Guidance Notes On

Yacht Design

January 2022
**Foreword (2022)**

These Guidance Notes outline alternative arrangements of yachts that may be accepted based on approval by the flag Administration. These Guidance Notes address key design issues that are increasingly applied to the new construction of yachts. The recommendations in these Guidance Notes are based on the Red Ensign Group Yacht Code, as well as IMO Unified Interpretations (UI) TM.5/Circular 6. Technical background is also provided.

These Guidance Notes cover statutory requirements including the Red Ensign Group Yacht Code, the International Convention on Load Lines (ICLL), and the International Convention on Tonnage Measurement. This document also discusses statutory requirements that have been adopted into the ABS Guide for Building and Classing Yachts.

The January 2022 edition clarifies the sections for sill heights, windows and storm shutters, reduced freeing ports, and portable ventilator covers, relocates portlights and deadlight covers to the Yacht Guide, updates the section for steel guard rails, introduces a section on glazed bulwarks, and replaces the references to the superseded MCA LY3 Code with the new Red Ensign Group Yacht Code.

These Guidance Notes become effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of these Guidance Notes is the most current.

*We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.*

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**1 Introduction (2022)**

ABS recognizes that new, innovative design and arrangements of yachts may not be fully addressed by the ABS Guide for Building and Classing Yachts (Yacht Guide), and yet are increasingly applied to the new construction of these vessels. These Guidance Notes have been developed to provide information to designers, builders, and flag Administrations on arrangements that have been previously approved to have an equivalent level of safety to that outlined in the Yacht Guide.

In addition to Statutory Regulations such as International Convention on Load Lines (ICLL) and Tonnage, the Large Yacht Code is widely used by designers and owners’ flag Administrations as the basis for yacht design and construction. The Code has been developed with the intention of setting pollution prevention and safety standards that identify the specific needs of vessels in commercial use for sport and pleasure.

**3 Scope and Application**

These Guidance Notes should be considered as general guidance only and technical reviews should be verified in compliance with the Yacht Guide.

Exemption certificates should be issued to indicate that the flag Administration has accepted an arrangement that does not comply with the applicable statutory regulations. Equivalency will be considered and may be granted to indicate acceptance of alternative arrangements for equivalent levels of safety. Acceptance of an equivalent arrangement should be documented by ABS.

These Guidance Notes apply to commercial and non-commercial yachts.

**5 Flag and Recognized Organization**

ABS is a Recognized Organization (RO) that carries out surveys and issues or endorses Statutory Certificates on behalf of a flag Administration and complies with the RO Code (Resolution Msc.349(92) (Adopted On 21 June 2013), Code For Recognized Organizations, and/or MLC, 2006.

This document is intended to discuss statutory regulations that cover buoyancy, stability and tonnage. Class requirements such as hull structures and machinery requirements are not within the scope of these Guidance Notes. However, there are statutory requirements that have been adopted in the Yacht Guide, and some of those are covered in these Guidance Notes.

**7 Process for Granting Equivalency for Statutory Requirements**

Equivalencies are alternative yacht designs and arrangements that may be authorized if found to provide an equivalent level of safety to that provided by the applicable standard.
Requests for equivalency determinations of statutory requirements should be forwarded to the flag Administration for consideration, along with the ABS recommendation regarding the merits of the proposed alternative. The flag Administration will review the equivalency request and take appropriate action.

ABS is not authorized to approve equivalencies or grant exemptions on behalf of flag Administrations for statutory requirements.

9 Change of Flag

When a yacht changes flag Administration, all statutory certificates need to be reissued. This requires that exemptions and equivalencies be approved by the new flag Administration.

11 Definitions

Sill Height: The vertical distance from the deck to the lower edge of the access opening (i.e., downflooding point). If the deck in way of the opening has a camber, the sill height to be considered is the least height of the opening above the deck.

Enclosed Space: A space that is bounded by the vessel’s hull, by fixed or portable partitions or bulkheads, or by decks or coverings other than permanent or movable awnings. No break in a deck, nor any opening in the vessel’s hull, in a deck or in a covering of a space, or in the partitions or bulkheads of a space, nor the absence of a partition or bulkhead precludes the space from being included in the total volume of all enclosed spaces.

Negative Sill Height: The vertical distance from deck to the lowest edge of a gutter (below the deck).

Statutory Requirement: Requirements which are applicable by virtue of laws enacted by a government. These are enacted by passing the law in the legislative assembly or parliament.

LL-11D: An attachment form to the ship Load Line Certificate showing the layout of the ship and all weather exposed openings on the ship.

13 Abbreviations and Acronyms (2022)

The following acronyms are use in these Guidance Notes:


RO: Recognized Organization

ICLL: International Convention on Load Lines

IMO: International Maritime Organization

ITC 69: The International Convention on Tonnage Measurement of Ships

1 **General**

The stability, buoyancy, freeboard, and subdivision characteristics of a yacht should be designed, constructed, and maintained to provide an adequate reserve of buoyancy in all foreseeable intact and damaged conditions in the environment for which the yacht is expected to operate.

These Guidance Notes provide considerations that may be given to alternative arrangements that provide an equivalent level of safety in respect to downflooding and green sea loading.

3 **Doorways, Companionway and Access Sill Heights**

The heights above deck of the coamings, the sills of companionways and access openings, should not be less than given in 3-2-10/5.1 TABLE 1 of the *Yacht Guide*.

3.1 **Negative Door Sill Height**

A negative sill height consists of a channel or gutter with a cover grill on top allowing water to drain down and out through scuppers underneath the gutter.

A negative sill height may be considered for doors in protected locations as an alternative/equivalent level of safety to sill height requirements in 3-2-10/5 of the *Yacht Guide* and 5.3 of the *Large Yacht Code*, provided the following are satisfied and subject to the flag Administration’s approval:

- i) The depth of the gutter in way of the bottom of the door should be at least 150 mm (515/16 in.)
- ii) Drainage capacity of the drainage channel should be demonstrated to at least the maximum capacity of the main fire pump and be tested on board and verified by the attending Surveyor.
- iii) The channel cover/grating should extend to at least the outboard edges of the doors and have enough open area to rapidly drain the deck of water but be small enough to avoid issues with crew/passengers walking on them.
- iv) The drainage arrangements will not be effective when the door is open. Therefore, the door should be weathertight and appropriately tested to the satisfaction of the attending Surveyors. The doors should be kept closed during open ocean voyage or heavy weather and may be opened in port or in a sheltered area. Door open/closed indicators should be provided in the navigation bridge, and local audible and visual alarms should be provided for when the vessel is on voyage or during heavy weather. Signs should be posted near the doors, and the restrictions should be placed in the LL-11D, Stability Booklet and Operations Manual. Depending on door location and installation, enhanced arrangements to protect from water ingress may be required.
- v) The door can be only considered as a secondary means of escape, and therefore, another weathertight door at the same deck level with the required sill height should be provided as a
primary means to enter and exit the structure while at sea and on voyage unless an alternative arrangement is accepted by the flag Administration.

vi) Effective means should be provided to keep scuppers and gutters clean and always open for draining. Instructions should be included in the Operations and Maintenance Manual.

vii) Scuppers penetrating the side shell should comply with the Yacht Guide, Large Yacht Code, and the International Convention on Load Lines (ICLL).

viii) All weather decks should be provided with freeing ports in accordance with the Yacht Guide and Large Yacht Code.

ix) Superstructres/deckhouse spaces to which the door with negative sill gives access should not be considered as buoyant in the stability calculation unless agreed to by the flag Administration.

ABS acceptance of negative sill height is on a case-by-case basis and is subject to flag Administration approval.

3.3 Reduced Sill Height of Door Openings (2022)
Reduced sill heights on external doors in the deckhouse or superstructure, including companionways, that give access to spaces below the weather deck may be considered, provided the heights are in accordance with 5.3 of the Large Yacht Code, and the door sill height in position 1 should not be less than 150 mm ($5\frac{1}{16}$ in.).

Further reductions in sill height of door openings may be considered, on a case-by-case basis and subject to flag Administration approval, provided the following conditions are satisfied:

i) The door should normally be closed while in an open ocean voyage but may be left open in port or sheltered area. The door can be only considered as a secondary means of escape, and therefore, another weathertight opening at the same deck level with the required sill height should be provided as a primary means to enter and exit the structure while at sea and on voyage unless an alternative arrangement is accepted by the flag Administration.

ii) Signs should be posted near the doors, and restrictions should be placed in the LL-11D, Stability Booklet and Operations Manual.

iii) Door open/closed indicators should be provided on the navigation bridge, and a local audible and visual alarm should be provided for when the vessel is on voyage.

iv) Overall minimum sill height should not be less than 75 mm (2.95 in.) for Position 1 and 50 mm (1.97 in.) for Position 2. In case of a lower sill height, the arrangement should be reviewed in accordance with 2/3.1 above.

v) Superstructres/deckhouse spaces to which the door with negative sill gives access should not be considered as buoyant in the stability calculation unless agreed to by the flag Administration.

Where actual freeboard to the weather deck exceeds the required ICLL value by at least one standard superstructure height, openings on that deck, abaft of the forward quarter, may be assumed to be in Position 2, subject to flag Administration approval.

3.5 Reduced Sill of Hatch Opening (2022)
Reduced sill heights on hatch openings that give access to spaces below the weather deck, including hatch-companionways, may be considered, provided the heights are in accordance with 5.3 of the Large Yacht Code and the hatch sill height in Position 1 is not less than 150 mm ($5\frac{1}{16}$ in.).

Further reductions in sill height of hatch openings may be considered on a case-by-case basis and subject to flag Administration approval, provided the following conditions are satisfied and subject to flag Administration approval:
i) The hatch should normally be closed while in an open ocean voyage but may be left open in port or in sheltered area. The hatch can be only considered as emergency means of escape, and therefore, another weathertight opening at the same deck level with the required sill height should be provided as a primary means to enter and exit the structure while at sea and on voyage unless an alternative arrangement is accepted by the flag Administration.

ii) Signs should be posted near the doors and restrictions should be placed in the LL-11D, Stability Booklet and Operations Manual

iii) Hatch open/closed indicators should be provided on the navigation bridge, and a local audible and visual alarm should be provided for when the vessel is on voyage.

Where actual freeboard to the weather deck exceeds the required ICLL value by at least one standard superstructure height, openings on that deck, abaft of the forward quarter, may be assumed to be in Position 2, subject to flag Administration approval.

5 Windows and Storm Shutters (2022)

Storm shutters (strong protective covers with fittings) are required for all windows in the front and sides of the first tier and front windows of the second tier of the superstructure or weathertight deckhouse.

Exemptions to the use of storm shutters may be considered provided the following conditions are complied with and subject to flag Administration’s approval:

i) The glass should be of laminated construction.

ii) The glazed openings meet an enhanced structural standard (i.e., a factor of 1.5 is applied to the design pressure defined in 3-2-12/5.3 of the Yacht Guide).

iii) Testing of windows should be carried out in accordance with 3-2-12/5.5.3 (Hydrostatic Verification) of the Yacht Guide, considering a factor of safety equal to four times the design pressure defined in 3-2-12/5.3 of the Yacht Guide.

iv) Provision of blanking plate(s) (a plate capable of being fixed over a broken window) should be provided so that any window opening may be sealed in the event of glass failure. When blanking plates are interchangeable port and starboard, a minimum of 50% of each size should be provided.

v) Proper instructions should be included in the operating manual.

7 Reduced Freeing Ports (2022)

Freeing ports are to be arranged in accordance with 3-2-12/3 of the Yacht Guide.

Freeing ports arrangements meeting the requirements of Sect. 6 of the Large Yacht Code may be considered equivalent to the above requirements.

Reduced freeing ports area may be specially considered subject to flag Administration's approval.

9 Guardrails (2022)

Requirements for steel guardrails are provided in 3-2-12/1.5 of the Yacht Guide.

Alternative guardrail arrangements may be specially considered subject to submission and satisfactory review of documentation demonstrating the adequacy of the design for each location and satisfactory test carried out in the presence of the Surveyor.

The following approach can be used for the design of an alternative arrangement.

For Pleasure and Commercial Yachts, a guard rail stanchion spacing up to 2200 mm (86.61 in.) may be accepted as allowed by 3-2-12/5.7 of the Yacht Guide.
For Passenger Yachts, the maximum spacing is 1500 mm (59.05 in.).

The distances between the courses and their scantlings should be in line with the present prescriptive requirements in 3-2-12/1.5 of the *Yacht Guide*.

For strength of guardrail stanchions, in lieu of the prescriptive requirement in 3-2-12/1.5 of the *Yacht Guide*, the scantlings may be based on an equivalent strength.

The stanchions strength should be checked considering a design force applied at the stanchion’s top equal to 850 N (58.26 lbf) x \(a\), where \(a\) is the maximum distance in meters (ft) between the stanchions.

The force applied at the top of the stanchion should be not less than 1045 N (234.93 lbf).

The allowable stress should be the yielding strength of the stanchion material divided by a safety factor of 1.67.

For aluminum, an additional material factor 0.9 x \(Q\) as defined in 3-2-12/7.1 of the *Yacht Guide* shall be considered in the case of welded connection.

A practical test may be required through the application of a proof force (determined as above and increased by the safety factor considered in the scantlings assessment), applied at the top of the stanchion.

The test procedure should be submitted for review and the test properly witnessed by the attending ABS Surveyor.

Final acceptance of alternative arrangements is subject also to the flag Administration approval

### 11 Glazed Bulwarks (2022)

Glazed bulwarks are frequently used in yacht construction in lieu of typical bulwarks or guardrails to provide safety for crew and passengers.

Fully glazed bulwarks used aesthetically may always be considered if stanchions and guardrails complying with the Rules are fitted inside the bulwark for crew protection. ABS acceptance of glazed bulwarks is on a case-by-case basis and is subject to flag Administration approval.

Fully glazed bulwarks are not acceptable on the main weather deck. Glazed bulwarks can be fitted between vertical stanchions and top rail in accordance with 3-2-12/1.11 of the *Yacht Guide*.

For locations on superstructure/deckhouse decks, fully glazed bulwarks without stanchions or top rail can be considered, provided the following conditions are complied with:

1. **Arrangement, material, and strength:**
   - Glazing material should be of laminated toughened safety glass type.
   - The height of glazed bulwark should not be less than 1.0 m (3.28 ft).
   - Maximum panel width should be approximately 1.5 m (4.92 ft) and, in any case, not to exceed 2.2 m (7.22 ft).
   - Glass panels should be effectively supported at the lower end. The depth of structural glass support is not to be less than 100 mm (3.94 in.).
   - Direct contact between metal supporting structures and glass should be prohibited.
   - Glazed panels should be designed considering a minimum linear load of 850 N/m (58.26 lbf/ft) applied on the top edge and with a Safety Factor of 4 on the breaking strength of the laminated glass and a maximum deflection at the top of the panel of 1/50 of the
unsupported panel height. Proper supporting calculations should be submitted by the designer.

g) Supporting deck structures should be designed considering a minimum linear load of 850 N/m (58.26 lbf/ft) applied on the top edge with a Safety Factor of 1.67 on the yielding strength of the material. Proper supporting calculations should be submitted by the designer.

ii) Proper load tests should be carried out on a sample representative of the largest panel and relevant connection to the desk structures as described below. The test procedure should be submitted for review and test properly witnessed by the attending ABS Surveyor:

   a) A static load test with a test load of 1.67 x 850 (58.26) = 1,420 N/m (97.29 lbf/ft) applied at the top edge for at least 1 minute. No permanent deformation shall be found at the completion of the test.

   b) A dynamic test carried out with a "hard body" of 50 kg (110.2 lb) falling from a height of 1.5 m (4.92 ft) applied at the center of the panel (Ref. to EN13049). No glass breakage and no permanent deformation shall be found at the completion of the test.

iii) Proper arrangement for installation of portable stanchions and lifelines to be put in place in case of glass breakage should be provided. Scantlings of portable stanchions and their connection to the deck structures should be in compliance with Sect. 3-2-12/1.5 of the Yacht Guide and Subsection 2/9 above.

iv) Freeing port arrangement shall be in accordance with applicable class/statutory requirements for the specific location under consideration.

v) Glazed bulwarks shall not be located in essential areas like muster stations, lifebuoys stations, or lifting davits.

vi) No sharp edges of the glass panels should remain exposed.

vii) The use of forward facing glazed bulwarks on superstructures and deckhouses forward of 0.5L should be avoided if possible. If used, a higher design load may need to be applied for possible green water impacts.

viii) Proper attention should be paid to the use of glass with significant curvature due to the potential fire risks.

Final acceptance of alternative arrangements is also subject to the flag Administration approval.

13 **Portable Ventilator Covers (2022)**

Portable ventilator covers may be considered as an alternative to the permanently attached closing device as required by 3-2-12/7.3.3 of the Yacht Guide provided the following are satisfied, and subject to flag Administration approval:

i) Covers can be easily and safely installed by one person while vessel is at sea or in the event of bad weather conditions.

ii) Alternative means of engine room ventilation are provided.

iii) Proper instructions are included in the Operations Manual.

iv) Openings should be considered as downflooding point during stability assessment.

15 **Rupture Discs**

15.1 **General (2022)**

Rupture discs are fittings that may be installed in a horizontal watertight boundary. They contain membranes that fail at a predetermined differential pressure (or head pressure), allowing water to pass
through the boundary. This allows vertical cross flooding to occur from a damaged upper space to a lower, intact space.

Most damage stability requirements for commercial yachts (such as the Large Yacht Code) are considered to be for “minor damage”, wherein only one watertight space is flooded due to a puncture of the hull, and damage does not occur to any vertical, horizontal, or longitudinal watertight bulkhead.

In order to comply with the applicable “minor” damage stability requirements, rupture discs may be installed to allow vertical cross flooding between two watertight dry spaces that are located between the same set of adjacent transverse subdivision bulkheads. The arrangement is to be purely mechanical and passive. Longitudinal cross flooding through transverse subdivision bulkheads is not permitted.

The use of rupture discs is subject to flag Administration approval.

15.3 Location

Rupture discs are permitted to be fitted only between dry spaces. Installation in bulkheads forming the boundary of a tank containing liquids is not permitted. The discs should be located as close as possible to the sides of the vessel. The longitudinal location should be as close as possible to the forward and aft extremities of the compartment and the position may need special consideration on a case-by-case review basis, depending on the vessel’s expected trim.

15.5 Installation

Rupture discs should be installed and maintained in strict accordance with the manufacturer’s instructions.

In order to anticipate disc failure and to minimize the amount of seawater necessary to rupture the discs, it is recommended that the rupture discs be installed in a recess of the internal deck/horizontal watertight boundary. The height of the recess should not be less than the head of water corresponding to the rupture disc opening pressure.

An easily removable grating or other means should be installed over each disc to prevent debris from blocking the drain. The total open area ratio of the grating to the relevant disc should be at least six to one. The grating should be installed so as to prevent large objects from blocking the discs. No openings in the grating should be greater than 25 mm (1 in.).

Areas around the rupture discs should be kept clear of equipment and stores, and not otherwise be obstructed. Arrangements should be such that discs’ conditions can be easily checked at regular intervals.

15.7 Damage Stability

The damage stability criteria are to be complied with during intermediate stages of flooding, considering that cross flooding will start when the head of water in the damaged compartment (at the location of the rupture discs) is equal to discs’ bursting pressure. The intermediate stages of flooding can be defined based on IACS Recommendation No. 110 para. 9.3.

The net area of the rupture discs on each side of the compartment is to be such that cross flooding will complete (i.e., the lower cross flooded volume is completely filled) within three (3) minutes of the discs’ rupture.

Damage stability calculations, including the intermediate stages of flooding together with hydraulic calculations of the three (3) minute cross flooding time, may be submitted as supporting documentation.

15.9 Annual Survey

Shop tests on at least two (2) samples should be carried out to demonstrate the ability of the discs to rupture at the predetermined pressure. Tests should be witnessed by an ABS Surveyor.
The discs and their arrangements should be examined by an ABS Surveyor at each Annual Survey.

15.11 **Guidance for Master/Crews**

Rupture disc arrangement and the relevant operational and maintenance instructions should be included in the approved Trim & Stability Booklet and/or the approved Operating Manual.

A clearly visible sign or marking should be provided in way of the recesses/discs stating that they are not to be covered or obstructed.
SECTION 3
Tonnage

1 General
The tonnage admeasurement process calculates both the total enclosed volume of a vessel (gross tonnage) as well as its total cargo capacity (net tonnage). These tonnage values are referred to by flag Administrations when determining which statutory requirements are applicable to a vessel. Such statutory regulations include, but are not limited to, those dealing with vessel safety, vessel security, and environmental protection regulations. Additionally, tonnage values are used during the assessment of taxes and fees.

This Section covers the volume measurement of spaces that may be exempted in accordance with IMO Unified Interpretations TM.5/Circ. 6, as well as the spaces accepted as exempt by the yacht industry as a whole.

3 Above Deck Enclosed Space Guidelines

3.1 Enclosed Space Exceptions
Enclosed spaces above the upper deck not exceeding 1 m³ (35.3 ft³) may be excluded in the total volume of all enclosed spaces in accordance with IMO Unified Interpretations (UI) TM.5/Circular 6.6-1, subject to flag Administration approval.

3.3 Inaccessible Spaces (Enclosed Bulwark, Fairing Structure, Engine Room Air Trunk, etc.)
Inaccessible spaces above the upper deck created for aesthetic reasons (e.g., enclosed bulwarks, enclosed fairing structures, engine room ventilation trunks, etc.) having a cross-sectional area not exceeding 1 m² (10.8 ft²) and separated on all sides from other enclosed spaces may be excluded from the total volume of all enclosed spaces in accordance with IMO UI TM.5/Circ. 6 Reg. 2(4)-6 and Reg. 1(3)-1, subject to flag Administration approval.

3.5 Furniture, Sofas, and Beds on Open Decks
Furniture, sofas, and beds on open decks each not exceeding 1 m³ (35.3 ft³) in volume may be excluded in the total volume of enclosed spaces in accordance with TM.5/Circ. 6 Reg.6-1. Furniture, sofas, and beds on open decks exceeding 1 m³ (35.3 ft³) in volume and not considered to be permanently fixed furniture (i.e., not welded to the hull/superstructure but simply bolted to avoid shifting) may be excluded from the total volume of the enclosed space, subject to flag Administration approval.

3.7 False Ceilings
Completely inaccessible false ceilings above the upper deck bounded on at least one side by aesthetic plates or fairing structures may be excluded in the total volume in accordance with IMO UI TM.5/Circ. 6 Reg. 1(3)-1, subject to flag Administration approval.
3.9 Enclosed Space Covered by Gratings

Spaces such as those covered by louver gratings of tender garage, spaces fitted with any means for securing cargo or stores, and openings that are fitted with any means of closure, or whose construction provides any possible means of such openings being closed are considered as enclosed spaces and included in the total volume in accordance with IMO UI TM.5/Circ. 6 Reg. 2(5)-3.2.

However, this volume may be excluded for new construction upon approval of the flag Administration, provided a statutory memo is added to the Record stating that at each annual survey the attending Surveyor will confirm in the report that openings in such spaces should not be covered with means of enclosure, shelves, or other means of securing cargo or stores.
References (2022)

2) ABS Guide for Building and Classing Yachts
3) The International Convention on Tonnage Measurement of Ships (ITC 69)
4) International Maritime Organisation (IMO) Unified Interpretation TM.5/Circ. 6
5) USCG-M-1-90, Loadline Technical Manual
6) MTN 01-99-CH9, USCG Marine Safety Center Technical Note