Danish Maritime Authority's Technical Regulation No x of xx. xx 2007

Technical Regulation on the stability and buoyancy etc. of houseboats and floating structures[1)]

The following is laid down in pursuance of Sections 1, 3, 17(5), 22, 28 and 32 of the Act on safety at sea, cf. Consolidated Act No 627 of 26 July 2002 as amended by Act No 1465 of 22 December 2004, following authorisation from the Danish Minister for Economic and Business Affairs:

Scope

Section 1. The regulation concerns the stability, buoyancy, watertight subdivision etc. for houseboats (floating homes) and floating structures that are subject to the Construction Act.[2)] The regulation supplements the Construction Act and the administrative provisions issued pursuant thereto.

Subsection 2. The regulation shall also apply to existing floating structures, which shall be approved by an authorised person or undertaking not later than one year after the regulation has entered into force.

Definitions

Section 2. The following definitions are used in this regulation:

1. "Hull": the pontoon or barge under a houseboat or floating structure or the hull of a previous ship that has been fitted out as a floating structure used as a home or for commercial purposes etc.
2. "Recognised standards": Danish design and construction standards, codes of practice[3] and equivalent international standards, as well as recognised classification societies' rules on the design and construction of ships and vessels.
3. "Houseboats and floating structures": unit on the water that is permanently fixed in a port and that is used as a home or for commercial or similar purposes and that is not merely transitory in nature".
4. "Authorised person or undertaking": a person or undertaking authorised by the Danish Maritime Authority to carry out the verifications referred to

1) This Technical Regulation has been notified in draft form in accordance with European Parliament and Council Directive 98/34/EC (the Information Procedure Directive), most recently amended by Directive 98/48/EC.

2) Section 2(3) of the Building Act: "The Act shall apply to portable structures which are intended to be used for structural purposes that are not merely transitory in nature. However, this shall not apply to portable structures permitted to be erected pursuant to the Act on summer houses and camping etc." The comments relating to the Act state that floating structures that are permanently fixed in a port and used as homes or for commercial or institutional purposes are subject to the Construction Act. It is also stated in Section 11(b) of the Construction Act that such structures shall comply with the building regulations or the municipal authority's requirements.

3) E.g. codes of practice for steel or concrete etc.

in Section 13. An authorised person is authorised to demand that repairs are carried out and, following a satisfactory inspection, to issue a certificate concerning this inspection.

5. "Technical expert": a person with documented specialist knowledge on stability and floating structures.

Equivalents

Section 3. If this regulation requires that a particular accessory, material, device or apparatus, or type thereof, be fitted or present on board a houseboat or floating structure, or that certain measures be taken, the Danish Maritime Authority shall permit another accessory, material, device or apparatus, or type thereof, or a different measure to be taken on the floating home if, by the testing thereof or via another method, it feels that it has been substantiated that such an accessory, material, device or apparatus, or type thereof, or measure is as effective as that required in accordance with the regulations.

Subsection 2. The Danish Maritime Authority shall accept tests that have been carried out by recognised testing bodies, including testing bodies in other EU Member States, EFTA States that are signatory to the EEA Agreement and in Turkey, which provide appropriate and satisfactory guarantees of the technical, professional and independent nature of the tests.

Technical requirements

The hull

Section 4. The strength and design of the hull shall be sufficient to withstand all foreseeable conditions during its planned use. The dimensions of the hull shall be such that it is able to bear and absorb the static and dynamic effects of forces from the houses and superstructures placed in or above the hull and from engine or tank installations, where applicable, as well as other equipment. The necessary reinforcements shall be built in where point loads occur.

Subsection 2. The hull shall be designed and constructed in accordance with the relevant provisions in the rules issued by a recognised organisation[4)] with regard to the barge's hull design, strength and material dimensions.

Subsection 3. Where the hull is made of a material or using a method for which there are no design rules provided by the recognised organisations or the Danish Maritime Authority, other recognised standards or codes of practice may be used.

Subsection 4. All spaces, tanks and subdivisions shall be accessible for inspection.

Subsection 5. The hull shall be fitted with its own cleats, fixtures or bollards in order to be able to moor the floating structure securely. There shall also be at least one fixture or bollard at each end which can be used for towing. If the towing fixtures are easily accessible, these may also be approved as mooring fixtures. The area to which the cleats, fixtures and bollards are to be fastened shall be adequately reinforced.

Subsection 6. The design and construction shall be carried out in accordance with recognised standards[5] and with what is required by the materials and construction method used in order to achieve a reliable and safe construction.

Subsection 7. Welding of the hull shall be carried out in accordance with recognised standards and codes of practice for carrying out welding work, e.g. in accor-

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4) Refer to Technical Regulation No 5 of 9 August 2002 on the recognition and authorisation of organisations carrying out inspections and surveys of ships.

5 Where recognised organisations have produced guidelines for the construction, these may be used.

dance with the rules of a recognised organisation.

Materials

Section 5. The hull shall be constructed of steel, aluminium, reinforced concrete or other suitable material which is resistant to salt water, with the application of effective protection, where applicable.

Subsection 2. All materials used for the hull, deck, external cladding and the base for the floor covering that is exposed to water or moisture shall be made of a material that is not adversely affected by moisture, or else it shall be protected in a suitable manner.

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Tanks

Section 6. Where tanks need to be present on board for the storage of water, oil, sewage, etc., in newly constructed hulls the tanks shall be loose or built into a double bottom or double shell and be easy to inspect, both internally and externally.

Subsection 2. The tanks shall be dimensioned to withstand the maximum pressure they may be exposed to during use. Vent pipes shall discharge into the open air at least 380 mm above the deck of the hull.

Bilge systems

Section 7. Each separate delimited space below deck in the houseboat or floating structure shall have a high water level alarm giving an acoustic and visual warning, which in the event of an unintentional inflow of water can be heard throughout the floating home. Where several spaces are connected, it is sufficient for high water level alarms to be installed in one of the spaces at the lowest points, taking into account trim and heel, where applicable.

Subsection 2. There shall be a bilge pump with a minimum capacity that ensures that water can be pumped through the main bilge pipe at a rate of at least 2 m/s. However, the capacity of the bilge pump shall not be less than 15 m^3/h.

The internal diameter 'd' of the main bilge pump is determined using the following formula:

$$d = 25 + 1.68\sqrt{L(B+D)} \text{ (mm)}$$

where: L, B and D are the hull's length, breadth and depth or moulded depth in metres.

The bilge pump(s) shall be arranged so that it is possible to discharge from all spaces below deck, apart from spaces used only for storing water or oil, or it shall be possible to move the pump from one suction well to another.

Subsection 3. Where it can be established that the safety of the barge is not thereby impaired, the bilge pumping arrangement and high water level alarms may be dispensed with in certain spaces. This assumes that in the event of a leak an actual minimum GM value of 0.60 m can be maintained.

Subdivision, buoyancy and stability

Section 8. The houseboat or the floating structure shall be stable under all conceivable conditions, both taking account of its unladen weight, supplies and cargo as well as persons and other moving cargo, during normal use and whilst being towed. It shall be possible for this to be documented for the houseboat or floating structure.

Subsection 2. Hulls constructed as closed, watertight pontoons, for the sole purpose of maintaining the buoyancy of the houseboat or floating structure shall be subdivided by means of, among other things, longitudinal and transverse watertight divisions (bulkheads), which shall ensure that the fully laden house boat or floating structure remains afloat with posi-

tive stability, even if the largest space becomes filled with water. Alternatively, there shall be a sufficient number of pontoons for the houseboat or floating structure to remain afloat with positive stability and a minimum GM value of 0.60 m, even if the largest pontoon becomes filled with water.

Subsection 3. Stability,[6] expressed as metacentric height, GM, in intact condition, shall as a minimum be equal to or greater than a metacentric height (GM) of 0.60 m.

$$GM = \left(\frac{I_{VL}}{V} \right) - BG$$

I_{VL} = the athwartships moment of inertia of the waterplane around the centreline (m^4).

V = the volume of total displacement of the houseboat or floating structure to the relevant waterline (m^3).

G = the common centre of gravity for the fully laden houseboat or floating structure, measured in metres above the lower edge of the keel (lowest point on the lower edge of the barge) in the middle of the barge.

BG = the vertical distance between the centre of buoyancy (B) and the fully laden houseboat or floating structure's combined centre of gravity (G).

M = The metacentre is the point of intersection between the buoyancy line before and after a very slight list.

Subsection 4. When construction of a houseboat or floating structure is complete (that is to say, when it has a superstructure etc.), an inclining test shall be carried out to establish the centre of gravity (G). As an alternative to an inclining test, detailed weight and centre of gravity calculations may be carried out by a competent technical expert.

Subsection 5. If modifications are made to the hull or superstructure which significantly affect the unladen weight and the location of the centre of gravity, the stability shall be re-evaluated by a competent technical expert. Significant in this connection means a change to the unladen weight of ±5% or above or an increase in BG of 3% or above.

Subsection 6. Determination of G may be dispensed with for a particular hull under a houseboat or floating structure if data from an inclining test is available or a precise calculation has been made for a sister vessel. A follow-up check on the unladen weight shall be carried out by observing the draught or freeboard. In the case of deviations of up to 5% of the unladen weight (displacement), the use of stability data from a sister ship is acceptable.

Subsection 7. The stability of the finished, complete houseboat or floating structure shall, in the case of asymmetrical loading (side stress), wind action and a crowding of the maximum number of persons that can be expected to be on board onto one side on the topmost available level, be sufficient for the hull not to list more than 4º and the list must reduce the freeboard on one side by a maximum of two thirds of the original freeboard. A wind pressure of not less than 500 N/m^2 on the floating home's facade above the mooring level shall be applied and the vertical moment arm shall be measured from the centre of the projected underwater hull in profile, or alternatively the wind pressure shall be determined by means of a more detailed calculation pursuant to the

[6]) Refer to the Danish Maritime Authority's most recent guideline on stability approval.

Danish standard code DS 410 Code of practice for loads for the design of structures.

Subsection 8. Equivalent methods for determining stability may be used, provided this is acceptable to the authorised person.

Subsection 9. Ship-like hulls which comply with the relevant provisions for ships shall be regarded as having adequate stability and buoyancy etc.

Freeboard and freeboard-related conditions

Section 9. The freeboard, measured from the surface of the water to the top edge of the hull on the finished houseboat or floating structure, must never be less than 500 mm when the floating home is not listing.

Subsection 2. The watertightness and integrity of the hull, including the watertightness of openings into the sea, shall be maintained whilst being towed. New hulls must not have sea valves and other openings below the waterline, unless there is a closable valve on the shell that can be shut from the deck. Discharge openings in the hull above the light waterline and less than 350 mm above the deepest waterline, and systems with open discharge outlets inboards shall have a non-return valve preventing the penetration of water. Pipe systems connected to lead-throughs in the hull shall be fitted so as to prevent water entering the vessel, even if the valves are open. Valves on hull lead-throughs shall be fit for use on houseboats or floating structures and made of steel, bronze or another tough material and be fitted in such a way that they are easily accessible.

Subsection 3. If the hull has sidescuttles, the lower edge of these shall be positioned at least 500 mm above the surface of the water at the maximum draught. Sidescuttles and windows whose lower edge is less than 800 mm above the waterline at the maximum draught must not be openable. Sidescuttles, windows and apertures as well as the glass therein shall be of solid construction and made of suitable materials. Glass in sidescuttles as well as windows and apertures situated within the freeboard shall be hardened or laminated glass, which shall be mechanically secured between two metal frames or between a flange and a metal frame.

Special safety rules for houseboats or floating structures

Section 10. At least one approved lifebuoy provided with a 30 m line, ready for immediate use, shall be placed on the seaward side of the houseboat or floating structure.

Subsection 2. The houseboat or floating structure shall be provided with a permanently fitted ladder to enable a person who has fallen into the water to climb safely onto the hull. Where the houseboat or floating structure is located at a wharf or bridge provided with equivalent ladders, the ladder on the houseboat or floating structure may be dispensed with.

Subsection 3. In order to prevent people from falling into the water, a guard rail or railing with a handrail, knee rail and foot rail shall be provided on deck and in other places where people pass, or equivalent protection shall be provided by other means. The handrail shall be located at a minimum height of 1 metre, the knee rail at a height of approximately 0.5 metres and the foot rail shall be at least 0.1 metre high. In the case of open types of guard rail the distance between the bars must not be greater than 150 mm. The bars in guard rails shall be placed vertically so that children cannot climb up. For existing railing this can be ensured by fitting plates or tarpaulin on the inside of the bars. Decks,

steps or other places where people pass shall be designed so that the area is anti-skid or shall be covered with an anti-skid material.

Removal of floating structures

Section 11. When a houseboat or floating structure is moved within a harbour or similarly sheltered area, only the number of persons necessary for the removal may be present on board. Approved[7)] lifejackets shall be available for those present on board.

Subsection 2. If the houseboat or floating structure is moved from one harbour to another, it shall be done during a period with prospects of favourable weather conditions, and there must be no persons on board whilst it is being towed outside harbour areas, unless the rules for the construction, design, equipment and operation of ships are complied with.

Approval and surveys

Section 12. Before a hull for a houseboat or floating structure is put into service its structure shall be approved pursuant to this regulation and inspected by a person or undertaking that is authorised to do so by the Danish Maritime Authority. The authorised party shall, following a satisfactory examination and inspection, issue a certificate confirming that the hull complies with this regulation. Before the finished houseboat or floating structure is put into service as new, an authorised person shall verify the stability of the total construction using a recognised method and issue appropriate documentation. The documentation shall be retained by the owner.

Subsection 2. The outside of the houseboat or floating structure's bottom shall be inspected on land by an authorised person at least every 5 years and a certificate shall be issued concerning the inspection. The owner shall retain the certificate from the most recent inspection. The owner shall send a copy of the certificate to the Danish Maritime Authority in electronic or paper form.

Subsection 3. In the case of houseboats and floating structures with a bottom made of specially resistant materials, or which has undergone special preservation and external corrosion protection using long-life paint systems combined with active anodes, the intervals between bottom inspections may be extended to 10 years.

Penalties and entry into force

Section 13. Contravention of Sections 4-13 shall be punished with a fine or imprisonment of up to one year.

Subsection 2. The penalty may increase to imprisonment for up to 2 years, if

1) the contravention has caused harm to life or health or led to the risk thereof,
2) a ban or order has previously been issued regarding the same or equivalent circumstances, or
3) the contravention resulted in, or was intended to result in, financial gain for the party concerned or for others.

Subsection 3. It shall be deemed particularly aggravating circumstances if young people under the age of 18 have suffered harm to life or health or there has been the risk thereof, cf. subsection 2, point 1.

Subsection 4. If the profits gained through the contravention are not confiscated, particular consideration shall be given to the size of the financial gain or intended financial gain when meting out any fine, including any supplementary fine.

[7)] Life-jackets approved in accordance with recognised codes of practice are life-jackets that are CE or wheel marked.

Subsection 5. Criminal liability may be incurred by companies, etc. (legal entities) in accordance with the rules of Chapter 5 of the Penal Code.

Section 14. This regulation shall enter into force on xx.xx.2007.

Section 15. The regulation shall not apply to Greenland.

Subsection 3. Technical Regulation No 1 of 27 January 2004 on the stability and buoyancy etc. of floating homes shall be rescinded.

The Danish Maritime Authority, xx.xx.2007

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Centre for maritime regulation, case 200702234