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**British Marine Federation**

**Association of Inland Navigation Authorities**

**Maritime and Coastguard Agency**

# **Code for the Design, Construction and Operation of Hire Boats.**

**Part1: Power driven boats.**

**Issue: CD4. Technical and Operational Standards**

*[Author's comments in square italicised brackets]*

**17<sup>th</sup> April 2008**

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**Change record**

<b>Issue</b>	<b>Date</b>	<b>Change</b>
CD1	19 June 2007	First consultation draft.
CD2	6 August 2007	Amended following consultation with BMF members.
CD3	28 February 2008	Edited to enable public consultation on technical and operational standards.
CD4	17 April 2008	Simplified methods of stability assessment added in draft form.

Note: *[Editorial notes and comments are shown in square italicised brackets throughout this draft]*

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3. *[Not used]*
4. MAIB Breakaway V report
5. NWSF Principles for Water Safety
6. *[Not used]*
7. Regulatory Impact Assessment
8. CEC Guide 2005 . Amending the RCD and Comments to the Directive Combined.
9. RSG Guidelines. Recreational Craft Sectoral Group [www.rsg.be](http://www.rsg.be)
10. Hire Boat Code. Stability and Freeboard Testing. Part 1 Power Driven Boats. Check Stability Testing.
11. *[Not used]*
12. National Guide to Hire Boat Handover. BMF
13. National Guide to Day Boat Handover. BMF
14. Quality Assurance of Handover. BMF

## **Definitions**

**1 'Hire craft'** means power driven or unpowered vessels of every description excepting houseboats, used for sport or pleasure on inland waters at anytime and not intended for the carriage of more than twelve passengers, which are :-

- a) let or hired under an arrangement with no skipper or crew being provided, whether or not that arrangement is on a pre-contract basis, or;
- b) the subject of a bare boat charter arrangement, or;
- c) owned by a club for the use of its members without skipper or crew being provided, whether or not the user makes any separate payment for such use of the vessel, or;
- d) owned by a body corporate for the use of its employees without skipper or crew being provided, whether or not the user makes any separate payment for such use of the vessel, or;
- e) the subject of any form of shared use arrangement (including timeshare) without skipper or crew being provided, excepting where the vessel is wholly owned by her users and no other person or organization receives money for or in connection with the operation or management of the vessel, other than as a contribution to the direct expenses of the operation of the vessel on an individual voyage or excursion.

**2 'Hirer'** The person hiring the craft from the hire operator.

**3 'Hire Operator'**. The person or organisation offering the vessel for hire or for commercially operated or managed shared use.

**4 'Houseboat'**. Any vessel not being a power driven vessel or being capable of being readily adapted to become a power driven vessel, which is kept stationary and is, or is capable of being used as either:

- (a) A place of habitation, whether by day or night,
- (b) A place for receiving or accommodating persons for the purposes of shelter, recreation, entertainment, or refreshment,
- (c) Club premises, offices, kitchen, pantry or store

**5 'Power driven boats'** means any vessel powered by internal (i.e. spark or compression ignition) or external combustion engines (e.g. steam engine) or electric motors, but excludes sailing boats fitted with engines (see definition of 'sailing boat').

**7. 'Day-hire craft'** means any power driven hire craft not used for over-night stays.

**8. 'Licensing authority'** A body empowered under the Public Health Acts (Amendment) Act 1907, the Civic Amenities (Scotland) Act or under specific legislation to licence or regulate the operation of craft on defined waters.

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9. **'Harbour Authority'**. A body with powers and responsibilities for managing harbour areas made under the Harbours, Docks, and Piers Clauses Act 1847, or the Harbours Act 1964, or local legislation.
10. **'Navigation Authority'** A body with powers and responsibilities for waterways defined in specific legislation. (Note that for the remainder of this Code, this term is taken to include 'Harbour Authorities')
11. **'Certifying Authority'**. A body authorised or appointed by licensing authorities to carry out independent verification of compliance to specified standards. (An example is the Boat Safety Scheme)
12. **'Inland Waters'**. Waters listed in MCA notice MSN 1776(M) or its amendments as falling within the categories A to D, or waters not so listed but falling within the definitions given in MSN 1776(M), or controlled waters as defined in the Water Resources Act 1991.
13. **'Open Boat'**. A boat not fitted with a watertight deck or rigid cabin top covering at least 70% of the plan area at deck level. Sliding or lifting cabin tops may be included as decked areas. Boats with a rigid canopy over an open well are considered to be open boats unless the sides are enclosed by a rigid weathertight structure.
14. **'Sailing boat'**. A boat fitted with sails of a total profile area ( $m^2$ ) greater than  $0.3 L_H^2$  (where  $L_H$  is in metres)
15. **'Design Class'**. A design of boat that has the following:
  - (a) Common hire operator.
  - (b) Relies on the same Initial Stability and Freeboard Tests.
  - (c) The same hull form.
  - (d) The same arrangement of seating, cockpit, decking and superstructure.
  - (e) The same location and weight of major masses (e.g. engines, batteries, fuel, and water tanks)
  - (f) The same limitations on numbers of persons and accessible areas.

## **Section 1: Introduction**

### **1.1 Background**

For many years licensing authorities (including navigation authorities<sup>1</sup>), and the hire boat trade, have been applying standards and regulating hire boats through initiatives such as the Boat Safety Scheme (BSS) and the British Marine Federation (BMF) Hire Boat Handover Audit Service.

The accident to the day-hire boat Breakaway V in July 2003 in which the boat capsized leading to the drowning of one of the occupants, was investigated by the Marine Accident Investigation Branch (MAIB). Their report (reference 4) recommended:

- Development of a national code of safe practice for boats let for hire on inland waterways and co-ordination of the licensing regimes of local authorities and navigation authorities, including the empowerment of the latter to licence where required.
- A review of the international standard on boat stability.
- Encouraging boat builders to obtain independent assurance of compliance with the Recreational Craft Directive

The Maritime and Coastguard Agency (MCA) initiated discussion of the recommendations with stakeholders from across the hire-boating industry. It was decided that it would be appropriate for a non-statutory code to be produced jointly by the MCA, the Association of Inland Navigation Authorities (AINA), and the BMF which would set down best practice and be suitable as a basis for licensing by local or navigation authorities.

The approach adopted in this Code is based on the foreseeable risks of hire boating activity and recognises the responsibilities that navigation authorities, hire operators and hirers have in ensuring adequate levels of safety. The risk control measures are considered to be reasonably practicable given the level of risk, and are consistent with established principles of risk management (see section 1.3).

### **1.2 Scope**

The Hire Boat Code is published in two parts:

Part 1, the present document, deals with power-driven boats. These include:

- Boats providing overnight accommodation and cooking facilities.
- Day-hire.
- Commercially operated or managed shared use including time share. Personal water craft are not included<sup>2</sup>.

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<sup>1</sup> Note that throughout this Code references to navigation authorities is taken to include Harbour Authorities in whose area hire craft operate.

<sup>2</sup> Refer to 'Managing Personal Watercraft'. Personal Watercraft Partnership 2004  
Hire Boat Code . Issue CD4. Technical and Operational Standards.

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Refer to the definitions given above for further details.

This issue of Part 1 deals specifically with technical and operational issues pending agreement of the arrangements for certification and verification of standards by licensing authorities. When these arrangements have been agreed a full issue of this Code will be issued for consultation (section 1.4)

Part 2 will deal with unpowered craft.

### **1.3 Principles for determining standards.**

The National Water Safety Forum have published a set of 'Principles for Water Safety' (reference 5) which are intended to help ensure that safety across the water sector is applied in a way that is consistent, proportionate, and fully recognises the broader societal benefits of water-related activity. They have been applied in the production of this Code.

Account has also been taken of the available data on accidents and incidents in the sector.

### **1.4 Consultation.**

The drafting of this code was carried out by representatives of the BMF, MCA and AINA. Drafts were circulated to members of the BMF working group, and the AINA Safety Issues Group<sup>3</sup>. Following amendment, a revised draft was circulated to all BMF members, AINA members, and the organisations represented on the initial working group set up by the MCA when the project was started, this latter group being considered to represent the full range of stakeholders.

Lastly, a final draft was placed on the BMF, AINA and MCA websites for twelve weeks public consultation prior to finalising the first issue of the technical and operational aspects of the Code. Principal stakeholders were notified by email. A full list of consultees is given in appendix 3.

The responses to comments raised during consultation were posted on the BMF, AINA and MCA websites.

Any proposals for revisions after first issue will also be subject to appropriate consultation, see section 9.

### **1.5 Implementation**

Full implementation of the code requires a number of activities to be completed. These include:

- a)** Achieving required technical standards on existing craft,
- b)** Having sufficient trained resources to carry out stability tests,

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<sup>3</sup> Note the AINA Safety Issues Group also acts as the Inland Waters Advisory Group of the National Water Safety Forum.

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- c) Introducing revised schemes of certification (e.g. Boat Safety Scheme)
- d) Training sufficient numbers of examiners
- e) Review and revision by licensing authorities of their licensing arrangements and conditions for hire craft.

The scope and programme for implementing items c), d) and e) above are under consideration by the sponsoring organisations.

This issue of the Code will be released for consultation in Spring 2008. It is considered that this will give hire operators in particular, sufficient time to comment and make the necessary arrangements for achieving the required standards.

Subject to agreeing their approach to the licensing and enforcement aspects of the Code (to be published in the full issue of the Code), it is anticipated that licensing authorities will commence seeking self-certification by hire operators of compliance with the Code from Spring 2009 with the full arrangements in place during 2011. A detailed implementation plan will be published on the BMF, AINA and MCA websites<sup>4</sup>. These organisations will oversee implementation and amend the programme accordingly as well as acting to overcome any difficulties that may arise (Review arrangements are discussed in section 8).

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<sup>4</sup> BMF [www.britishmarine.co.uk](http://www.britishmarine.co.uk)

AINA [www.aina.org.uk](http://www.aina.org.uk)

MCA [www.mcga.gov.uk](http://www.mcga.gov.uk)

## **Section 2: Responsibilities**

The principal parties involved in the hire of a vessel all have responsibilities for safety, (reference 5). The hire operator has a duty to the hirer to provide a vessel that is safe to operate and live in, and to provide adequate instruction in the safe operation of the vessel on the waters where it is intended for use. The licensing authority (where there is one) also has a duty both to the hirer and the hire operator to assure itself that licenses are issued only to operators meeting and maintaining the standards of this code.

### **2.1 The Hirer**

The hirer has responsibilities which include:

- a) Nominating a party leader (the 'Skipper', who may not be the same person who made the booking.)
- b) The skipper and any other party member nominated to drive or handle the boat must attend the handover briefings (see section 5) and take heed of the advice and instruction given.
- c) Be familiar with the safety features and instructions given during the safety briefings.
- d) Navigate in accordance with the advice and instructions given (in whatever form including written, verbal, signage) by the hire operator and the body responsible for the waters to be navigated.
- e) Study the briefing material provided.
- f) Use safety equipment as instructed.
- g) Ensure that young people or those with special needs are appropriately supervised (Appendix 1 has more information for special needs and educational parties)

### **2.2 Hire Operator**

The hire operator will:

- a) Ensure their vessels comply with this Code and are maintained in that condition. (see section 6)
- b) Provide handover briefings
- c) Not permit vessels to depart if they consider that the crew does not have sufficient competence to navigate without putting others at risk, or being able to control their passengers or crew. (Refer to appendix 1).

### **2.3 Licensing/Navigation authority**

The body responsible for the navigation and/or licensing will:

- a) Verify within the scope of their powers that hire vessels which they licence or regulate comply with the Code.(see section 6)
- b) Where hire vessels or hire operators are not in compliance, take action within the scope of their powers to ensure that acceptable standards are achieved. (see section 6)

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- c) Overseeing as far as practicable, the use of licensed waters and taking action with those responsible when unacceptable or unsafe use is seen or reported to them.

### **Section 3: Risk Assessment**

In common with other modern safety management standards, this code is based on an informed assessment of foreseeable risks and an informed judgement of whether the measures introduced to control those risks are proportionate and sufficient.

The technical and operational standards in this code are risk-based, having taken a view of incidents, accidents and foreseeable risks across the whole industry. In practice, the risks found with particular waterways, hire operators and hirers will vary from these industry 'averages'. A process of risk assessment is therefore needed by the organisations with management responsibilities (navigation authorities and hire operators) to assess their local circumstances and decide whether risk controls **additional** to those set down in this Code are required.

A simple process of risk assessment is required to ensure that all risks in the local environment are being adequately addressed. Note that it is only necessary to specify standards above those set down in this code where increased local risks are judged to require them. The process should involve the persons with relevant knowledge and experience, and its results must be communicated to those who may be affected by it.

Some typical points to consider are as follows:

#### **3.1 Hire Operators**

- Modifications to waterway structures which may require revised handover briefings
- Changes to staffing arrangements
- Installation or modification to craft systems or fittings outside the scope of this code
- Weather or water flow conditions

A sample risk assessment format is given in appendix 4, however operators should use a risk assessment method which they feel comfortable with. Further guidance on risk assessment is available from the BMF.

#### **3.2 Navigation/Harbour Authorities**

- Temporary engineering works which close or restrict the navigation
- Unusual variations in water levels or flows due to water control or natural causes.
- Unusual boat traffic, either in type or volume.

As with all risk assessments it is important that they be kept under continual review and kept in step with any change that may affect safety (section 6, Change Control), and recorded (section 7, Record Keeping).

## **Section 4: Technical Standards**

This section sets down the standards which apply to the design, construction and maintenance of the hire boat. All new hire craft will be expected to comply with these standards by *[DATE]*. Craft already in service as hire craft at *[DATE]* will be expected to be brought into compliance, where practicable, in accordance with section 4.5.

The standards are discussed in four groups, 4.1 to 4.4, below<sup>5</sup>:

**4.1 Recreational Craft Directive.** New craft within the scope of this Code must comply with the Recreational Craft Directive (RCD). The RCD applies to craft between 2.5m and 24 metres in hull length used for sport or leisure, including hire vessels, and constructed in the UK or anywhere else and first used within the EU on or after 16<sup>th</sup> June 1998. They may only be placed on the market in the UK or put into service use if they comply with the essential safety requirements set out in the Recreational Craft Regulations. Craft need to display a CE marking to show they satisfy conformity assessment procedures. Further information can be found at (references 8 and 9).

This Code requires hire operators to provide the licensing authority with evidence from a competent third party body of compliance with the principal requirements of the RCD<sup>6</sup>. A model form for providing to the licensing authority is given in appendix 6.

### **4.2 Licensing Authority Standards.**

Requirements for craft already in service relating to fires, explosion, ventilation, and the environment, are taken from the Boat Safety Scheme<sup>7</sup>. The current Boat Safety Scheme requirements for *privately owned* boats were published in 2004. These are presented in three groups: mandatory, advisory, and best practice. Compliance with the mandatory requirements is necessary to obtain a private boat licence. These BSS requirements have been examined for relevance to hire boats taking into account the duty-of-care of the hire operator and likely level of knowledge and experience of the hirer. The results of this review are shown in reference 1. All the requirements which are mandatory for private boats have

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<sup>5</sup> In due course it is intended to bring together the standards discussed at 4.2 to 4.4 together with the BSS standards for privately owned boats under the ownership of AINA acting on behalf of the National Water Safety Forum.

<sup>6</sup> The BMF provide a service which independently verifies arrangements for demonstrating compliance with the RCD.

<sup>7</sup> Boat Safety Scheme website: [www.boatsafetyscheme.com](http://www.boatsafetyscheme.com)

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been carried over to hire boats. Non-mandatory private boat requirements have been reviewed in table 1, below for application to hire boats.

## Hire Boats Code Table 1: Boat Safety Scheme: Advisory Items/Best Practice for Application to Hire Boats

**Introduction.** This table reviews the 'advisory' and 'best practice' items in the Boat Safety Scheme requirements 2005 (privately owned boats, ref BSS Essential Guide 2nd Edition) , and the 2002 Boat Safety Scheme requirements (currently applicable to hire vessels) and makes recommendations for continued application to hire vessels. Note that Boat Safety Scheme requirements Part 10 for hire boats, are reviewed under miscellaneous equipment, Table 2.

				Recommendations for continued application		
Ref <sup>1</sup>	Status	Topic	Item	New Build ?	Retrospective application to existing craft?	Recommendations for maintenance & inspection.
Fixed Fuel Systems and Engines.						
2.2.1 (2002)	Best Practice	Fuel filling lines.	Inspect hose connections regularly. Use double clamps on petrol filling hoses. Lines as short as possible, regularly supported.	Y	Y	Monitoring of bilge areas for signs of leakage.
2.2.3	Best Practice	Fuel filling lines.	Hoses marked BS EN ISO 7840, alternatively marked to SAE J 1547 or DIN 4798	Y	Y (when replaced)	Replace with marked hoses when showing signs of degradation or when carrying out nearby work.
2.7.1 (2002)	Best Practice	Petrol system electrical bonding.	Bonding cables to be 2.5 mm <sup>2</sup> min.	Y	N	Ensure any replacement cable is to size.
2.10.2 (2002)	Best Practice	Flexible fuel feed/return hoses.	Restrict length of hose to absolute minimum.	Y	Y (At time of major inspections or refits)	
2.13.2 (2002)	Best Practice	Fuel shut-offs	Means of operating valve or cock from outside engine compartment.	Y	Y (Where practicable and at times of major inspection/overhaul)	
2.16.2	Best Practice	Steam engines.	Pressure systems subject to regular inspection and covered by insurance policy.	N (Inspection item only)	Y	No addition to normal operator inspection regime.

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Electrical Installations.						
3.1.2 (2002)	Best Practice	Battery location	For sustained charge rates >2kW (i.e.electrically propelled craft) install fan-assisted ventilation.	Y	Y	
3.2.2	Best Practice	Cables.	Use multi stranded.	Y	N	Best practice to use multi stranded when replacing cable or installing additional equipment.
3.2.3	Best Practice	Cables.	Visual check for damage during routine maintenance.	N (Inspection item only)	N/A	Best practice during maintenance and inspection.
3.3.1	Best Practice	Cable runs.	Keep away from potential sources of heat/impact damage. (ISO 10133/13297)	Y	Y (where practicable)	Best practice during maintenance and inspection.
3.4.3 (2002)	Advisory	Shore power connections.	Shore power and battery charging leads splash-proof to BS EN 60309.	Y	Y (where fitted)	Condition of shore power lead to be checked at end of each hire period.
3.5.2	Best Practice	230v supplies.	Fit earth leakage protection (RCD)	Y	Y(high priority item)	RCD functional check
3.6.1	Best Practice	Battery Isolators.	Fitted in an easy to reach location.	Y	N/A Accessing isolators to be covered during handover.	N/A
3.6.5 (2002)	Best Practice	Battery Isolators.	Label isolators e.g. 'starter' and 'services'.	Y	Y	Check present.
Electrically Propelled Vessels						
4.3.1	Best Practice	Battery charging equipment.	Fit manually operated isolating switch to mains supply.	Y	Y	
Fire Extinguishing and Escape						
6.1.3 (2002)	Best Practice	Fire extinguishers.	Annual service by competent person.	N (Inspection item only)	N/A (Inspection only item)	Annual inspection by hire operator staff (suitably trained)
6.2.2	Best Practice	Fire blankets.	Fix permanently.	Y	Y	

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6.3.1 (2002)	Advisory	Emergency Escape.	At least two means of escape recommended. Can include breaking out by hammer of a fixed window or port.	Y	Y	N/A
6.3.1	Best Practice	Emergency Escape.	Label secondary means of escape where not obvious (e.g. Break-out window using hammer)	Y (also handover item)	Y (also a handover item)	Check labelling still in place.
6.3.1 (2002)	Best Practice	Emergency Escape.	Soft furnishings, fillings etc to meet fire resistance, smoke release standards. (see also Table 2)	Y	N	N/A
<b>LPG Installations</b>						
7.1.2 (2002)	Best Practice	Self-contained gas appliances.	Closely supervise use, and safely dispose of used containers.	N/A	N/A (Handover item - strongly discouraged)	N/A
7.7.1 (2002)	Best Practice	HP LPG non-return valves.	Check regularly, where fitted.	N (Inspection item only)	N (inspection item)	Routine inspection item
7.7.2	Best Practice	Regulators.	Replace at least every ten years.	N (Maintenance item)	Y	Replace as part of routine maintenance.
7.8.1	Best Practice	LPG metal pipework fixings.	Recommended spacings at < 500mm apart.	Y	Y (where practicable)	To be met as opportunities arise during normal maintenance.
7.9.3	Best Practice	LPG hose at least 75mm from exhaust and flue.	Keep away from all surfaces where temp. may reach 50 deg C.	Y	Y (where practicable)	Examine as and when opportunity arises.
<b>Cooking, Heating, Lighting Appliances.</b>						
8.4.2	Best Practice	Heat damage to adjacent materials.	Soft furnishings/fabrics/foam material of suitable fire resistant/non-toxic material. Upholstery fabric test to BS EN 1021 Pts 1&2	Y	N	Routine inspection for signs of heat damage.
8.9.1 (2002)	Advisory	Fixed ventilation to standard.		Y	Y	Routine inspection.

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8.9.2 (2002)	Advisory	Warning notices, closeable ventilators on sea-going vessels.	To help ensure that ventilators are opened when appliances are in use.	Y	Y	Routine serviceability inspection.
8.10.1 (2002)	Advisory	Appliances flued where required.		Y	Y	Check flues complete and intact.
8.10.2 (2002)	Advisory	Flues complete and in good condition.		Y	Y	Check flues complete and intact.
8.10.3 (2002)	Advisory	Flues terminate direct to outside air.		Y	Y	Check.
8.10.4	Advisory	Flues operating effectively.		N (Inspection item only)	Y	Routine visual and annual examinations (Appendix 2)
<b>Pollution Reduction</b>						
9.1.2	Best Practice	Bilge pumping.	Arrangements for keeping bilge area oil-tight.	N (Maintenance item)		Part of regular inspection

Note 1. Numbers refer to BSS 2005. '(2002)' indicates requirement also found in BSS 2002.

### 4.3 Stability and Freeboard Standards

The Breakaway V accident showed that in certain circumstances of load and distribution the ISO stability standard (BSS EN ISO 12217) mandated under the RCD could 'pass' conditions where stability margins were inadequate. With the support of MCA and AINA, the BMF have commissioned work to investigate the standard and recommend changes to address these issues. The completed work (appendix 5) is the basis for determining acceptable stability and freeboard standards under this Code.

In due course a revised ISO standard will be issued which could also be used to demonstrate adequate stability for the craft within its scope.

There are two levels of stability and freeboard testing, discussed in section 4.3.1.

#### 4.3.1. Stability Testing.

**(a) Initial Stability and Freeboard Test.** These are applied to a representative sample of each design class when:

- This Code comes into effect,
- New or used boats are taken into hire service
- Reference data or certification from a previous Initial Stability Test is not available.

Both tests shall be applied to an individual boat that has failed a check stability test.

(Refer to section 1.5, for further information on implementation dates)

Two types of stability test are available:

- (i) The General Initial Stability Test explores the limits of a craft's stability and must only be undertaken by persons competent to do so and working to a safe system of work. See 3.2 of Appendix 5 and consult the BMF Technical Department for more information<sup>8</sup>.
- (ii) The Simplified Initial Stability Test (see 3.3 of Appendix 5) is available for boats operating on MCA Category A, B or C waters and which are:
  - 2.08m beam cruising narrowboats over 10m length, and
  - decked power-driven boats over 7m length meeting certain parameters.

The latter test is simplified, and may be conducted by suitably competent hire operator staff.

**(b) Check Stability Test.** This test will be carried out when any of the following apply:

- After any change of engine type, internal or deckhouse arrangement, or the amount of ballast.

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<sup>8</sup> BMF Technical Department reference [www.britishmarine.co.uk](http://www.britishmarine.co.uk)

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- When any permanent weights of more than 3kg/metre of hull length are added or taken off, or any weight is added high up, e.g. adding or altering a mast.

Check Stability Tests can be carried out by suitably competent hire operator staff. Further details of the test and competence required can be found in reference 10. Depending on the results of stability testing and the layout of the boat, Appendix 5 provides information on preventing or discouraging access to areas of a boat where the stability tests indicate a need to do so.

### 4.3.2. Open Powered Boats

Boats required to be marked with either of the labels shown in figures 3 or 4 of Appendix 5, section 3.2, shall not be permitted to operate in Category C or D waters.

#### (a) Fitted with Flotation

Flotation is a means of providing buoyancy to a swamped boat, e.g. air tanks or buoyancy bags.

Boats under 4m hull length may only be operated in Category A or B waters.

Boats fitted with flotation shall comply with and be tested to clause 6.4 and Annex B of ISO 12217-3, except that the One Person Test is not required for boats where the hull length is greater than 6m.

Note that freeboard requirements are higher where flotation is not fitted.

#### (b) Not fitted with Flotation.

Boats of this type can only operate in the following waters:

- MCA Category A if more than 4m hull length.
- MCA Category B if more than 4.5m hull length.
- MCA Category C if more than 5m hull length.
- MCA Category D – operation not permissible - Flotation essential.

*(Note: Hull length  $L_H$  is defined in ISO 8666 as the length from the forward side of the stem at gunwale level to the aftermost point of the watertight hull, measured parallel to the loaded waterline.)*

### 4.3.3 Handover Procedures – Stability Aspects.

The following stability-related aspects are included in handover procedures, (references 12 and 13):

- a) Open powered boats under 8m length (approx.). Not more than one person should be outside the cockpit at any time. In most circumstances all persons should remain in the cockpit at all times.

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- b) Open boats of  $L_H$  less than 6m displaying the labels given in figures 4 or 5 of reference 10: Take care to keep the boat upright at all times. Excessive heel may swamp the boat or cause it to capsize.
- c) Narrowboats. Where side-decks are provided, are of width not less than 75 mm and have a non-slip finish they may be used for occasional access to facilitate mooring, lock operation etc. They should not be regarded as providing a safe route along the boat.

No more than two (this may vary according to stability test results) persons to be on cabin roof at any one time. (Note: This requirement is in respect of stability issues only. It does not override other issues restricting access such as limited airdraft)

Because some gates leak water into the lock, there is a risk of swamping if the boat is too close to the upstream lock gate. Boats should keep back from leaking gates.

- d) General. Restrict numbers of persons using the side decks and cabin roof in accordance with stability testing results (section 4.3).

### 4.4 Miscellaneous equipment

An examination of available accident and incident data has been used to determine the need for equipment and features additional to those referred to at 4.1 and 4.2 above. These are shown in table 2, below. This includes items applicable to hire boats covered in Part 10 of the 2002 BSS standards.

Hire Boats Code Table 2: Miscellaneous Standards.

Control Measure	Boat Type (note 4)	Comments	New build - Applicable Waters (note 3)				Retro-spective? (note 2)	Recommendations for maintenance and inspection by hire operator.	Certifying Authority inspection item?	
			A	B	C	D				
<b>Lifebuoys</b>										
One (minimum) for all vessels to be kept as close as practicable to helm position.	Day/24+	600mm diameter to MSN 1676 construction requirements. Alternatives to lifebuoys include (with appropriate instruction) horseshoe buoys, rescue quoit and line, rescue can and line.	Y (note 1)	Y			Y	Routine condition inspection (Appendix 2)	Y	
One buoy (not in addition to the above), fitted with buoyant line	Day/24+				Y	Y	Y		Y	
<b>Personal Flotation Devices</b>										
One to be carried for each child and non-swimmer carried. 'Offered' to all others.	24+	Minimum standard BS EN ISO 12402-4 . Permanent flotation (non-inflatable) type. Sizes appropriate to occupants, e.g. children and large adults. Inflating jackets (manual or automatic) are an alternative.						Routine condition inspection (Appendix 2)	Y	
			100 N Buoyancy	Y	Y					Y
			150 N Buoyancy			Y	Y			Y
'Offered' for Cat A waters	Day	100 N Buoyancy (standard as above)	Y	Y			Y	Routine condition inspection (Appendix 2)	Y	
		150 N Buoyancy (standard as above)			Y	n/a	Y			
<b>Handholds</b>										
Handholds are any part of the boat that may be gripped by hand to reduce the risk of falling overboard. To be available around superstructure	Day/24+	BS EN ISO 15085 gives further guidance.	Y	Y	Y	Y	Y	Routine condition inspection (Appendix 2)	Y	

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<b>Non-slip decks</b>										
Weather decks and exterior tread surfaces, gang plank and brows to be provided with effective non-slip surfaces/coatings.	Day/24+		Y	Y	Y	Y	Y		Routine condition inspection (Appendix 2)	Y
<b>Hull integrity</b>										
Hull structure proven (on this or similar vessel) by recent history of safe operation in similar or more onerous operating category, and by monitoring of soundness and integrity.			Y	Y	Y	Y	Y		Hire operators should staisfy themselves of continued soundness and integrity, including appropriate out-of-water examination at least every five years (more frequently for wooden hulls).	Y
Forward bulkhead to be weathertight at bow to prevent ready ingress of water.		Includes provision of 75mm (Nominal) door cill height at bows to reduce influx of water from lock gates (leaks or gate paddles)	Y	Y	Y	Y	N			N
Sea cocks fitted		For openings below deepest laden waterline and permanently connected to ducts or pipes watertight to above 250mm:							Routine condition inspection (Appendix 2)	Y
		To BS EN ISO 9093			Y	Y	Y			
		To a suitable standard	Y	Y		Y	Y			
		To a suitable standard for openings above deepest laden waterline and connected to ducts or pipes watertight to less than 250mm above. <i>[Exclude exhausts and engine compartment ventilation openings - picked up by stability tests?]</i>	Y	Y	Y	Y	Y			
Weed hatch cills , where fitted, to be minimum of 150mm above deepest laden waterline and fitted with watertight cover.			Y	Y	Y	Y	N			

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<b>Bilge Pumping</b>										
Manual pump, or electric or engine-driven pump with manual starting facility.	Day/24+		Y	Y	Y	Y	Y		Routine condition inspection (Appendix 2)	Y
Bailers	Open boats		Y	Y	Y					
<b>Spread of Fire</b>										
Fire resistant noise and thermal insulation materials.	Day/24+ Decked.	[Standard to be defined - see also Table 1]	Y	Y	Y	Y	N			Y
Means of escape to be marked.	Day/24+ Decked.	(See also BSS standards review - Table 1)	Y	Y	Y	Y	Y			Y
Soft furnishings/fabrics/foam material of suitable fire resistant/non-toxic material. Upholstery fabric test to Standards of BS EN 1021 Parts 1 and 2.	Day/24+	BSS 2002 recommendation. See also Table 1.	Y	Y	Y	Y				Y
<b>Cleats and strong points</b>										
To be provided appropriate to the vessel and its area of operation. Minimum of one at bow and stern.	Day/24+	To provide means of mooring or being towed.	Y	Y	Y	Y	Y		Condition monitoring.	Y
		For vessels likely to use locks or otherwise securing against high walls, cleats must securely hold ropes at high angles. BS EN ISO 15084 provides general guidance on strong points.								Y
										Y
<b>Mooring Lines</b>										
Two lines minimum. Number and length to be selected based on vessel type and knowledge of operating area and conditions.	All types	Lines to be in good condition and free of knots, stranding etc. Lines, including eyes/splices to be of material, size and strength appropriate for size and weight of vessel. Account must be taken of navigation authority requirements.	Y	Y	Y	Y	Y		Pre hire checks. General condition monitoring.	Y

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<b>Fendering</b>										
Fendering and rubbing strakes, where fitted, are soundly fastened.		Bow/stern fenders designed as far as practical not to cause hang-ups in locks.	Y	Y	Y	Y	Y	Y	General condition monitoring.	Y
<b>Anchors and Cables</b>										
Anchor, mudweights and cable/warp to suit boat size/weight		Application includes canalised rivers with weirs. Need and type dependent on risk assessment of local conditions. Refer to BS EN ISO 15084 for general guidance on strong points and warps.		Y	Y	Y	Y	Y		Y
<b>Smoke Detectors</b>										
To be specified when standard is developed and products available.	Day/24+	Boats with enclosed cabins only. Day boats only where cooking/heating appliance is not visible from the steerer's position.	Y	Y	Y	Y	Y	Y	Periodic functional checks.	Y

Note 1. Small day-hire boats on category A waters may be exempted due to space constraints.

Note 2. Includes equipment which may be fitted by the hire operator.

Note 3. Day boats are taken as limited to Cats A to C only.

Note 4. '24+' denotes craft used for overnight stays.

**4.5 Application to Existing Craft.**

For existing craft which may not meet the standards described above, tables 1 and 2 show those items where deferred compliance, where practicable, is acceptable. The implementation plans for the Code, referred to in section 1.5, show the dates by which compliance is to be achieved.

## **Section:5 Operational Standards**

This section is primarily concerned with the way in which boat hirers, who may have little or no previous experience, are provided with sufficient information and instruction to enable them to safely undertake the trip. It follows the stages of a trip through from booking, to departure from the hire base, to the conclusion of the trip.

*(Note: This section is based on the national hire boat and day-boat handover schemes run by the British Marine Federation, references 12 and 13)*

### **5.1 Pre trip information**

Advanced booking gives an opportunity for the hire operator to provide the hirer with information both on navigating boats in general, such as using locks, rules of the road, mooring etc, and on the area in which they will be boating. General information is also available from some navigation authorities and industry associations<sup>9</sup>. Navigation Authorities will often produce cruising notes.

### **5.2 Handover procedures**

Whether the boat is a large well-equipped cruiser designed to provide living accommodation for several weeks, or a simple day-boat, it is essential that before the hire operator gives control of the boat to the hirer a systematic and documented handover procedure, appropriate to the type of boat and its area of operation, is followed. This will cover topics which include:

- a) Equipment.
  - Gas and electric appliances, and sanitary facilities.
- b) Using the boat
  - Steering, stopping and mooring
  - Awareness of access limitations to ensure stability (see section 4.3.3 for detail)
  - Use of locks, swing bridges etc
  - Awareness of navigation hazards (e.g. weirs, tidal flows and/or river flows, commercial traffic, shallow water etc)
  - Speed limits
  - Restrictions to navigation notified by navigation or harbour authorities, or the MCA.
- c) Safety Equipment.
  - Life jackets
  - Lifebuoys, throwlines etc

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<sup>9</sup> The Boaters Handbook. Published by British Waterways and the Environment Agency. Also available in CD ROM.

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### d) Briefing material

The handover should be supported by briefing material (a 'Boat Manual') left in the boat which provides full information on:

- Personal safety
- Safe use of appliances fitted in the vessel – cookers, stoves, heaters etc
- Safety on the move
- Safety equipment
- Navigation rules, including speed limits, speed, giving way, etc.
- Mooring (where and how)
- Dealing with fouled propellers, going aground, etc
- Navigation features and hazards such as locks, weirs, currents, tides etc
- Detailed reference information on how the boat works
- Contact information including for emergencies

### e) Communications

- Using the contact material in the boat manual.

### f) Dealing with emergencies

- Man overboard
- Breakdown
- Use of fire extinguishers/blankets
- Emergency contact details
- Recording and reporting

It is essential that the briefing is done by a competent and experienced member of the hire operators staff who can deal confidently with any questions the hiring party may have.

## **5.3 Competence Assessment**

During or at the completion of the handover briefing, the hire operator must decide whether the hirer and his party are sufficiently competent to be allowed to take the boat out.

Reasons for not doing so would include:

- Inability of the skipper(s) to demonstrate adequate control (even after repeated instruction)
- Perceived impairment through drink or drugs
- Inadequate resources available to the party to control children safely or supervise persons with special needs (refer to appendix 1).

If the decision is made not to permit the boat to go out, this should be recorded in the handover documentation.

Throughout the handover process, the person giving the instruction should take account of any qualifications (for example, RYA Inland Helmsman) or previous experience professed by

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the skipper(s), however this should only be recognised as an opportunity to accelerate the briefing, not dispense with it.

### 5.4 During and after the Hire Period

At the conclusion of the hire period the hirer should have the opportunity, where practicable, to report back to the hire operator on any problems or incidents that occurred. These would include:

- Accidents
- Breakdowns
- Vandalism or anti-social behaviour

Hire operators must be aware of the statutory duty to report certain types of accident involving the use of hire craft to the Marine Accident Investigation Branch<sup>10</sup>. In the interests of building a better understanding of boating accidents, their frequency and causes, hire operators are encouraged to pass on details through their navigation, or BMF, for inclusion in the IRIS database<sup>11</sup>.

### 5.5 Documentation

The handover process is an essential element of delivering a safe boat trip to the hirer. It is important that an audit trail of its delivery is maintained. This will include:

- Booking terms and conditions
- Booking confirmation
- Customer log sheet. The record of when the hirer and his party arrived and departed, party member names, delivery of handover.
- Boat acceptance certificate. A record of the handover and the hirers' and skippers' written acceptance of it. *(Note: If a signed certificate is to carry any weight in any subsequent investigation or claim it is essential that it clearly readable and understandable in the relatively short period available during the handover process!)*
- Accident/incident reports and records of any other customer feedback.

### 5.6 Audit

In view of the importance of the handover process, hire operators are strongly recommended to have their handover arrangements independently audited every [X] years<sup>12</sup>. Licensing authorities can reserve to right as part of licence conditions to carry out sample audits; having an independent audit available is likely to satisfy such a requirement.

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<sup>10</sup> Statutory Instrument no SI 881/2005. Merchant Shipping (Accident Reporting and Investigation) Regulations 2005

<sup>11</sup> IRIS is AINA's incident and accident recording system which is used to provide the National Water Safety Forum with industry wide data. For more information: *[Details]*

<sup>12</sup> The British Marine Federation offer an external audit service. [www.britishmarine.co.uk](http://www.britishmarine.co.uk) Details of the service are also given at references 12, 13 and 14.

## **Section 6: Change Control**

Changes to boats and the areas in which they operate inevitably occur and they need to be appropriately considered if the overall operation is to stay in compliance with this Code. Hire operators and navigation authorities need to have processes in place which will ensure that the risks from any actual or proposed change are assessed and responded to appropriately.

### **6.1 Boats**

Hire operators need to carefully consider whether any changes under consideration would lead to the boat falling out of compliance with the standards in this code. In particular they need to pay attention to those changes with the greatest potential for increasing risk. These include:

- **Stability.** Additions to passenger numbers, structural alterations which may add weight or affect centre of gravity, fitting of different engines. These may require additional stability testing, see section 4.3.
- **Fire or explosion.** Installation of new gas appliances, re-routing of pipework, fuel system changes, electrical system changes.
- **Ventilation.** Changes to ventilation arrangements, appliance flues or anything which may impair maintenance of effective fixed ventilation to the required standard.

Any changes being considered must be assessed to ensure they will not increase risk or take the boat out of compliance with this Code. Changes must be carried by competent fitters in accordance with any statutory requirements such as Gas Safety (Installation and Use) and fully tested. The assessment should be simply documented to show that the change has been adequately considered. This can be done in a similar way to the risk assessment process - a simple form for this purpose is given in appendix 4.

### **7.2 Operational Changes.**

Temporary or permanent changes to the area in which the hire boat operates could cause additional hazards which may require additional briefing of hirers, or restrictions to the area of operation. These could include:

- Complete or partial closures to navigable channels for maintenance purposes, or special events.
- Temporary obstructions restricting available channel or airdraft.
- Missing or unserviceable navigation signs or aids e.g. channel markers.
- Severe weather conditions causing flooding or high water flows.

Hire operators should ensure that they pay due heed to the available information sources such as navigation authority notices and bulletins, notices to mariners, extreme weather and flood alerts etc. Navigation and harbour authorities need to ensure they take reasonable measures to notify boat operators of hazardous conditions which they otherwise might not be aware of.

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Risk assessments (section 3) need to be brought up to date accordingly, and the change recorded (appendix 4).

## **Section 7: Record Keeping**

This section recommends the information that should be retained by hire operators and licensing/Navigation authorities. This will assist them if required to produce evidence of compliance with this Code. The following is recommended for document retention:

- *Operational records*: Minimum of two years plus a further two years where any incident has occurred.
- *Boat records*: Minimum of two years plus a further two years where any incident has occurred.
- *Legal, Commercial or Safety Management records*: 6 years.

### **7.1 Hire Operator**

#### **(a) Safety Management Arrangements**

- Who has responsibility for safety, including handovers and the condition of boats (This could be covered by the safety policy statement produced under the Health and Safety at Work act.)

#### **(b) Boat**

- Certificates and results of Initial and Check stability tests (retain for life of boat)
- GSIUR certificates
- Certifying authority certificates, e.g.BSS.
- Inspection records
- Major maintenance and inspection records
- Change/modification records

#### **(c) Operations**

- Booking terms and conditions, and confirmations.
- Who received and delivered handover briefings
- Incidents and accidents reported by operators, hirers, and third parties
- Boat manuals, or briefing notes.
- Customers log sheets (when the hirer and his party arrived on board and were briefed, names of party,etc)
- Boat Acceptance Certificates
- Accident/Incident Reports
- Handover procedures

### **7.2 Licensing/Navigation/Harbour Authorities**

- Safety Policies
- Navigation risk assessments

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- Communications with hire operators
- Accident/incident records
- Licensing records

## **Section 8: Review**

The BMF, AINA, and the MCA will form a small review team who will:

- Monitor experience with the Code, including accident/incident data,
- Propose changes,
- Consult stakeholders on proposed changes,
- Deal with queries on interpretation of the Code,
- Issue and communicate future revisions and issues,

Formal reviews will be carried out annually and reported on the host organisations' websites. Every effort will be made to avoid a substantive re-issue within the first three years of its implementation.

*[Contact Details x 3]*

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**Appendix 1 Guidance on Educational and Special Needs Parties**

*[To be completed on receipt of advice from National Community Boats Association]*

## Appendix 2 Recommendations and Best Practice for Inspection and Maintenance of Craft by Hire Operators.

### A2.1 Introduction

This section contains recommendations for what are considered to be reasonable minimum standards of inspection and maintenance to ensure that boats are dispatched in a safe, serviceable and fully equipped condition, and remain safe throughout their operating lives. Note that these recommendations apply only to safety-related aspects.

This appendix groups maintenance and inspection checks into three types:

- **Turn-round.** The minimum required at turn-round to ensure that the craft is dispatched in a safe and serviceable condition with all its safety equipment.
- **Periodic.** Items which should be checked regularly during the season to ensure safety. Operators may choose to combine these with the *turn-round* checks, or for boats used more intensively, typically day-boats, at time or number-of-trips intervals.
- **Major Servicing** . Carried out at least annually, this includes servicing of major items of equipment and machinery, inspections for deterioration, and replacement of parts as required for a further period of safe operation.

*The following sections give an illustration of items covered under the three types of checks. It is not an exhaustive list. Hire operators are recommended to produce their own maintenance arrangements according to their type of operations and environment.*

### A2.2 Turn-round

Items to be covered include:

- Lifebuoys
- Fire extinguishers/blankets
- Fuel
- Drip trays. Clean and serviceable.
- Engine oil levels
- Ropes, fenders and anchors

### A2.3 Periodic

Items to be covered include:

Functional checks:

- Bilge pumping systems
- Cables and controls
- Switches and instruments
- Battery master switches
- Shore power RCD

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Condition checks:

- Bilge water
- Alternator drive belt
- Coolant level
- Hydraulic system levels
- Ventilation clear (visual check)
- Safety signs (e.g. limited access areas)
- Anti-slip surfaces

### A2.3 Major Servicing

Items to be covered include:

- *Engine/gearbox.* Routine maintenance (e.g. oil/filter changes, valve clearances, drive belt condition, cabling and terminals, starters, leak checking, mountings condition and alignment etc), taking account of manufacturers recommendations.
- *Exhaust.* Serviceability and condition check, including lagging.
- *Hull integrity.* Inspections for deterioration, sea cocks serviceability
- *Cooling system.* (flush, condition of hoses, clips, leak test) Includes calorifiers.
- *Fuel system.* Condition check of pipes, connections, and tanks. Leak-free.
- *Cables and Controls.* Check for damage and wear. Lubricate. Functional checks
- *Stern gear.* Inspect and service.
- *Fire extinguishers.* Annual inspection.
- *Gas systems.* Annual GSIUR inspection. All joints, flexible pipes and regulators, burners flame failure devices etc
- *Battery condition.* Also condition of cables and terminals.
- *Electrics.* Condition of visible cables and terminals.

### A2.4 Documentation

- It is recommended that hire operators produce their own maintenance schedules covering as a minimum the items listed above. It is also recommended that a record of the completion of major servicing is retained signed off by the hire operator. (The signature of the hire operator's representative on handover documentation (section 5.5 – Boat Acceptance Certificate) is confirming to the hirer that turn-round and periodic checks have been carried out.)

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**Appendix 3 List of Consultees**

Association of Inland Navigation Authorities

Association Waterway Cruising Clubs

British Marine Federation

British Ports Association

British Waterways

British Waterways Boat Safety Scheme Advisory Group

Broads Authority

Dept for Transport, Ports Division

Dept for Transport, Shipping Policy

Environment Agency

Inland Waterways Association

Mike Barrett, BRM consultancy Services Ltd

National Assembly for Wales

National Trust

North Norfolk District Council

Port of London Authority

Scottish Executive

South Lakeland District

South West Standing Committee on Safety of Small Craft

UK Major Ports Group

Waterways Ireland

Yacht Brokers, Designers and Surveyors Association

*[To be completed following discussions with BMF, AINA and MCA]*

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**Appendix 4 Example of Risk Assessment and Control Form**

**Hire Boat Company Name**

Prepared by: Dave Brown

Date: 18th June 2008

Authorised by: Harry Smith

Date: 25th June 2008

Next Review Date: 31st March 2009

<b>Boats</b>		
<b>Change<sup>1</sup></b>	<b>Possible Hazard<sup>2</sup></b>	<b>Additional Risk Control Measures<sup>3</sup></b>
<i>Fitting cabin to open boat.</i>	<i>Reduced stability.</i>	<i>Carry out new Initial Stability Test.</i>
<i>New engine/transmission installation.</i>	<i>Different weights/locations could have adverse effect on trim and stability.</i>	<i>Carry out check stability test. Substantial changes may need a new Initial Stability Test.</i>
	<i>Incorrect or incomplete installation.</i>	<i>Commission surveyor to oversee works and commissioning</i>
<i>Additions or modifications to gas systems.</i>	<i>Gas leaks. Potential for fire/explosion.</i>	<i>Works carried out and inspected by competent person.</i>

<b>Operating Environment</b>		
<b>Change<sup>1</sup></b>	<b>Possible Hazard<sup>2</sup></b>	<b>Additional Risk Control Measures<sup>3</sup></b>
<i>Restriction to navigation notified by navigation authority - restricted bridge hole due to repair work.</i>	<i>Collision with temporary works.</i>	<i>Include in handover briefings for duration of works.</i>
<i>Strong streams due to water control.</i>	<i>Abnormally strong flows, flow directions and level changes.</i>	<i>Include in handover briefings for as long as necessary. Possibly advise alternatives routes.</i>
<i>Poor weather leading to abnormal wave heights.</i>	<i>Stability question if heights are outside assumptions made in stability assessment.</i>	<i>Check available margins on wave height and restrict operations if necessary.</i>
<i>Operation of boat outside original area.</i>	<i>Risks arising from non-compliance with the Code.</i>	<i>Assess against Code provisions. Identify non-compliance and identify measures required.</i>

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<b>Crew/Passengers</b>		
<b>Change<sup>1</sup></b>	<b>Possible Hazard<sup>2</sup></b>	<b>Additional Risk Control Measures<sup>3</sup></b>
<i>Exceptionally heavy party.</i>	<i>Stability margins reduced.</i>	<i>Do not permit total crew weight to exceed 85kg times number of persons. Re-emphasise handover briefing stability aspects.</i>

**Notes**

- 1 'Change' includes anything which could introduce a hazard outside the scope of the Code, or require substantial alteration to measures already introduced.
- 2 What could happen as a result of the change.
- 3 The measures judged necessary to deal with the hazard.

## BMF / MCA HIRE BOAT CODE

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### STABILITY, BUOYANCY & FREEBOARD REQUIREMENTS

#### PART 1 – POWERED CRAFT

## 1 GENERAL

### 1.1 Scope

These requirements apply to power-driven boats, including:

- boats providing overnight accommodation and cooking facilities
- day-hire boats
- time-share boats (commercially run)

Personal watercraft, human propelled boats and sailing boats fitted with engines are not included.

### 1.2 Definitions

The following definitions apply:

Child: person weighing less than 37.5kg (approximately 1.2m height).

Day-hire boat: a boat not fitted with overnight accommodation (bunks and cooking facilities).

Decked Boats: boats fitted with a watertight deck or rigid cabin top covering at least 70% of the plan area at deck level. Sliding or lifting rigid cabin tops may be included in the area described as “decked”. Boats with a rigid canopy over an open well are considered to be Open Boats unless the sides are enclosed by rigid structure.

Design Class: a design of boat that has the following:

- (a) Common hire operator.
- (b) Relies on the same Initial Stability Test and Initial Freeboard Test.
- (c) The same hull form.
- (d) The same arrangement of seating, cockpit, decking and superstructure.
- (e) The same location and weight of major masses (e.g. ballast, engines, batteries, fuel and water tanks).
- (f) The same limitations on numbers of persons and accessible areas.
- (g) The same interior arrangement and outfit.
- (h) The same positions of critical downflooding openings.

Different sub-classes (or models) may be created where changes are made to d) e) or f) above. The change will require a Check Stability Test to be carried out. If this

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shows that a fresh Initial Stability Test is required then the boat will be regarded as a new design class.

Flotation: means of providing buoyancy to a swamped boat, eg: air tanks, buoyancy bags.

Freeboard: the least height (when the boat is upright) from the loaded waterline to any opening that may admit water into the interior or non-self-draining part of the boat (also known as downflooding height).

Freeboard margin: the minimum freeboard measured when heeled during the Initial Stability Test.

Hire operator: Person or organisation offering boats for hire (includes time-share operators).

Hirer: Person hiring the boat from the hire operator.

Length of Hull ( $L_H$ ): length of boat from the forward side of the stem at gunwale level to the aftermost point of the watertight hull, measured parallel to the loaded waterline.

Narrowboat: a boat with a maximum beam of 2.08m (6 feet 10 inches) and designed for the narrow waterways and canals.

Open Boats: all boats that are not Decked Boats.

Pontoon Boat: day-hire boat comprising a platform mounted on two cylindrical sealed hulls.

Powered Boats: boats powered by internal (ie: spark or compression ignition) or external combustion engines (eg: steam engine) or electric motors and not fitted with sails.

Seating Place: a place where people can be seated, minimum width 500mm, with legroom appropriate to its height. It may be a dedicated seat or bench, a bunk, sun pad or (in Canoes, Dinghies or Punts) the bottom boards.

Significant wave height: average height of the highest one third of the waves, unless otherwise indicated.

**NB:** Where any of the foregoing definitions differ from the Hire Boat Code, the definitions given above shall be utilised when applying these requirements

## 2. GENERAL STABILITY & FREEBOARD REQUIREMENTS

### 2.1 General

- (a) Except in relation to freeboard (also known as downflooding height), references to:
  - Design Category C in ISO 12217 shall be taken as applicable to MCA Categories C and D.
  - Design Category D in ISO 12217 shall be taken as applicable to MCA Categories A and B.
- (b) Even where ISO 12217 is being utilised, the freeboard requirements of section 4 shall apply to boats assessed using this Code instead of those in ISO 12217.
- (c) Where reference is made to an ISO standard, the relevant definitions and requirements in the document being used shall apply unless they differ from those in this Code, in which case the latter shall apply.
- (d) The maximum number of persons shall not exceed the number of available Seating Places.
- (e) Where limits are placed on the number of persons based on plan area, figures calculated shall be rounded up if the first decimal place is 5 or more, otherwise rounded down.
- (f) Day-hire boats unable to satisfy all the requirements for Category B, but meeting the requirements for Category A, may be operated in Category B waters provided that they do so in conditions not exceeding 20 knots of wind and wave heights of 0.1m significant. When this option is exercised, the hire operator shall maintain daily records of the wind and wave conditions during periods when boats are being hired out.
- (g) Where boats are hired out to groups of young people or groups of mixed ages, the total number of persons permitted by this Code may be exceeded provided that the total weight of persons using the boat does not exceed the number permitted by this Code multiplied by 75kg.

### 2.2 Decked Powered Boats

The stability of decked powered boats shall be assessed using the stability test procedure given in section 3.

The maximum number of persons on the boat, excluding the number permitted on cabin top or side-deck, shall not exceed twice the total plan area (in m<sup>2</sup>) of cockpits that are either open to the air or equipped with portable means of shelter (sliding tops, canvas covers, etc).

Minimum freeboard shall comply with sections 4.1 and 4.2.

Pontoon boats may only be given MCA Category A or B.

### 2.3 Open Powered Boats

The stability of open powered boats shall be assessed using the stability test procedure given in section 3. During the test, persons may be restricted to cockpits or wells.

The maximum number of persons on the boat shall not exceed twice the total plan area (in m<sup>2</sup>) of cockpits that are either open to the air or equipped with portable means of shelter (sliding tops, canvas covers, etc).

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Minimum freeboard shall comply with sections 4.1 and either 4.3 or 4.4 according to whether or not flotation is fitted. The following open powered boats must comply with the flotation requirements of 6.4 and Annex B of ISO 12217-3:

- less than 4m  $L_H$  in Category A waters
- less than 4.5m  $L_H$  in Category B waters
- less than 5m  $L_H$  in Category C waters
- all those in Category D waters

Where flotation is fitted, boats shall comply with clause 6.4 and Annex B of ISO 12217-3, except that the One Person Test is not required for boats where  $L_H$  is greater than 6m. Freeboard requirements are higher where flotation is not fitted.

Boats under 4m length may not be operated outside of MCA Category A or B waters.

Boats required to be marked with either of the labels shown in Figures 3 or 4 (section 3.2) shall not be operated in Category C or D or coastal waters unless a support boat and crew are immediately available.

## 2.4 Plan of Stability and Freeboard Testing

Power-driven boats shall be subjected to the following tests:

### 2.4.1 Initial Stability Test and Initial Freeboard Test.

These tests shall be applied to a representative sample boat of each Design Class when:

- this code comes into effect,
- new or used boats are taken into hire service
- reference data or certification from a previous Initial Stability Test is not available.

Both tests shall be applied to an individual boat that has failed a Check Stability Test.

The Initial Stability Test explores the limits of a craft's stability and must only be undertaken by persons competent to do so and working to a safe system of work. Consult the BMF Technical Department for more information<sup>13</sup>. Further details can be found in Section 3 of these requirements.

Further details of the Initial Freeboard Test can be found in Section 4.1 of these requirements.

### 2.4.2 Check Stability Test.

This test shall be carried out on any boat when any of the following apply:

- after any change of engine type, internal or deckhouse arrangement, or the amount of ballast.

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<sup>13</sup> BMF Technical Department reference [www.britishmarine.co.uk](http://www.britishmarine.co.uk)

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- when any permanent weights of more than 3kg/metre of hull length are added or taken off, or any weight is added high up, e.g. adding or altering a mast.

If the Check Stability Test does not adequately repeat the measurements made during the Initial Stability Test, the latter test is to be conducted on the boat in question.

Check Stability Tests can be carried out by suitably competent hire operator staff. Further details of the test can be found in Section 3.3 of these requirements.

### 3 STABILITY TESTING OF POWERED BOATS

#### 3.1 General

- (a) The Offset Load Test used in ISO 12217 Parts 1 and 3 as amended shall be accepted as equivalent, provided that data to enable Check Stability Tests to be undertaken has been recorded.
- (b) Every boat of a class used by a given hire operator shall have the bow and stern freeboard measured prior to every new season. When this check is made the boat shall be in the loading condition described in 3.2.1(b).
- (c) The Crew Area comprises the areas of the boat in which persons may be safely located when the boat is in use, and comprises all areas defined by the Hire Operator for people to stand, walk, sit or lie during normal operation of the boat including internal decks. On some boats it may be limited to the cockpit, but it must always include all of the primary cockpit. The Crew Area of each class of boat is to be identified in the Hire Operator's documentation and on a diagram placed at the main control position – see Figure 1.
- (d) If the Hire Operator chooses to assess the stability by excluding some areas from the Crew Area or limiting the number of people on any given area, such areas are to be listed in the Hire Operator's documentation and physically marked with “do not access” or “limited access” signs as illustrated in Figures 2 and 3. In addition a diagram identifying such areas and their access limitations shall be placed at the main control position – see Fig 1.
- (e) The lettering on Figure 1 shall be a minimum of 3mm high. Figures 2 and 3 shall have a minimum vertical dimension of 30mm and shall be placed where they are clearly visible. Each label shall comprise a rigid plate or flexible label affixed to the craft in such a way that it can only be removed by the use of tools.

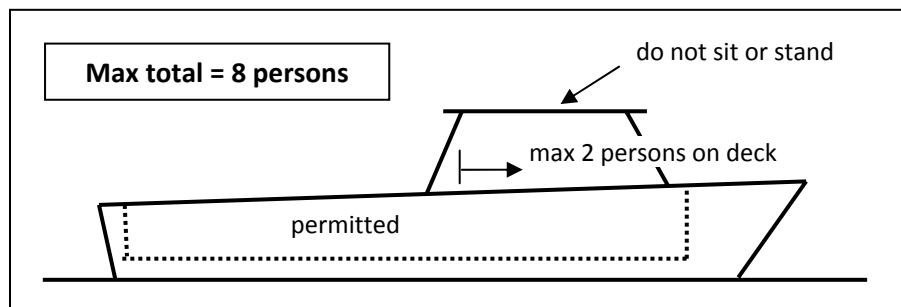


Figure 1

Example Of Crew Area & Access Limitation Label For Control Position.



Figure 2

Do not access



Figure 3

Not more than two persons to access level above

## 3.2 General Initial Stability Test Procedure

### 3.2.1 General

- (a) This procedure applies to the first boat tested of each Design Class that is identical in its class. For details of Check Stability Tests see 3.5.
- (b) Ensure that the bilges of the boat are pumped as dry as practicable and fuel, water and other tanks are between about 25% and 75% full. The boat should be fitted with all normal operating equipment, and outboard motor if appropriate. No personal gear should be on board.
- (c) Record the freeboard on the centreline at both bow and stern, and clearly record the position to which these freeboards have been taken, and whether the boat is in salt or fresh water. These measurements are referred to as the Datum Freeboards.
- (d) Load the boat with all personal effects, stores and baggage to be carried. At least 5kg/person shall be added for open boats, and 20kg/person be added for boats with overnight accommodation or for boats used for camping trips.
- (e) During the tests, on boats with watertight or quick-draining cockpits, water may enter the cockpit through drains when the boat is heeled during the test, provided this water drains overboard when the test weights are moved to the centreline.
- (f) The freeboard margin is, when the boat is heeled, the vertical height from the waterline to the point at which water could first begin to enter the interior or bilge. Where a hull fitting is connected to a pipe, the highest point of the pipe is the height to be measured. Pipes through which water cannot enter the interior or bilge (eg: exhaust pipes, pipes with non-return valves) can be disregarded.
- (g) During the tests, when measuring the freeboard margin, one outboard engine well penetration fitted with a sealing boot may be disregarded.
- (h) All applicable boats must be tested according to 3.2.2. Open power-driven boats of less than 6m  $L_H$  shall also be tested according to 3.2.3.

### 3.2.2 Procedure for General Initial Stability Test

- (a) Assemble a group of people up to a total weight of  $98n$  kg (where  $n$  = number of persons the boat is intended to carry). Record the weight of each person. Alternatively, an 85kg set of test weights may be used instead of each person.

NOTE 85kg includes a margin of 13% to allow for the probability that a group of persons may weigh on average more than 75kg each

- (b) For boats in which all parts of the Crew Area are below the sheerline, successive persons shall be placed on board so as to result in the **least freeboard margin** in each case. For all other boats two tests shall be conducted: the first with persons placed so as to result in the **maximum heel angle**. After completion of this, the persons are to be moved to the positions (using the criteria of (g) below) that result in the least freeboard margin. If the measured freeboard does not satisfy Table 4, remove people or sets of test weights until this is achieved, whilst maintaining the most adverse positioning of the remainder.
- (c) For each test use the following procedure. Where the crew limit is expected to exceed seven persons, up to 25% of the crew limit may be added at each of the first two stages. Successive stages of a physical test should not exceed one person.
- (d) Where people are standing, as far as practicable they should remain upright without exerting much weight on any handholds. When the tester is onboard the boat, he/she should stand on the centreline as close as practicable to the centre of area of the waterplane, so that their presence does not affect the trim, and always stand in the same

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position when measurements are taken. Their weight may be offset against the mass of carry-on load. Persons measuring freeboards should not be on board the boat being tested.

- (e) Place the first person at the main control position, as far outboard as practical but not closer than 200mm from the outboard edge. Measure the heel angle and freeboard margin (see 3.2.1 (f) and (g)).
- (f) Repeat in the opposite direction of heel unless it is clear from any assymetry of the boat that the first direction is most onerous, when only this direction need be tested. The most adverse of the two measurements of each parameter made are to be recorded.
- (g) Place an additional person to one side of the Crew Area. The centre of gravity of each person shall be positioned as far to one side as practicable, provided that adjacent people are not placed with their centres-of-gravity closer than 500 mm apart in any direction, or closer than 200 mm from the outboard edge of the Crew Area, except where the deck is less than 400mm wide when practical positions are to be used .
- (h) Measure the heel angle and least freeboard margin. Repeat in the opposite direction of heel unless it is clear from any assymetry of the boat that one direction is most onerous, when only this direction need be tested. The most adverse of the two measurements made are to be recorded.
- (i) Repeat (e) and (f) for further increments of not more than one person at a time, whilst observing the Hire Operator's definition of Crew Area according to 3.1 (c) and (d). Stop the test when the **first** of the following events happens:
  - the minimum heeled freeboard before downflooding is reached according to Table 4, whether over the gunwale or through openings in the topsides
  - the heel angle (degrees) is  $11.5 + \frac{(24 - L_H)^3}{520}$ , see also Table 5
  - the total mass of people on board reaches  $98n$  kg for the desired crew limit  $n$ .
  - the heel angle suddenly increases a large amount for a small increase in heeling moment. This is when the boat is close to a complete loss of residual stability and consequent capsize.

NOTE: The safe loading of a boat may be limited by any of these factors and there is no safe method of determining in advance which is the limiting factor for a given boat. Therefore all need to be considered and the test stopped when the first of them occurs.

**Caution:** Great caution must be exercised when doing this test because some boats may capsize suddenly. Therefore heeling moments should be increased carefully, especially when approaching the expected Crew Limit. As this point is approached, smaller increments of test weights should be used. In smaller boats it is helpful to attach a capsize preventer rope (eg: from the depressed gunwale to a strong point ashore) provided that this is kept slack enough not to interfere with the test. For larger boats, to give warning of loss of stability, a continuously plotted graph of heel angle against heeling moment (product of the mass of test weights times the distance off the centreline measured parallel to the design waterline) should be used.

**Caution:** Because of the risk of capsize, sets of test weights should be used instead of persons in any locations from which escape would become hazardous should the boat capsize.

- (j) Of the measurements made according to (c), (e) or (h), the maximum heel angle recorded shall be less than that given in Table 5, and the minimum measured freeboard margin recorded shall exceed the requirement given in Table 4.

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- (k) If the test is limited by downflooding over the gunwale, the maximum number of persons allowed is calculated as the maximum actual mass of persons on board, divided by 85kg per person, rounded downwards to the nearest child (or adult).
- (l) If the test is limited by maximum heel angle, loss of stability or downflooding through openings in the topsides, the maximum number of persons allowed is calculated as the maximum actual mass of persons on board, divided by 98kg per person, rounded downwards to the nearest child (or adult).

NOTE: 98kg incorporates a 15% stability margin for persons weighing 85kg each, or 30% for persons weighing 75kg each.

**Table 4 — Required minimum freeboard margin**

Dimensions in millimetres

MCA Category	Decked Boats	Open Boats with Flotation	Open Boats without Flotation
A	10	10	$53\sqrt{L_H}$
B	40	40	$77\sqrt{L_H}$
C	70	70	$92\sqrt{L_H}$
D	100	100	$104\sqrt{L_H}$

**Table 5 — Maximum heel angle for offset load test**

$L_H$ (m)	3	4	5	6	7	8	10	12	15	18	21	24
max heel angle (°)	29.3	26.9	24.7	22.7	20.9	19.4	16.8	14.8	12.9	11.9	11.6	11.5

- (m) When the crew limit has been found, return to a loading condition in which between 40% and 60% of the crew limit are on board, positioned as during the test above. Record the weight and positions (lengthwise and athwartships) of each of the people on board, the consequent heeling moment applied, and the measured heel angles and freeboard margins for later comparison with Check Stability Tests conducted in accordance with 3.4.
- (n) Where an open power-driven boat of  $L_H$  less than 6m of Category A or B is unable to comply with the test above when using people, it may be retested using a set of test weights totalling  $(85 \times L_H / 6)$  kg in respect of each person, in which case the crew limit shall be calculated as in (j) and (k) but using  $(85 \times L_H/6)$  instead of 85 and  $(98 \times L_H / 6)$  instead of 98 respectively.
- (o) If the boat passes this revised test, a label as shown in Figure 4 shall be displayed on the boat. This label shall have a minimum vertical dimension of 50mm and shall be placed where it is clearly visible when entering the boat. It shall be a rigid plate or flexible label affixed to the craft in such a way that it can only be removed by the use of tools.

NOTE The use of water containers instead of metallic test weights will give a less advantageous result.



**Figure 4**  
Dinghy is vulnerable to capsize or swamping

### 3.2.3 Gunwale Load Test

- (a) This test is only applicable to open powered boats of  $L_H$  less than 6m.
- (b) Apply a vertically downwards load of 85kg to the gunwale of the boat without crew at  $L_H/2$  forward of the stern. If this load is applied by suspending a test weight in the water, the dry mass of the test weight must be  $85d$ , where  $d$  is a material coefficient as given in Table 6.

NOTE 85 kg includes a margin of 13% to allow for the probability that a person may weigh on average more than 75kg.

**Table 6 – Material coefficient**

material	lead	65/35 brass	steel	cast iron	aluminium
value of $d$	1,099	1,138	1,151	1,163	1,612

- (c) If the boat swamps or capsizes under this load, a warning label as shown in Figure 5 shall be displayed where it is clearly visible when entering the boat. This label shall have a minimum vertical dimension of 50mm and shall be a rigid plate or flexible label affixed to the craft in such a way that it can only be removed by the use of tools.



**Figure 5**  
Do not sit or stand on the gunwale

### 3.3 Simplified Initial Stability Test (draft)

- (a) This test is only applicable to boats which operate on MCA Category A, B or C waters and which are:
  - (i) 2.08m beam cruising narrowboats over 10m in length, or
  - (ii) decked power-driven boats over 7m in length and which satisfy the following:
    - maximum height of deck or coachroof on which crew members may sit or stand is less than [50]% of the maximum hull beam (excluding rubbers), and

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- maximum number of persons is less than  $(L_H \times B \times B)/15$ , where  $L_H$  is the length of hull and B is the maximum hull beam excluding rubbers.
- (b) This test may be conducted by suitably competent hire operator staff.
- (c) This procedure applies to the first boat tested of each Design Class that is identical in its class. If in any doubt as to whether the weight of ballast fitted or downflooding openings are the same, first conduct the Check Stability Test to confirm this. For details of Check Stability Tests see 3.4.
- (d) Before conducting Initial Stability Test, prepare the boat in accordance with 3.2.1(b), (c) and (d).
- (e) Identify all points in the topsides through which water may flood the interior of the boat (downflooding points). In particular identify those openings with the least height above the waterline. Engine exhausts can be ignored. For openings piped internally, the critical height is to the highest point reached before downflooding begins. On narrowboats the forward door from the bow cockpit is often critical. In such cases if the bow cockpit is watertight, the downflooding point is the door sill.
- (f) Where the minimum *upright* freeboard to critical downflooding openings when the boat is fully loaded with the maximum number of persons onboard at 75kg each is greater than that given in Table 7 or 8 below, no further action is required. In using this table, boat length should be rounded down, and beam rounded up to the nearest figures tabulated.

**Table 7 (provisional)**

**Minimum Upright Freeboard (mm) for MCA Category A and B Waters**

<b>L<sub>H</sub></b> <b>(m)</b>	<b>Maximum Beam (m) excl. rubbers</b>								
	<b>2</b>	<b>2.25</b>	<b>2.5</b>	<b>2.75</b>	<b>3</b>	<b>3.25</b>	<b>3.5</b>	<b>3.75</b>	<b>4</b>
7	508	552	597	642	686	731	776	820	865
8	482	523	565	606	648	689	731	772	814
9	459	497	536	575	613	652	690	729	768
10	439	475	511	547	583	619	655	691	727
11	421	455	489	523	557	590	624	658	692
12	406	438	470	502	534	566	598	630	662
13	393	423	454	484	514	545	575	605	636
15	373	401	429	457	485	513	541	569	597
18	356	382	408	434	460	486	511	537	563
24	349	374	399	424	449	474	499	524	549

**Table 8 (provisional)**

**Minimum Upright Freeboard (mm) for MCA Category C Waters**

<b>L<sub>H</sub></b> <b>(m)</b>	<b>Maximum Beam (m) excl. rubbers</b>								
	<b>2</b>	<b>2.25</b>	<b>2.5</b>	<b>2.75</b>	<b>3</b>	<b>3.25</b>	<b>3.5</b>	<b>3.75</b>	<b>4</b>
7	558	602	647	692	736	781	826	870	915
8	532	573	615	656	698	739	781	822	864
9	509	547	586	625	663	702	740	779	818
10	489	525	561	597	633	669	705	741	777
11	471	505	539	573	607	640	674	708	742
12	456	488	520	552	584	616	648	680	712
13	443	473	504	534	564	595	625	655	686
15	423	451	479	507	535	563	591	619	647
18	406	432	458	484	510	536	561	587	613
24	399	424	449	474	499	524	549	574	599

Where the minimum *upright* freeboard to critical downflooding openings when loaded as described above is NOT greater than that given in Table 7 or 8, then the procedure below must be followed.

- (g) Assemble a group of persons weighing not less than  $98n$  (kg), where  $n$  is the maximum number of persons the boat is intended to carry. Check their total weight using scales.
- (h) Mark the mid-length of the hull of the boat, excluding bow/stern fittings or rudder.
- (i) Position the group of persons on the side-deck, evenly fore-and-aft about the mid-length, and standing as upright as practicable, holding on lightly if necessary.
- (j) Measure the angle of heel and the vertical freeboard margin to the most critical downflooding points forward and aft. BMF Technical Department can advise simple ways of measuring the heel angle.
- (k) If the angle of heel is less than that given in Table 5 above, and the freeboard margin is more than [150]mm for Category A or B waters, or [200]mm for Category C waters, the boat has passed.
- (l) If the boat fails to meet these parameters, either:
  - reduce the number of persons and retest, or
  - impose restrictions on the movement of persons on board (as described in 3.1 above), and retest the boat, positioning persons not permitted on side-decks as far to one side as reasonably practical, or
  - conduct the General Initial Stability Test instead.
- (m) If the number of persons has been reduced, the crew limit is the total weight in kg of those finally on board, divided by 98.
- (n) After the maximum number of persons on board has been found, gather data for the Check Stability Test as follows.
- (o) Find the total weight of a group of approximately half the maximum acceptable number of persons that has been found.
- (p) Repeat the measurements in (i) when this reduced number of persons is positioned on the side-deck evenly about the mid-length, and record the heel angle and freeboard margin fore and aft for comparison with future Check Stability Tests.

### **3.4 Check Stability Test**

- (a) This procedure applies to Check Stability Tests only. For details of tests to be applied to the first boat tested of each Design Class see 3.2 or 3.3.
- (b) Before conducting Check Stability Tests, prepare the boat in accordance with 3.2.1(b), (c) and (d).
- (c) Replicate the total weight of people / weights and total heeling moment as recorded for this test during the Initial Stability Test (see 3.2.2(m) or 3.3(o)).
- (d) The resulting maximum heel angle and minimum heeled freeboard requirements shall then be compared with those of the initial heeling moment during the Initial Stability Check – see 3.2.2 (i). If, for the same total mass of persons added, the original heel angle is exceeded by more than 2% or the original freeboard margin is not attained, then the safe Crew Limit is to be reassessed using the Initial Stability Test procedure as 3.2 or 3.3 above (as was originally used for the boat) in its entirety.

## 4 FREEBOARD REQUIREMENTS

### 4.1 Initial Freeboard Test

- 4.1.1 Freeboard is the least vertical height from the loaded waterline (at design trim and no heel) to any opening in the hull (including the edge of a coaming) that may admit water into the interior or bilge of a boat or a recess. Such openings are called “downflooding openings”.
- 4.1.2 Freeboard shall be measured when the boat is loaded with:
- (a) all normal operating equipment,
  - (b) outboard motor if appropriate,
  - (c) full fuel and water tanks (or weights to make up any missing quantity),
  - (d) a weight of 75kg for each person to be carried, located in practical positions (ie: on thwarts and seats where appropriate) so as to produce a sensible operating trim, ie: slightly stern down (if practicable).
  - (e) at least 5kg/person allowance for personal effects shall be added for day-hire boats, and 20kg/person be added for boats with overnight accommodation or those used for camping trips.
- 4.1.3 When a boat has no downflooding openings, the minimum freeboard to the main deck shall not be less than 80% of the requirements of 4.2.
- 4.1.4 The requirements given in 4.2, 4.3 and 4.4 apply to all downflooding openings except:
- (a) engine exhausts or other openings that are only connected to watertight systems;
  - (b) openings in the sides of outboard engine wells which are of
    - watertightness degree 2 and having the lowest point of downflooding more than 0.1 m above the loaded waterline, or
    - watertightness degree 3 and having the lowest point of downflooding more than 0.2 m above the loaded waterline and also above the top of the transom in way of the engine mounting, provided that well drain holes are fitted, see Figure 6, or
    - watertightness degree 4 and having the lowest point of downflooding more than 0.2 m above the loaded waterline and also above the top of the transom in way of the engine mounting, provided that well drain holes are fitted, and that the part of the interior or non-quick-draining spaces into which water may be admitted has a length less than  $L_H/6$  and from which water up to 0.2 m above the loaded waterline cannot drain into other parts of the interior or non-quick-draining spaces of the boat, see Figure 6.

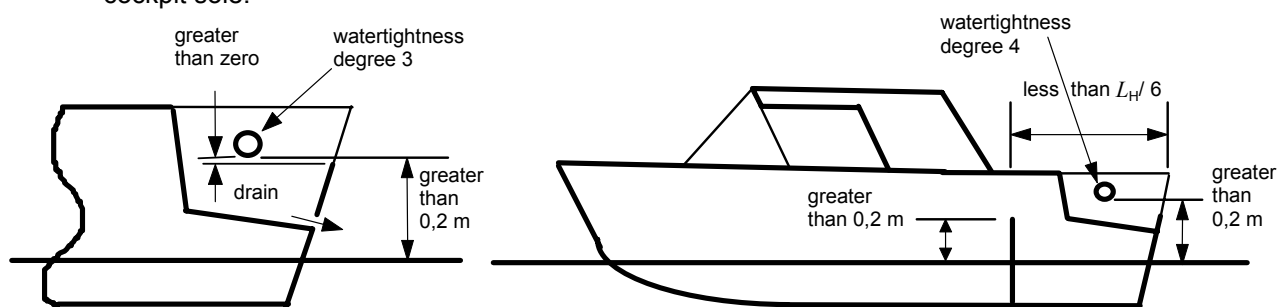
NOTE: Degrees of watertightness and means of testing are given in ISO 12216.

- 4.1.5 Downflooding openings may exist inboard of the side shell, eg: door sills, hatches, outboard engine trunks, sinks or drains piped to hull fittings.
- 4.1.6 Where the flow of water to a downflooding point inboard of the side shell is restricted by drainage holes, channels or pipes with a total cross-section area of less than 20cm<sup>2</sup>, the freeboard shall be not less than 70% of that required by 4.2 to 4.4 below.

EXAMPLES: Sink drains, cabin doors leading from bow cockpits on narrowboats, bilge pump outlets.

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NOTE: It is recommended that doors from bow cockpits on narrowboats (which may be vulnerable to swamping from leaking lock gates) should have a minimum sill height of 75mm above the cockpit sole.



**Figure 6 – Openings in Outboard Engine Wells**

**4.2 Freeboard Requirements for Decked Boats**

The minimum freeboard to downflooding of Decked Boats shall exceed the values given in table 9.

**Table 9 – Minimum Freeboard Of Decked Boats**

dimensions in m

MCA Category	Minimum freeboard (m)		
	$L_H$ less than 7m	$L_H = 7$ to 18m	$L_H$ more than 18m
A	0.250	0.250	0.250
B	0.250	0.250	0.250
C	0.360	$0.0245 \cdot L_H + 0.189$	0.630
D	0.600	$0.0409 \cdot L_H + 0.314$	1.050

**4.3 Freeboard Requirements for Open Boats without Flotation**

The minimum freeboard to downflooding of all Open Boats not fitted with means of flotation shall exceed the values given in Table 10.

**Table 10 – Minimum Freeboard of Open Boats without Flotation**

MCA Category	Minimum freeboard (m)
A	0.250
B	0.400
C	0.600

**4.4 Freeboard Requirements for Open Boats with Flotation**

The minimum freeboard to downflooding of all Open Boats fitted with means of flotation shall exceed the values given in Table 11.

Table 11 – Minimum Freeboard of Open Boats with Flotation

dimensions in m

MCA Category	Minimum freeboard (m)			
	$L_H$ less than 4m	$L_H = 4$ to 7m	$L_H = 7$ to 18m	$L_H$ more than 18m
A	0.200	$0.0167.L_H + 0.133$	0.250	0.250
B	0.200	$0.0167.L_H + 0.133$	0.250	0.250
C	0.300	0.300	$0.0164.L_H + 0.185$	0.480
D	0.400	0.400	$0.0364.L_H + 0.145$	0.800

