

Hull Configurations, Freeboard and Stability Requirements for Small Boats

Interim Technical Note (ITN-01-20)

February 2020

General Purpose

Interim Technical Notes (ITNs) provide supporting information on specific technical issues or areas related to maritime rules or marine protection rules. The material in this ITN should not be treated as a substitute for the rules, which are the law. This ITN may be replaced with or clarified by operational guidance or an advisory circular at a later date.

Application

This ITN provides clarification on the application of Maritime Rule 40A.15(1) and 40C.15(2) which relate to hull configurations of small boats and their corresponding freeboard requirements.

This ITN applies to:

- Passenger ships which are less than 24 metres and do not carry cargo (to which Maritime Rule 40A.15(1) applies); and
- Non-passenger ships which are less than 24 metres and do not carry cargo (to which Maritime Rule 40C.15(2) applies).

This ITN does not apply to:

- Passenger ships which are 6 metres or less solely engaged in recreational diving (to which Maritime Rule 40A.64(1) applies).

Background

• Deck types

The **cockpit** and **well deck** are defined in both Maritime Rule 40A.2 and Maritime Rule 40C.2.

The definitions (using Maritime Rule 40A.2 as example) are:

Terminology	Definition
<i>cockpit</i>	<i>an exposed recess in the weather deck of a ship that extends not more than one half of the length overall of the ship</i>
<i>well deck</i>	<i>a weather deck, watertight against a head of 1.2 metres of seawater, which is fitted with solid bulwarks such as would impede the drainage of solid water over the sides. If the freeboard to this deck, measured from the designed load waterline is less than 250 mm the vessel shall be considered as an open boat for the purposes of subdivision,</i>

	<i>stability, and drainage requirements. The deck within the bulwarks is considered to be a weather deck unless it is completely enclosed by a weathertight superstructure</i>
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• **Hull configurations**

The **fully decked boat**, **partially decked boat** and **open boat** are defined in Maritime Rule 40A.2 and Maritime Rule 40C.2.

The definitions (Maritime Rule 40A.2 as example) are:

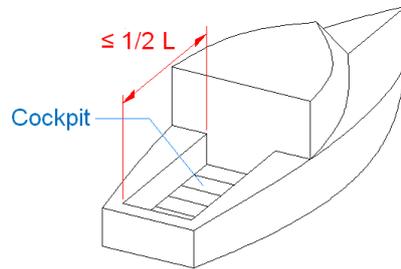
Terminology	Definition
<i>fully decked boat</i>	<i>a boat in which the horizontal projection of the sheerline area comprises decking with opening appliances which are weathertight. The horizontal projection of the sheerline area may also include – (a) a watertight self-draining cockpit complying with rule 40A.15(1)(c); and (b) other watertight recesses of volume less than the product of length overall × maximum beam × minimum freeboard, divided by 40 (m³)</i>
<i>partially decked boat</i>	<i>a boat in which at least two-thirds of the horizontal projection of the sheerline area is equipped with decking, cabins, shelters or rigid covers which are weathertight and designed to shed water overboard. The decked area must include all that area within one third of the length from the bow plus the area 100 mm inboard from the periphery of the boat (excluding the transom) (Note: partially open boat has the same meaning)</i>
<i>open boat</i>	<i>a boat not protected from entry of water by means of a complete deck or by a combination of a partial weather deck and a weathertight superstructure or deckhouse</i>

Clarification of Hull Configurations

Based on the definitions of hull configurations and deck types, sketches and explanations are given as follows:

- **Cockpit**

A sketch of **cockpit** is shown in Figure A.

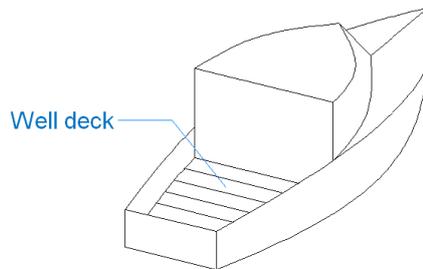


(A) Cockpit

A cockpit typically does not extend to the outboard extent of a deck, either at side or at transom.

- **Well deck**

A sketch of **well deck** is shown in Figure B.

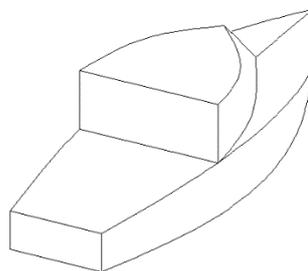


(B) Well Deck

A well deck extends to the outboard extent of a deck, either at side or at transom.

- **Fully decked boat**

The **decked ship**, or **decked boat** or **fully decked ship** has same meaning as **fully decked boat**. A sketch of **fully decked ship** is shown in Figure C.1.



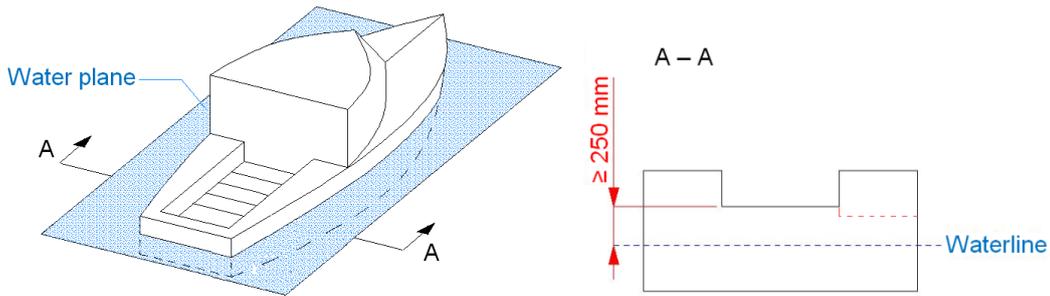
(C.1) Fully decked boat

If there is a cockpit, a boat can still be considered as fully decked boat if:

- (a) the freeboard measured from the lowest point of the weather deck complies with 40A.15(1)(a); or
- (b) the height of the cockpit sole above the water at the lowest point is 250 mm or larger (shown in Figure C.2); or
- (c) the cockpit is permitted by the Recognised Surveyor(s) in accordance with 40A.15(1)(c).

Otherwise, for the purpose of subdivision, stability, and drainage requirements, the boat is considered as same as an open boat.

• Fully decked boat with small recess



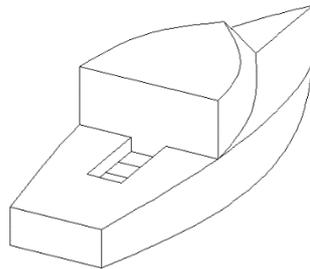
(C.2) Fully decked boat with a cockpit

If there is one or more watertight recesses of total volume significantly small (determined by the following formula) compared with a rectangular cuboid with the same moulded dimensions of the boat above water-line, a boat can still be considered as a fully decked boat (shown in Figure C.3).

$$V_c < \frac{L \times B \times F}{40}$$

where:

- V_c – total volume of the watertight recesses (m³)
- L – length overall of the boat (m)
- B – maximum beam of the boat (m)
- F – minimum freeboard of the boat (m)



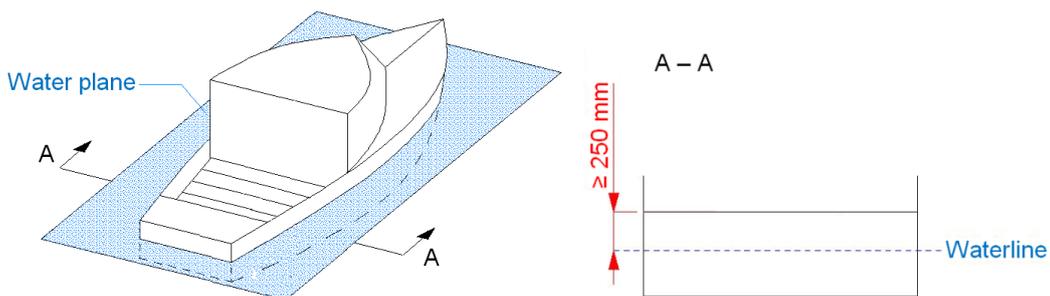
(C.3) Fully decked boat with small recess

• Fully decked boat with well deck

If there is a well deck, a boat can still be considered as fully decked boat if:

- (a) the freeboard measured from the lowest point of the weather deck complies with 40A.15(1)(a); and
- (b) the height of the well is 250 mm above the water line or higher (shown in Figure C.4).

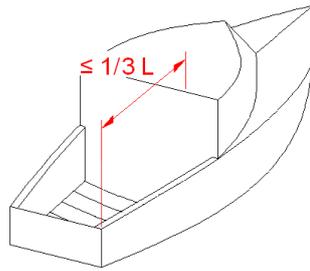
Otherwise, for the purpose of subdivision, stability, and drainage requirements, the boat is considered as same as an open boat.



(C.4) Fully decked boat with a well deck

- **Partially decked boat**

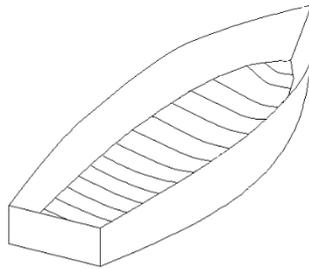
A sketch of **partially decked ship** is shown in Figure D.



(D) Partially decked boat

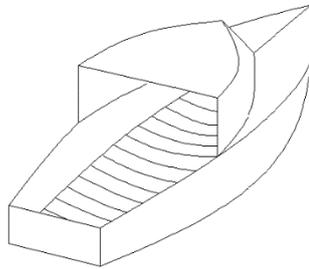
- **Open boat**

A sketch of **open boat** without cover is shown in Figure E.1.



(E.1) Open boat without cover

A sketch of **open boat** with cover is shown in Figure E.2.



(E.2) Open boat with cover

Clarification of Freeboard and Stability Requirements

• Freeboard requirements

For boats less than 24 metres that do not carry cargo, a summary of applicable freeboard requirements for some hull configurations are listed in Table 1 (Maritime Rule 40A.15(1) used as example).

However, this table should not be treated as as exhaustive, as situations vary due to other reasons (operating limits, length, applicability of 40A.15(2), etc.).

Table 1 – Freeboard Requirements

Freeboard Requirements	40A.15(1) (a) (Note 1)	40A.15(1) (b)	40A.15(1) (c)	40A.15(2)
Hull Configuration				
Fully decked boat with continuous weather deck	√			
Fully decked boat with cockpit complying 40A.15(1)(c)	√		√	√ (Note 2)
Fully decked boat with cockpit not complying 40A.15(1)(c)		√		
Fully decked boat with small recess	√			
Fully decked boat with well deck ≥ 250mm above waterline	√			
Fully decked boat with well deck < 250mm above waterline		√		
Partially decked boat		√		
Open boat without cover		√		
Open boat with cover		√		

Note 1: for convenience, the freeboard required in 40A.15(1)(a) is no less than a value calculated by the following formulas:

$$F_{min} = 375 \quad (L \leq 6)$$

$$F_{min} = 31.25 \times (L - 6) + 375 \quad (6 < L < 18)$$

$$F_{min} = 750 \quad (L \geq 18)$$

where:

F_{min} – minimum required freeboard (mm)

L – length overall of the boat (m)

Note 2: additional conditions apply

• Stability requirements

Based on the situations listed in Table 1, according to Maritime Rule 40A.13 (assuming a boat is a post-27 May 2004 ship), a summary of applicable stability requirements are listed in Table 2.

However, this table should not be treated as as exhaustive, as situations vary due to other reasons (applicability of 40A.13(9) or 40A.14, etc.).

Table 2 – Stability Requirements

Stability Requirements	40A – Appendix 1	Swamp calculation or test
Hull Configuration		
Fully decked boat with continuous weather deck	√	

Fully decked boat with cockpit complying 40A.15(1)(c)	√	
Fully decked boat with cockpit not complying 40A.15(1)(c)		√
Fully decked boat with small recess	√	
Fully decked boat with well deck ≥ 250mm above waterline	√	
Fully decked boat with well deck < 250mm above waterline		√
Partially decked boat		√
Open boat without cover		√
Open boat with cover		√

Further Recommendation

The application of freeboard or stability requirements does not affect the determination of the original hull configuration for a boat. For example, a boat may use the same freeboard requirements as an open boat, for a purpose other than subdivision, stability and drainage; it could still be a decked boat for other rule requirements based on its original hull configuration.

For a boat that may have a hull configuration not prescribed in this document, having regard to the nature of the boat (design features, operating limits, intended use, etc.), by exercising professional judgement, the Recognised Surveyor(s) may determine a certain hull configuration which is most suitable for any individual case.

Reference Material(s)

No.	Title	Author / Publisher	Year
1	Maritime Rule 40A: Design, Construction and Equipment – Passenger Ships which are not SOLAS Ships	<i>Maritime New Zealand</i>	2016
2	Maritime Rule 40C: Design, Construction and Equipment – Non-passenger Ships which are not SOLAS Ships	<i>Maritime New Zealand</i>	2016

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