the accommodation, automatic fire dampers are to be provided in the deck or bulkhead within the accommodation.

The automatic fire dampers are also to be manually operable from outside the machinery space or galley.

The requirements above also apply to ventilation ducts for accommodation spaces passing within category A machinery spaces.

For yachts of less than 300GT what above is not mandatory.

2.1.4 With reference to Pt C, Ch 4, Sec 3, [4.1.9] the above means may be avoided for openings located at least 1m above the freeboard deck and 0,5m above the 1st tier superstructure deck or above.

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