

## APPENDIX C

### BUOYANCY TESTS FOR PASSENGER SHIPS OF CLASSES V, VI AND VI(A)

1. A vessel shall be deemed to have met the buoyancy test survivability standard, when it can be shown, by the following calculations or otherwise, that, after all compartments not totally enclosed within watertight boundaries are filled with water up to the lowest point of progressive flooding, it remains afloat with a reserve of intact buoyancy of 1/10th of the vessel's original loaded volume of displacement. For purposes of the calculation the flooded waterline is assumed to remain parallel with the intact loaded waterline.

2. An approved type of weathertight closing appliance in a compartment boundary may be considered as watertight for the purpose of the assessment of the extent of flooding.

3. Calculations must also show that the vessel would not capsize when swamped.

4. In accordance with paragraph 5.3.3 of these Instructions the buoyancy test calculations for non subdivided ships of Classes V, VI and VI(A) shall be carried out in the following manner:

5. The ship shall comply with the requirements of Appendix B (heeling test).

6. Ships for which hull form lines are not available.

(i) Vol. of displacement =  $L \times B \times d \times C_b$  at the LWL

(a) an average block coefficient of 0.63 may be assumed, or each space may be measured up on board the ship to give a more reliable volume of buoyancy, unless the vessel is of an unusual shape or fine hull form where it will suffice to produce an estimate of the vessels volume of displacement,

(b) the above measurements are to be taken at the waterline corresponding to the full load condition.

(c) Vol. of displacement at the LWL =  $L \times B \times d \times 0.63$  at the LWL.

(ii) The volume of buoyancy required = volume of displacement at the LWL x 1.1.

=  $L \times B \times d \times 0.63 \times 1.1$

= Length x Breadth x draught x 0.7

7. Ships for which hull form lines are available.
  - (i) a detailed calculation should be submitted to show that;
  - (ii) The volume of buoyancy items = volume of displacement at the LWL x 1.1.
8. Items accepted as providing buoyancy on the vessel in the event of swamping shall include;
  - (i) volume of spaces enclosed within watertight boundaries and therefore assumed not flooded,
  - (ii) volume of the ships structure (frames, floors, seats etc.) below the flooded waterline,
  - (iii) volume of engine(s), tanks and other buoyant fittings which shall,
    - (a) be protected against deterioration or damage; and
    - (b) effectively secured against movement; and
    - (c) be installed in such a way as to offer maximum stability as far as practicable whilst the ship is in an intact or damaged state.
9. The Volume of Buoyancy to be provided = Volume of Buoyancy required at 6(ii) or 7(ii) minus items 8(i), 8(ii) and 8(iii).
10. Figures C.1 to C.5 show some typical examples for open, partially decked and fully decked ships.

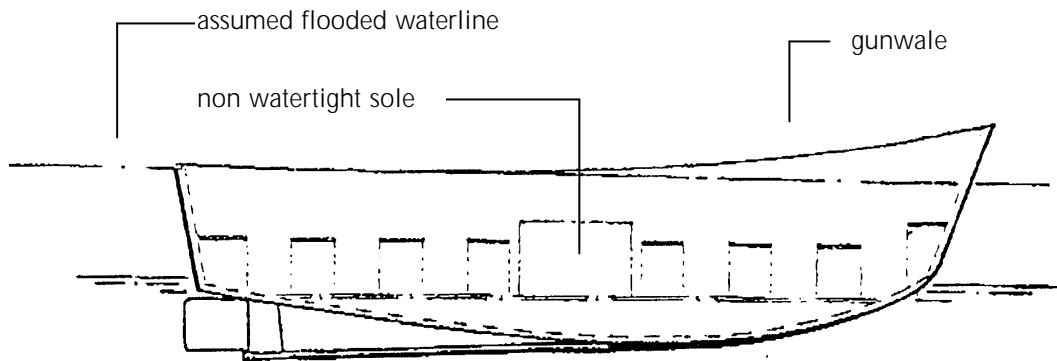


Figure C.1 Open Ship  
To illustrate paragraph 1(1)(a)(i) of Section 4 of Schedule 2 of Merchant Shipping Notice M 1699 (M)

Note: The inherent (built-in) buoyancy of the vessel comprising the buoyancy (below the assumed flooded waterline) of the shell, structure, engine, tanks, seats and their supporting structure, fittings etc., may be taken into account when assessing the required buoyancy.

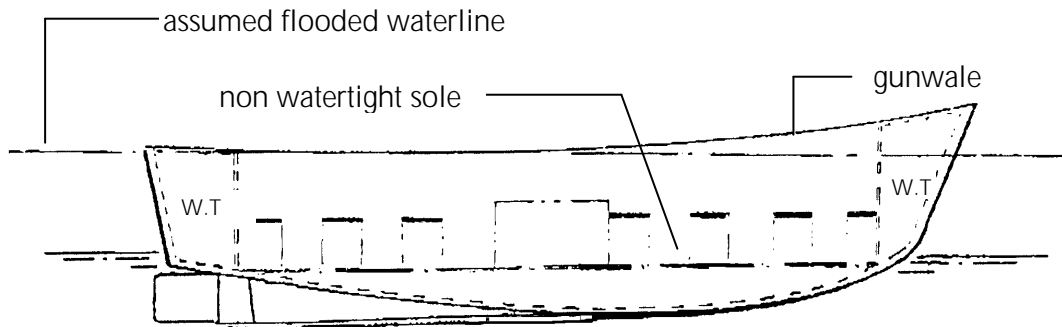


Figure C.2 Open Ship  
Alternative arrangement  
To illustrate paragraph 1(1)(a)(i) of section 4 of Schedule 2 of Merchant Shipping Notice M 1699 (M)

Note: In this case, provided the spaces at the forward and after end of the vessel are watertight, the part of their volume below the assumed flooded waterline, can be added to the buoyancy as calculated in case 1.

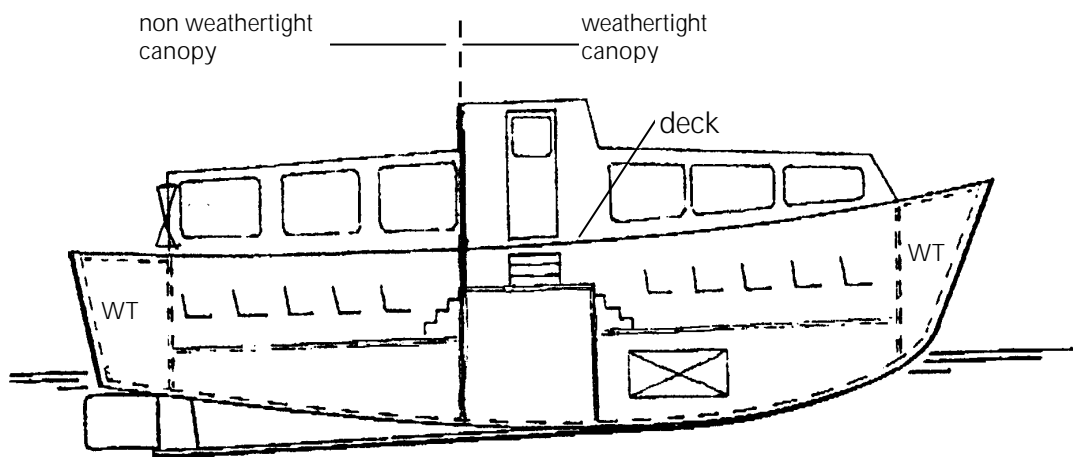
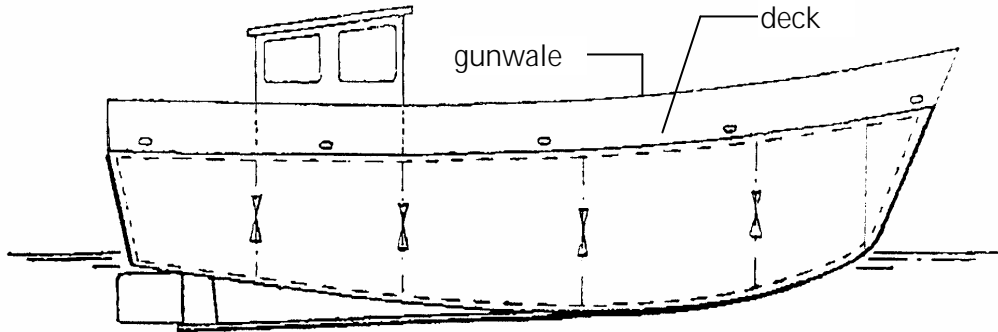
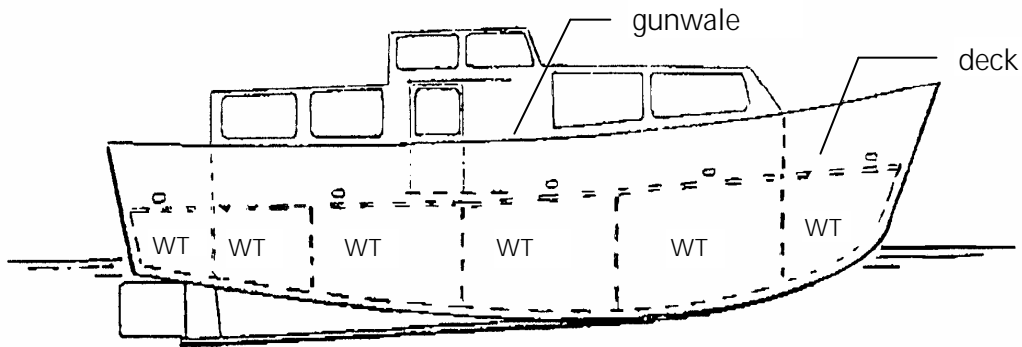


Figure C.3 Partially Decked Ship  
To illustrate paragraph 1(1)(a)(ii) of Section 4 of Schedule 2 of Merchant Shipping  
Notice 1699 (M)



**Figure C.4 Decked Ship**  
 To illustrate paragraph 1(1)(b) of Section 4 of Schedule 2 of Merchant Shipping  
 Notice 1699 (M)

Note: In this case provided the hull is watertight and the deck is weathertight the ship would meet the buoyancy requirement (irrespective whether the bulkheads are watertight or not).



**Figure C.5 Decked Ship**  
**Alternative arrangement**  
 To illustrate paragraph 1(1)(b) of Section 4 of Schedule 2 of Merchant Shipping  
 Notice 1699 (M)

Note: In this case, if the vessel does not meet "one" or "two" compartment standard, provided the hull is watertight and deck is weathertight (the deck being weathertight inside and outside the canopy), it meets the buoyancy test requirement.

However in such case the amount of water that can be trapped inside the canopy (and that cannot discharge itself rapidly) is to be taken into account when considering the intact stability of the vessel.