

**Translation: Only the Danish version is authentic**

*The Danish Maritime Authority's Technical Regulation no. 2 of 3 March 1998*

**Technical regulation on specific stability requirements for ro-ro passenger ships with water on deck engaged on international voyages (Stockholm Agreement)**

In pursuance of section 1(2), section 6, section 11(2) and section 28 of the Act on Ship Safety, etc., cf. consolidated act no. 594 of 26 June 1996, as amended by Act no. 887 of 3 December 1997 and on authority given in Order no. 694 of 17 August 1995, the following provisions are laid down:

*Definitions and equivalents*

**Section 1.** For the purposes of this technical regulation, the following definitions shall apply:

- 1) "Stockholm Agreement" means the Agreement Concerning Specific Stability Requirements for Ro-Ro Passenger Ships Undertaking Regular Scheduled International Voyages between or to or from Designated Ports in North West Europe and the Baltic Sea.
- 2) "Contracting Government" means a government that is a party to the Stockholm Agreement.
- 3) "International voyage" means a voyage from a port in a country which is a party to the Stockholm Agreement to a port in another country, or conversely.
- 4) "Ro-ro passenger ship" means a passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation II-2/3 of the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended.
- 5) "Specific stability requirements" means the specific stability requirements specified in the annexes.
- 6) "Designated port" means any port within the area bounded by lines and the coast as shown on the map at Annex 1 as well as Greenland ports from which ro-ro passenger ships operate on regular scheduled international voyages.

**Section 2.** The following countries are parties to the Stockholm Agreement: Denmark, Finland, Ireland, Norway, Great Britain, Sweden and Germany.

*Subsection 2.* Information about what countries are parties to the Stockholm Agreement will be published in Notices from the Danish Maritime Authority.

**Section 3.** The provisions of this technical provision shall not preclude the use on board of any other fitting, material, appliance, apparatus, etc. or the making of any other provision offering at least the same degree of safety as that required by this technical regulation.

*Subsection 2.* The Danish Maritime Authority shall accept calculations made by recognised test institutes, including by test institutes in other EU member States and in countries that have acceded to the EEA Agreement, which provide appropriate and satisfactory guarantees of a technical, professional and independent nature.

### *Application and documentation*

**Section 4.** The specific stability requirements as well as the provisions stipulating when they will enter into force, cf. Annex 2, shall apply to all ro-ro passenger ships, regardless of their flag, undertaking regular scheduled international voyages between, to or from designated ports.

**Section 5.** Ro-ro passenger ships covered by this technical regulation shall be provided with a document indicating that the ship complies with the specific stability requirements.

*Subsection 2.* The Danish Maritime Authority shall issue the document mentioned in subsection 1 to Danish ro-ro passenger ships.

*Subsection 3.* The Danish Maritime Authority shall accept the document mentioned in subsection 1 if a contracting government has issued it to a ship flying its flag as evidence that the ship complies with the specific stability requirements.

*Subsection 4.* The Danish Maritime Authority shall accept a document as that mentioned in subsection 1 issued by a non-contracting Government to a ship flying its flag unless there are clear grounds to believe that the ship does not comply with the specific stability requirements.

### *Exemption, penalty and entry into force clauses*

**Section 6.** The Danish Maritime Authority may exempt a Danish ro-ro passenger ship that is not normally engaged on regular scheduled international voyages between, to or from designated ports from complying with any or all of the provisions of this technical regulation if the ship is required to undertake a single voyage between, to or from designated ports.

*Subsection 2.* An exemption under subsection 1 may be granted only following consultations between the Danish Maritime Authority and the contracting Governments from or to whose port the voyage is to take place if both the Danish Maritime Authority and the contracting Governments agree that the ship complies with international safety requirements adequate for the intended voyage.

*Subsection 3.* The provision of subsection 2 shall also apply if another government exempts a ship flying its flag from complying with any or all of the specific stability requirements for a single voyage.

**Section 7.** Contraventions of this technical regulation shall be punishable by fine, simple detention or imprisonment for a term not exceeding one year.

*Subsection 2.* The penalty may be increased to simple detention or imprisonment for a term not exceeding two years if the transgressor has acted intentionally or shown gross negligence.

*Subsection 3.* When determining the penalty under subsections 1 and 2, it shall be considered especially aggravating if

- 1) the violation has resulted in damage to life or health, or risk of such damage,
- 2) an order under section 15 of the Act on Ship Safety, etc. has previously been issued for the same or equivalent behaviour, or
- 2) the violation has given or has been intended to give financial benefits to the transgressor or others.

*Subsection 4.* It shall be considered especially aggravating if the violation has resulted in damage to the life or health of young persons below the age of 18, or risk of such damage, cf. subsection 3(1).

*Subsection 5.* If the financial benefit achieved is not confiscated, special consideration shall be given to the size of the achieved or intended financial benefit when determining the size of the fine, including supplementary fine.

*Subsection 6.* Companies, etc. (legal personalities) may be liable to punishment under the rules of the Penal Code, chapter 5.

**Section 8.** This technical regulation enters into force on 1 April 1998.

*Subsection 2.* Technical regulation no. 2 of 17 March 1997 on specific stability requirements for ro-ro passenger ships with water on deck on international voyages (the Stockholm Agreement) issued by the Danish Maritime Authority shall be repealed.

The Danish Maritime Authority, 3 March 1998

Christian Breinholt / Arne Mikkelsen

## **Annex 1**

### **Significant wave heights**

#### **1. General**

This Annex states the significant wave heights ( $H_s$ ) that shall be used for determining the height of water when applying the technical standard contained in Annex 2.

The figures are provided on the enclosed maps presenting the significant wave heights which are not exceeded for more than 10% of the year for the different sea areas covered by the Stockholm Agreement.

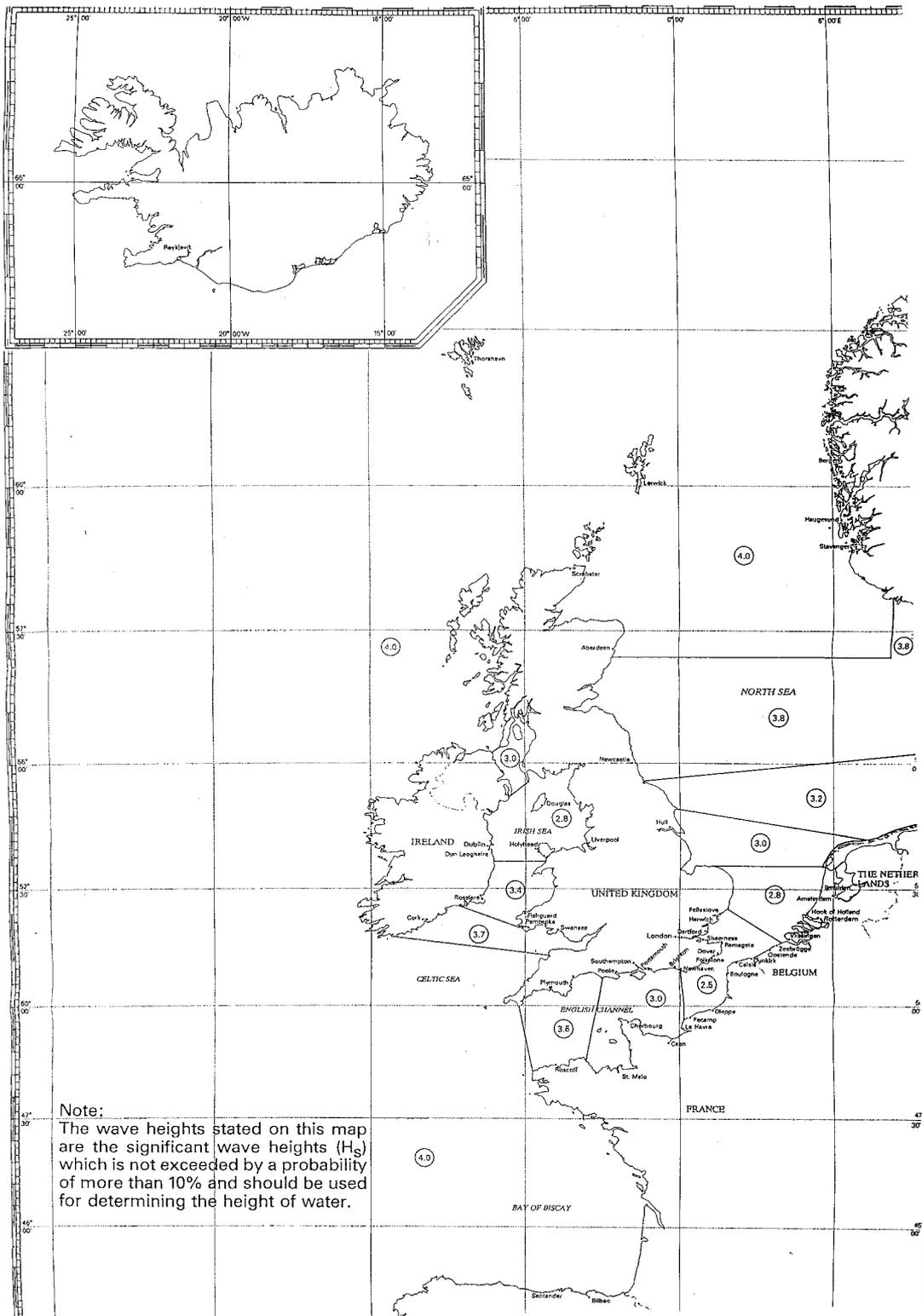
Inshore areas are considered to have a significant wave height less than 1.5 metres unless otherwise indicated on the map.

#### **2. Seasonal operation**

If an established operator operating a regular scheduled service on a year round basis wishes to introduce additional ro-ro passenger ships to operate for a shorter season on that service, the significant wave height applying for such a season shall be agreed by the administrations concerned, i.e. at both ends of the route.

Any such agreement, other than a single ship agreement of less than one month's duration, shall be notified to the Secretary-General of the IMO for circulation to contracting Governments to the SOLAS Convention as well as to the European Commission.





## Annex 2

### Stability requirements under the agreement

#### Introduction

#### Application

Passenger ships with ro-ro cargo spaces or special category spaces as defined in regulation II-2/3 of Notice B from the Danish Maritime Authority, as amended, shall comply with the provisions of this Agreement not later than at the first periodic main survey following the date of compliance prescribed below, according to the value of the calculated factor  $A/A_{max}$ .

$A/A_{max}$  is as defined in the annex to the “Calculation Procedure to Assess the Survivability Characteristics of Existing Ro-Ro Passenger Ships When Using a Simplified Method Based Upon Resolution A.265(VIII)”, developed by the IMO’s Maritime Safety Committee at its fifty-ninth session in June 1991 (MSC/Circ.574).

Value of $A/A_{max}$	Date of Compliance
Less than 85%	1 April 1997
Less than 90%	31 December 1998
Less than 95%	31 December 1999
Less than 97.5%	31 December 2000
97% or higher	31 December 2001 but in any case not later than 1 October 2002

#### Stability standards

- 1 In addition to the requirements of Notice B from the Danish Maritime Authority, regulation II-1/8, ro-ro passenger ships shall comply, subject to the provisions of subparagraph 2, if applicable, with the following:
  - 1.1 The provisions of Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraph 2.3, shall be complied with when taking into account the effect of a hypothetical amount of sea water which is assumed to have accumulated on the first deck above the designed waterline of the ro-ro cargo space or special category space as defined in regulation II-2/3 assumed to be damaged (referred to as “the damaged ro-ro deck” hereinafter). The other requirements of regulation 8 need not be complied with in the application of the stability standard contained in this Agreement. The amount of assumed accumulated sea water shall be calculated on the basis of a water surface having a fixed height above:
    - a) the lowest point of the deck edge of the damaged compartment of the ro-ro deck, or
    - b) when the deck edge in way of the damaged compartment is submerged, then the calculation shall be based on a fixed height above the still water surface at all heel and trim angles; as follows:
      - .1 0.5 m if the residual freeboard ( $f_r$ ) is 0.3 m or less;
      - .2 0.0 m if the residual freeboard ( $f_r$ ) is 2.0 m or more; and
      - .3 intermediate values to be determined by linear interpolation if the residual freeboard ( $f_r$ ) is 0.3 m or more but less than 2.0 m;

where the residual freeboard ( $f_r$ ) is the minimum distance between the damaged ro-ro deck and the final waterline at the location of the damage in the damage case being considered without taking into account the effect of the volume of assumed accumulated water on the damaged ro-ro deck;

- 1.2 when a high-efficiency drainage system has been installed, the Danish Maritime Authority may allow a reduction in the applied height of the water surface in accordance with the guidelines to be developed by the IMO;
- 1.3 for ships in geographically defined restricted areas of operation, the Danish Maritime Authority may accept a reduction of the applied height of the water surface determined in accordance with subparagraph 1.1 by substituting such height of the water surface by the following:
  - .1 0.0 m if the significant wave height ( $H_s$ ) defining the area concerned is 1.5 m or less;
  - .2 the value determined in accordance with subparagraph 1.1 if the significant wave height ( $H_s$ ) defining the area concerned is 4.0 m or above;
  - .3 intermediate values to be determined by linear interpolation if the significant wave height ( $H_s$ ) defining the area concerned is 1.5 m or more but less than 4.0 m; provided that the following conditions are fulfilled:
    - .4 the Danish Maritime Authority is satisfied that the relevant significant wave height ( $H_s$ ) is not exceeded with a probability of more than 10%; and
    - .5 the area of operation and, if applicable, the part of the year for which a certain value of the significant wave height ( $H_s$ ) has been established have been entered into the certificates; and
- 1.4 as an alternative to the requirements of subparagraph 1.1 or subparagraph 1.3, the Danish Maritime Authority may exempt application of these requirements and accept proof established by model tests carried out for each individual ship. The model test shall be carried out in accordance with the model test method shown in Annex 3. The model test shall show that the ship will not capsize with an assumed extent of damage as provided in Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraph 4, in the worst location being considered in relation to subparagraph 1.1 in an irregular seaway, and
- 1.5 reference to approval of the results of the model test by the Danish Maritime Authority as an equivalence to compliance with the requirements of subparagraph 1.1 or subparagraph 1.3 as well as the value of the significant wave height ( $H_s$ ) used in the model tests shall be entered into the ship's certificates.
- 1.6 The information to be supplied to the master of the ship in accordance with Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraphs 7.1 and 7.2, as developed for compliance with subparagraphs 2.3 to 2.3.4, shall be complied with unchanged by ro-ro passenger ships approved according to the agreement.
- 2 For assessing the effect of the volume of the assumed accumulated sea water on the damaged ro-ro deck in subparagraph 1, the following provisions shall prevail:
  - 2.1 A transverse or longitudinal bulkhead shall be considered intact if all parts of it lie inboard of vertical surfaces on both sides of the ship, which are situated at a distance from the shell plating equal to one-fifth of the breadth of the ship, as defined in Notice B from the Danish Maritime Authority, chapter II-1, regulation 2, and measured at right angles to the centreline at the level of the deepest subdivision load line;
  - 2.2 in cases where the ship's hull is structurally partly widened for compliance with the provisions of this regulation, the resulting increase of the value of one-fifth of the breadth of it is to be used throughout, but shall not govern the location of existing

bulkhead penetrations, piping systems, etc, which were acceptable prior to the widening;

- 2.3 the watertightness of transverse or longitudinal bulkheads which are taken into account as effective to confine the assumed accumulated sea water in the compartment concerned in the damaged ro-ro deck shall be assessed together with the drainage system used and shall be capable of withstanding the hydrostatic pressure in accordance with the results of the damage calculation. Such bulkheads shall be at least 4 m in height unless the height of water is less than 0.5 m. In such cases the height of the bulkhead may be calculated in accordance with the following:

$$B_h = 8h_w$$

where  $B_h$  = bulkhead height, and  
 $h_w$  = height of water

In any event, the minimum height of the bulkhead shall be not less than 2.2 m. However, in the case of a ship with hanging car decks, the minimum height of the bulkhead shall be not less than the height to the underside of the hanging car deck when in its lowered position.

- 2.4 For special arrangements such as, for example, full width hanging decks and wide side casings, other bulkhead heights may be accepted based on detailed model tests;
- 2.5 The effect of the volume of the assumed accumulated sea water need not be taken into account for any compartment of the damaged ro-ro deck, provided that such a compartment has on each side of the deck freeing ports evenly distributed along the sides of the compartment complying with the following:
- .1  $A = 0.3 l$   
where  $A$  is the total area of freeing ports on each side of the deck in  $m^2$ ; and  $l$  is the length of the compartment in m;
  - .2 the ship shall maintain a residual freeboard of at least 1.0 m in the worst damage condition without taking into account the effect of the assumed volume of water on the damaged ro-ro deck; and
  - .3 such freeing ports shall be located within the height of 0.6 m above the damaged ro-ro deck, and the lower edge of the ports shall be within 2 cm above the damaged ro-ro deck; and
  - .4 such freeing ports shall be fitted with closing devices or flaps to prevent water entering the ro-ro deck whilst allowing water which may accumulate on the ro-ro deck to drain; and
- 2.6 when a bulkhead above the ro-ro deck is assumed damaged, both compartments bordering the bulkhead shall be assumed flooded to the same height of water surface as calculated in subparagraphs 1.1 and 1.3 above.

## Annex 3

### Model test method

#### 1 Objectives

In the model tests prescribed in Annex 2, subparagraph 1.4 of the agreement, it shall be demonstrated that the ship is capable of withstanding a seaway as defined in subparagraph 3 below in the worst damage case scenario.

#### 2 Ship model

2.1 The model shall copy the actual ship for both outer configuration and internal arrangement – in particular of all damaged spaces, having an effect on the process of flooding and shipping of water. The damage shall represent the worst damage case defined for compliance with Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraph 2.3.2. An additional test shall be required at a level keel midship damage if the worst damage location according to SOLAS 90 is outside the range  $\pm 10\%$  Lpp from the midship. This additional test shall only be required when the ro-ro spaces are assumed to be damaged.

2.2 The model shall comply with the following:

- .1 The length between the perpendiculars (Lpp) shall be at least 3 m;
- .2 the hull shall be thin enough in areas where this feature has influence on the results;
- .3 the characteristics of motion shall be modelled properly to the actual ship, paying particular attention to scaling of radii of gyration in roll and pitch motions. Draught, trim, heel and centre of gravity shall represent the worst damage case;
- .4 main design features such as watertight bulkheads, air escapes, etc. above and below the bulkhead deck that can result in asymmetric flooding shall be modelled properly as far as practicable to represent the real situation;
- .5 the shape of the damage opening shall be as follows:
  - .5.1 Rectangular side profile with a width according to Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraph 4.1, and unlimited vertical extent;
  - .5.2 isosceles triangular profile in the horizontal plane with a height equal to B/5 according to Notice B from the Danish Maritime Authority, chapter II-1, regulation 8, subparagraph 4.2.

#### 3 Procedure for experiments

3.1 The model shall be subjected to a long-crested irregular seaway defined by the JONSWAP<sup>1</sup> spectrum with a significant wave height  $H_s$  as defined in subparagraph 1.3 in Annex 2 on stability requirements as well as a peak period  $T_p$  and a peak enhancement factor  $\gamma$  as follows:

- .1  $T_p = 4 \sqrt{H_s}$  with  $\gamma = 3.3$ ; and

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<sup>1</sup> JONSWAP: Joint Northsea Wave Project.

- .2  $T_p$  equal to the roll resonant period for the damaged ship without water on deck at the specified loading condition but not higher than  $6\sqrt{H_s}$  with  $\gamma = 1$ .
- 3.2 The model shall be free to drift and placed in beam seas ( $90^\circ$  heading) with the damage hole facing the oncoming waves. The model may not be restrained in a manner to resist capsize. If the ship is upright in flooded condition,  $1^\circ$  of heel towards the damage shall be given.
- 3.3 At least 5 (five) experiments for each peak period shall be carried out. The test period for each run shall be of a duration such that a stationary state has been reached but shall be run for not less than 30 minutes in full-scale time. A different wave realization train shall be used for each test.
- 3.4 If none of the experiments results in final inclination towards the damage, the experiments shall be repeated with 5 runs at each of the two specified wave conditions or, alternatively, the model shall be given an additional  $1^\circ$  angle of heel towards the damage and the experiment repeated with 2 runs at each of the two specified wave conditions. The purpose of these additional experiments is to demonstrate, in the best possible way, survival capability against capsize in both directions.
- 3.5 The tests shall be carried out for the following damage cases:
  - .1 The worst damage case with regard to the area under the GZ curve according to the requirements of Notice B from the Danish Maritime Authority; and
  - .2 the worst midship damage case with regard to residual freeboard in the midship area if required by subparagraph 2.1.

#### **4 Survival criteria**

- 4.1 The ship shall be considered as surviving if a stationary state is reached for the successive test runs as required in subparagraph 3.3 but subject to subparagraph 4.2.
- 4.2 Angles of roll of more than  $30^\circ$  against the vertical axis, occurring more frequently than in 20% of the rolling cycles or steady heel greater than  $20^\circ$  shall be taken as capsizing events even if a stationary state is reached.

#### **5 Test approval**

- 5.1 The Danish Maritime Authority shall approve the model test programme in advance. It shall be borne in mind that lesser damages may provide a worst case scenario.
- 5.2 The test shall be documented by means of a report and a video or other visual record containing all relevant information of the ship and test results. A copy of the video and report shall be submitted to the IMO together with the Danish Maritime Authority's acceptance of the test.

**Remarks to technical regulation no. 2 of 3 March on specific stability requirements for ro-ro passenger ships with water on deck engaged on international voyages (Stockholm Agreement)**

The contracting Governments have, in co-operation, drawn up a guidance to the agreement, of which the IMO has been informed by means of an information paper (SLF 40/INF.14). This material in English shall be the basis of the Danish Maritime Authority's interpretations of the agreement and is available from the Centre for Maritime Safety and Environmental Regulation at the DMA.

**Date of compliance with the requirements of the agreement**

Notice B from the Danish Maritime Authority, regulation II-1/8-1 of 1 July 1997 contains a table showing the dates on which existing ro-ro passenger ships engaged on international voyages shall comply with regulation II-1/8 in full. Furthermore, a footnote to regulation II-1/8-1 contains a reference to resolution 14 as adopted by the SOLAS Conference in 1995. This resolution stipulates that two or more contracting Governments may enter into regional agreements amending the provisions of regulation II-1/8-1 for all ro-ro passenger ships engaged on regular scheduled international voyages between designated ports in their territories. The contracting Governments may require that the ships in question comply with specific extra stability requirements that are, in the opinion of the contracting Governments, suitable for the relevant crossing. The Stockholm Agreement constitutes such a regional agreement on extra stability requirements, which means, among others, that the advanced dates in Annex 2 to the Agreement shall be applied to all ships covered instead of the dates stipulated in regulation II-1/8-1.

Notice B from the Danish Maritime Authority, regulation II-1/8-1, indicates the degree of subdivision of passenger ships and, the point of departure is that the requirements of the Stockholm Agreement shall be complied with for this degree of subdivision. However, regulation II-1/8-2 of 1 July 1997 contains provisions stipulating the date on which new and existing ro-ro passenger ships engaged on international voyages and carrying more than 400 persons shall comply with regulation II-1/8.2.3 as a minimum as two-compartment ships. Consequently, one-compartment ships shall, in general, comply with the requirements of the Stockholm Agreement, but when they are to be upgraded to two-compartment ships under regulation II-1/8-2, they shall also comply with the requirements of the Stockholm Agreement as two-compartment ships.

Ships complying with the provisions of IMO Resolution A.265(VIII) shall not comply with regulation II-1/8 without water on deck since they already comply with the equivalent provisions mentioned. On the other hand, the requirement in the Stockholm Agreement for compliance with regulation II-1/8.2.3 with water on deck is a regional extra requirement that these ships are not considered to be in compliance with. The requirement shall be met for the damage cases following from IMO Resolution A.265(VIII), regulation 5(b).

Ships complying with the provisions of the HSC Code shall also comply with regulation II-1/8.2.3 with water on deck for the damage case required by the Code.

Compliance with regulation II-1/8 in its entirety without water on deck cannot be an equivalent to model tests.

All ro-ro passenger ships engaged on regular scheduled international voyages between, to or from designated ports shall thus comply with the specific stability requirements of the table below, regardless of their flag, as a supplement to the requirements of Notice B from the Danish Maritime Authority at the latest at the next periodic main survey after the date stipulated.

### Specific stability requirements

Statutory basis of approved damage stability	Number of persons n to be carried	Entire Notice B, II-1/8	Notice B, II-1/8.2.3	Notice B, II-1/8.2.3	
		Without water on deck	Without water on deck	With water on deck or alternative model test	With water on deck or alternative model test
		As one or several compartment ship	As two or several compartment ship	As one or several compartment ship	As two or several compartment ship
$A/A_{max} < 85$ Keel laid before 1/7 1997	$n < 400$	1/4 1997	-	1/4 1997	-
	$400 \leq n < 600$	1/4 1997	1/10 2010*	1/4 1997	1/10 2010*
	$600 \leq n < 1000$	1/4 1997	1/10 2008*	1/4 1997	1/10 2008*
	$1000 \leq n < 1500$	1/4 1997	1/10 2006*	1/4 1997	1/10 2006*
	$1500 \leq n$	1/4 1997	1/10 2002*	1/4 1997	1/10 2002*
$85 \leq A/A_{max} < 90$ Keel laid before 1/7 1997	$n < 400$	31/12 1998	-	31/12 1998	-
	$400 \leq n < 600$	31/12 1998	1/10 2010*	31/12 1998	1/10 2010*
	$600 \leq n < 1000$	31/12 1998	1/10 2008*	31/12 1998	1/10 2008*
	$1000 \leq n < 1500$	31/12 1998	1/10 2006*	31/12 1998	1/10 2006*
	$1500 \leq n$	31/12 1998	1/10 2002*	31/12 1998	1/10 2002*
$90 \leq A/A_{max} < 95$ Keel laid before 1/7 1997	$n < 400$	31/12 1999	-	31/12 1999	-
	$400 \leq n < 600$	31/12 1999	1/10 2010*	31/12 1999	1/10 2010*
	$600 \leq n < 1000$	31/12 1999	1/10 2008*	31/12 1999	1/10 2008*
	$1000 \leq n < 1500$	31/12 1999	1/10 2006*	31/12 1999	1/10 2006*
	$1500 \leq n$	31/12 1999	1/10 2002*	31/12 1999	1/10 2002*
$95 \leq A/A_{max} < 97.5$ Keel laid before 1/7 1997	$n < 400$	31/12 2000	-	31/12 2000	-
	$400 \leq n < 600$	31/12 2000	1/10 2010*	31/12 2000	1/10 2010*
	$600 \leq n < 1000$	31/12 2000	1/10 2008*	31/12 2000	1/10 2008*
	$1000 \leq n < 1500$	31/12 2000	1/10 2006*	31/12 2000	1/10 2006*
	$1500 \leq n$	31/12 2000	1/10 2004*	31/12 2000	1/10 2004*
$97.5 \leq A/A_{max}$ Keel laid before 1/7 1997	$n < 400$	31/12 2001**	-	31/12 2001**	-
	$400 \leq n$	31/12 2001**	1/10 2010*	31/12 2001**	1/10 2010*
Entire Notice B, II-1/8 Keel laid before 1/7 1997	$n < 400$	Keel laying	-	31/12 2001**	-
	$400 \leq n$	Keel laying	1/10 2010*	31/12 2001**	1/10 2010*
Entire Notice B, II-1/8 Keel laid on or after 1/7 1997	$n < 400$	Keel laying	-	31/12 2001**	-
	$400 \leq n$	-	Keel laying	-	31/12 2001**
Res. A.265(VIII)		-	-	31/12 2001**	-
HSC Code		-	-	-	31/12 2001**

\* or when the ship is 20 years old if this date is later than the date stipulated.

\*\* or on 1 October 2002 if the periodic main survey has not been carried out yet.

- Not to be complied with.

The Danish Maritime Authority accepts that ships be upgraded gradually by increasing their  $A/A_{max}$  before the next periodic main survey after the date stipulated in the table. In this way, an increase of  $A/A_{max}$  may postpone the date of compliance. A postponement may also be

achieved if the number of persons that the ship is permitted to carry is reduced before the next periodic main survey after the date stipulated in the table.

Calculations along with a description of the upgrading shall have been received by the Danish Maritime Authority not later than three months after the date on which the requirement shall have been met.

If, for example, a one-compartment ship carrying 650 persons has a  $A/A_{\max}$  of 94%, it shall as a one-compartment ship comply with the entire regulation II-1/8 without water on deck as well as regulation II-1/8.2.3 with water on deck at the latest at the next periodic main survey after 31 December 1999. Furthermore, it shall as a two-compartment ship comply with regulation II-1/8.2.3 both with and without water on deck at the latest at the next periodic main survey after 1 October 2008.

If the ship in the example is upgraded to an  $A/A_{\max}$  of 97% before the next periodic main survey after 31 December 1999, the date of compliance as a one-compartment ship with the entire regulation II-1/8 without water on deck as well as regulation II-1/8.2.3 with water on deck may be postponed until the next periodic main survey after 31 December 2000.

If the ship in the example is instead limited to carrying 550 persons before the next periodic main survey after 1 October 2008, the date of compliance as a two-compartment ship with regulation II-1/8.2.3 both with and without water on deck may be postponed until the next periodic main survey after 1 October 2010 or when the ship is 20 years old, if this date is later.

### **Weathertightness**

The Stockholm Agreement and Notice B from the Danish Maritime Authority, regulation II-1/20-2, contains requirements for weathertight doors or similar means of closing in openings leading from ro-ro cargo spaces on the bulkhead deck to spaces below the bulkhead deck or subdividing ro-ro cargo spaces. Weathertight doors shall comply with the following requirements:

- a) The door shall be capable of withstanding a static pressure of 0.35 bar (3.5 metres of freshwater measured from the lower edge of the door).
- b) It shall be capable of withstanding the pressure from both sides or only from one side taking into account the spaces that are assumed flooded.
- c) The frame of the door shall be as strong as the door itself.
- d) The pressure test shall be carried out in full scale as a laboratory test and the pressure shall be maintained for at least ten minutes.
- e) A limited water percolation of maximum 1 litre/minute will be accepted at the above-mentioned pressure or at a lower pressure.
- f) When the pressure has been removed, a limited deformation of the door plate will be accepted.
- g) If the door is a type-approved fire door and if its design has been changed to a degree that will, according to an assessment, reduce its fire-resistance, it shall be type-approved again in accordance with IMO Resolution A.754(18).
- h) The pressure test shall be carried out in the presence of and be approved by a surveyor from the administration of the flag State, of one of the contracting Governments

(Stockholm Agreement, section 1(2)), or a classification society authorised by the administration of the flag State.

Bulkheads in which the weathertight doors mentioned have been fitted shall comply with the requirements of subparagraphs a, b and g, but it is accepted that the strength is demonstrated by means of calculations. Deformation shall be permitted, but not fractures.

Doors and bulkheads fitted with the purpose of subdividing ro-ro cargo spaces on the bulkhead deck so that the spread of penetrating water is limited shall comply with the requirements of subparagraphs a, b and c and, furthermore, comply in full with the strength requirements for watertight bulkheads. Means of closing shall be tested by means of high-pressure flushing and demonstrate weathertightness in the sense of the Load Line Convention.

Ramps and hatches leading to spaces below the bulkhead deck shall be tested by means of high-pressure flushing and demonstrate weathertightness in the sense of the Load Line Convention.

Trunks carried through the bulkhead deck shall be dimensioned as watertight bulkheads though the requirements for minimum thickness shall be disregarded.