GUIDANCE NOTES ON

YACHT DESIGN

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Foreword

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 MCA LY3 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 MCA LY3 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*.

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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SECTION 1 General

1 Introduction

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 MCA LY3 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

The following acronyms are use in these Guidance Notes:

MCA LY3:	Maritime and Coastguard Agency, Large Commercial Yacht Code, Third Edition
RO:	Recognized Organization
ICLL:	International Convention on Load Lines
IMO:	International Maritime Organization
ITC 69:	The International Convention on Tonnage Measurement of Ships
LL-11D:	International Convention on Load Lines, 1966 (IMO Standard Form) Record of Condition Assessment

SECTION 2 Buoyancy and Stability

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/Table 1 of the *Yacht Guide.* External doors in the deckhouse or superstructure that give access to spaces below the weather deck should be fitted with coamings with heights in accordance with 5.2.1.1 of the MCA LY3 Code.

The door sill height in position 1 should not be less than 150 mm ($5^{15}/_{16}$ in.) according to 3-2-10/5 of the *Yacht Guide* and is required for unrestricted yachts at location C in accordance with 5.2.1.1 of the MCA LY3 Code. Position 1 refers to the first tier of the superstructure above the main deck and includes the second tier forward of the quarter length. Refer to 3-2-10/3 of the *Yacht Guide* for a detailed description.

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 as an alternative/equivalent level of safety to sill height requirements in 3-2-10/5 of the *Yacht Guide* and 5.2.1.1 of the MCA LY3 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 ($5^{15}/_{16}$ in.) for doors in position 1.

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.

v) Another weathertight door on the main deck with a sill height of at least 150 mm ($5^{15}/_{16}$ in.) should be provided as a primary means to enter and exit the structure while at sea and on voyage.

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*, MCA LY3, 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 MCA LY3.

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

Reduced sill height of door openings may be considered as an alternative/equivalent level of safety to sill height requirements in 3-2-10/7.3 of the *Yacht Guide* and 4.4.3.1 of the MCA LY3 Code may be accepted, subject to flag Administration approval, provided the following are satisfied:

i) The door is normally closed while in an open ocean voyage but may be left open in port or sheltered area.

ii) Signs are posted near the doors and restrictions are to 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.

3.5 Reduced Sill of Hatch Opening

Reduced sill height of hatch openings may be considered as an alternative/equivalent level of safety to sill height requirements in 3-2-10/5.1 of the *Yacht Guide* and 5.2.2.1 of the MCA LY3 Code may be accepted provided the following are satisfied and subject to flag Administration approval:

i) The hatch is normally closed while in an open ocean voyage but may be left open in port or in sheltered area.

ii) Signs are posted near the doors and restrictions are to 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.

5 Storm Shutters on Window

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 in accordance with 5.5.7 of the MCA LY3 Code.

Exemptions to the use of storm shutters may be considered provided the following are satisfied with in accordance with 5.5.2 and 5.5.7 of the MCA LY3 Code and subject to flag Administration's approval:

i) The glass is of laminated construction.

ii) Testing of windows is carried out at four times the required pressure derived from an appropriate national or international standard in accordance with 5.5.2 of the MCA LY3 Code or glass laminated window thickness exceeds the requirements of the applied standard specified in 5.5.1 of the MCA LY3 Code by a minimum of 30% in accordance with 5.5.7.1 of the MCA LY3 Code.

iii) Provision of blanking plate(s) (a plate capable of being fixed over a broken window) is 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 in accordance with 5.5.7.1 of the MCA LY3 Code.

iv) Proper instructions are included in the operating manual.

7 Portlights, Windows, and Deadlight Cover

7.1 Portlights

Portlights are heavy glass covers for portholes that can be opened for air or sealed shut when the seas are rough. Portlights are defined as being round openings traditionally, but can be of an oval or rectangular shape with an area not exceeding 0.16 m^2 (1.72 ft^2).

Large portlights in the main hull below the level of the freeboard deck may be considered in lieu of the maximum standard size [i.e., 0.16 m^2 (1.72 ft^2)] permitted in 3-2-12/5.1 of the *Yacht Guide* and 5.4.4 of the MCA LY3 Code provided that prototype tests (watertightness and mechanical strength) are carried out for both the glass and the deadlight, subject to flag Administration approval:

Provided the strength is equivalent to the standard size, additional external glass is optional, but is not mandatory.

7.3 Portable Deadlight Covers

Deadlights are steel, or equivalent, covers fitted to a side porthole, scuttle, or window that, when secured, provide a watertight/weathertight seal.

Portable deadlight covers may be considered as an alternative to the fixed requirements in 3-2-12/5.1i) of the ABS *Yacht Guide* and 5.4.2 of the MCA LY3 Code provided the following are satisfied in accordance with 5.4.2 of the MCA LY3, and subject to flag Administration approval:

i) The installation of deadlight cover is easily carried out by a single person.

ii) Deadlight cover is stored close to the portlight.

iii) Proper instructions are included in the operating manual.

9 Reduced Freeing Ports

Where wells are formed on the decks exposed to the weather, ample provisions should be made for rapid freeing and draining of water in accordance with Annex I Reg. 24 of the ICLL and 3-2-12/3 of the *Yacht Guide*. Drainage should be provided for all sections of the deck.

Reduced freeing ports may be considered in lieu of the requirements in Annex I Reg. 24 of the ICLL and 3-2-12/3 of the *Yacht Guide* provided that the requirements of 6.1 and 6.2, as applicable, of the MCA LY3 Code are satisfied, and subject to flag Administration approval.

11 Glazed Bulwark

Glazed bulwarks are used in yacht construction in lieu of typical bulwarks or guardrails (made of steel or aluminum) to provide safety for crew and passengers as per 3-2-12/1.11 of the *Yacht Guide*.

Full glazed bulwarks used aesthetically may be considered if the stanchions and guardrails 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.

13 Portable Ventilator Covers

Portable ventilator covers may be considered as an alternative to the permanently attached closing device as required by 5.6.2 of the MCA LY3 Code and 3-2-12/7.3.3 of the *Yacht Guide* provided the following are satisfied, and subject to flag Administration approval:

i) Covers are installed 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.

15 Rupture Discs

15.1 General

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 LY2 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 m^3 (35.3 ft^3) 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 m^2 (10.8 ft^2) 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 m^3 (35.3 ft^3) 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 m^3 (35.3 ft^3) 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.

APPENDIX 1 References

1 MCA LY3 Code, *The Large Commercial Yacht Code, Third Edition*

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*

7 ICLL, *International Convention on Loadlines, 1966 and protocol of 1988, as amended in 2003*