

SOLAS

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The following amendments to the SOLAS Consolidated Edition 2014 were adopted by the Maritime Safety Committee (MSC) at its ninety-sixth, ninety-seventh, ninety-eighth and ninety-ninth sessions by resolutions MSC.404(96), MSC.409(97), MSC.421(98) and MSC.436(99). In 2018, the Secretariat also issued corrections to resolution MSC.290(87) under the cover of Note Verbale NV.009.

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MSC.290(87)	Chapter II-1: Construction – Structure, subdivision and stability, machinery and electrical installations (Part A-1)	NV.009	2
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MSC.404(96)	Chapter II-2: Construction – Fire protection, fire detection and fire extinction (Parts A, D and G) Chapter III: Life-saving appliances and arrangements (Parts A and B)	1 January 2020	3 4
MSC.409(97)	Chapter II-1: Construction – Structure, subdivision and stability, machinery and electrical installations (Part A-1) Chapter II-2: Construction – Fire protection, fire detection and fire extinction (Parts A and C) Chapter XI-1: Special measures to enhance maritime safety	1 January 2020	7 7 8
MSC.421(98)	Chapter II-1: Construction – Structure, subdivision and stability, machinery and electrical installations (Parts A, B, B-1, B-2, B-4 and C) Chapter II-2: Construction – Fire protection, fire detection and fire extinction (Parts A, C and G) Chapter III: Life-saving appliances and arrangements (Parts A and B) Appendix: Certificates	1 January 2020	9 26 27 28
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Resolution MSC.290(87)

Note verbale NV.009

Chapter II-1

**Construction – Structure, subdivision and stability,
machinery and electrical installations**

Part A-1

Structure of ships

Regulation 3-10

Goal-based ship construction standards for bulk carriers and oil tankers

In paragraph 1.1, the word “or” is added after the words “1 July 2016;” at the end of the sentence.

Resolution MSC.404(96)

adopted on 19 May 2016

Chapter II-2 Construction – Fire protection, fire detection and fire extinction

Part A General

Regulation 3

Definitions

1 *The following new paragraphs are added after the existing paragraph 56:*

“57 *Helicopter landing area* is an area on a ship designated for occasional or emergency landing of helicopters but not designed for routine helicopter operations.

58 *Winching area* is a pick-up area provided for the transfer by helicopter of personnel or stores to or from the ship, while the helicopter hovers above the deck.”

Part D Escape

Regulation 13

Means of escape

3 **Means of escape from control stations, accommodation spaces and service**

3.2 **Means of escape in passenger ships**

2 *The footnote to the title of paragraph 3.2 is deleted.*

3.2.6 **Normally locked doors that form part of an escape route**

3 *The following new paragraphs are added after the existing paragraph 3.2.6.2:*

“3.2.7 **Evacuation analysis for passenger ships***

3.2.7.1 Escape routes shall be evaluated by an evacuation analysis early in the design process. This analysis shall apply to:

- .1** ro-ro passenger ships constructed on or after 1 July 1999; and
- .2** other passenger ships constructed on or after 1 January 2020 carrying more than 36 passengers.

3.2.7.2 The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite to the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

* Refer to the Revised guidelines on evacuation analyses for new and existing passenger ships (MSC.1/Circ.1533), as may be amended.”

7 Additional requirements for ro-ro passenger ships

7.4 Evacuation analysis

4 *Paragraph 7.4 is deleted.*

Part G Special requirements

Regulation 18

Helicopter facilities

2 Application

5 *A new paragraph 2.3 is added after the existing paragraph 2.2 as follows:*

“2.3 Notwithstanding the requirements of paragraph 2.2 above, ships constructed on or after 1 January 2020, having a helicopter landing area, shall be provided with foam firefighting appliances which comply with the relevant provisions of chapter 17 of the Fire Safety Systems Code.”

6 *The existing paragraph 2.3 is renumbered as 2.4 and its text is replaced by the following:*

“2.4 Notwithstanding the requirements of paragraph 2.2 or 2.3 above, ro ro passenger ships without helidecks shall comply with regulation III/28.”

5 Fire-fighting appliances

7 *A new paragraph 5.1.6 is added after the existing paragraph 5.1.5 as follows:*

“.6 in lieu of the requirements of paragraphs 5.1.3 through 5.1.5, on ships constructed on or after 1 January 2020 having a helideck, foam firefighting appliances which comply with the provisions of the Fire Safety Systems Code.”

8 *The remaining paragraphs are renumbered accordingly.*

Chapter III Life-saving appliances and arrangements

Part A General

Regulation 3

Definitions

9 *The following new paragraph 25 is added after the existing paragraph 24:*

“25 *Requirements for maintenance, thorough examination, operational testing, overhaul and repair* means the Requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear, adopted by the Maritime Safety Committee of the Organization by resolution MSC.402(96), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.”

Part B Requirements for ships and life-saving appliances

Section I

Passenger ships and cargo ships

Regulation 20

Operational readiness, maintenance and inspections

3 Maintenance

10 *The existing paragraph 3.1 is replaced by the following:*

“3.1 Maintenance, testing and inspections of life-saving appliances shall be carried out in a manner having due regard to ensuring reliability of such appliances.”

11 Periodic servicing of launching appliances and on-load release gear

11 *The title and text of the existing paragraph 11 is replaced by the following:*

“11 Maintenance, thorough examination, operational testing, overhaul and repair of lifeboats, rescue boats and fast rescue boats, launching appliances and release gear

11.1 Launching appliances shall be:

- .1 subject to a thorough examination at the annual surveys required by regulations I/7 or I/8, as applicable; and
- .2 upon completion of the examination referred to in paragraph 11.1.1, subjected to a dynamic test of the winch brake at maximum lowering speed. The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals of at least once every five years, the test shall be carried out with a proof load equal to 1.1 times the weight of the survival craft or rescue boat and its full complement of persons and equipment.

11.2 Lifeboat and rescue boat release gear, including fast rescue boat release gear and free-fall lifeboat release systems, shall be:

- .1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8;
- .2 in case of on-load release gear, operationally tested under a load of 1.1 times the total mass of the boat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and operational test shall be carried out at least once every five years;* and
- .3 notwithstanding paragraph 11.2.2, the operational testing of free-fall lifeboat release systems shall be performed either by free-fall launch with only the operating crew on board or by a test without launching the lifeboat carried out based on Requirements for maintenance, thorough examination, operational testing, overhaul and repair.

11.3 Davit-launched liferaft automatic release hooks shall be:

- .1 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8; and
- .2 operationally tested under a load of 1.1 times the total mass of the liferaft when loaded with its full complement of persons and equipment whenever the automatic release hook is overhauled. Such overhauling and operational test shall be carried out at least once every five years.*

11.4 Lifeboats and rescue boats, including fast rescue boats, shall be subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8.

11.5 The thorough examination, operational testing and overhaul required by paragraphs 11.1 to 11.4 and the maintenance and repair of equipment specified in paragraphs 11.1 to 11.4 shall be carried out in accordance with the

Requirements for maintenance, thorough examination, operational testing, overhaul and repair, and the instructions for onboard maintenance as required by regulation 36.

* Refer to Recommendation on testing of life-saving appliances (resolution A.689(17), as amended). For life-saving appliances installed on board on or after 1 July 1999, refer to Revised recommendation on testing of life-saving appliances (resolution MSC.81(70), as amended)."

Resolution MSC.409(97)

adopted on 25 November 2016

Chapter II-1

Construction – Structure, subdivision and stability, machinery and electrical installations

Part A-1

Structure of ships

Regulation 3-12

Protection against noise

1 *The existing paragraph 2.1 is amended to read as follows:*

“.1 contracted for construction before 1 July 2014 and the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009; or”.

Chapter II-2

Construction – Fire protection, fire detection and fire extinction

Part A

General

Regulation 1

Application

2 Applicable requirements to existing ships

2 *The following new paragraph is added after existing paragraph 2.8:*

“2.9 Regulation 10.5.1.2.2, as amended by resolution MSC.409(97), applies to ships constructed before 1 January 2020, including those constructed before 1 July 2012.”

Part C

Suppression of fire

Regulation 10

Fire fighting

5 Fire-extinguishing arrangements in machinery spaces

5.1 Machinery spaces containing oil-fired boilers or oil fuel units

5.1.2 Additional fire-extinguishing arrangements

3 *In paragraph 5.1.2.2, the last sentence is replaced by the following:*

“In the case of domestic boilers of less than 175 kW, or boilers protected by fixed water based local application fire-extinguishing systems as required by paragraph 5.6, an approved foam-type extinguisher of at least 135 L capacity is not required.”

Chapter XI-1 Special measures to enhance maritime safety

4 *The following new regulation 2-1 is inserted after the existing regulation 2:*

“Regulation 2-1

Harmonization of survey periods of cargo ships not subject to the ESP Code

For cargo ships not subject to enhanced surveys under regulation XI-1/2, notwithstanding any other provisions, the intermediate and renewal surveys included in regulation I/10 may be carried out and completed over the corresponding periods as specified in the 2011 ESP Code, as may be amended, and the guidelines developed by the Organization,^{*} as appropriate.

^{*} Refer to the Survey guidelines under the harmonized system of survey and certification (HSSC), 2015, as adopted by the Assembly of the Organization by resolution A.1104(29), as may be amended.”

Resolution MSC.421(98)

adopted on 15 June 2017

Chapter II-1

Construction – Structure, subdivision and stability, machinery and electrical installations

Part A

General

Regulation 1

Application

1 *The following new paragraphs 1.1.1 and 1.1.2 are inserted after the existing paragraph 1.1:*

“1.1.1 Unless expressly provided otherwise, parts B, B-1, B-2 and B-4 of this chapter shall only apply to ships:

- .1 for which the building contract is placed on or after 1 January 2020; or
- .2 in the absence of a building contract, the keel of which is laid or which are at a similar stage of construction on or after 1 July 2020; or
- .3 the delivery of which is on or after 1 January 2024.

1.1.2 Unless expressly provided otherwise, for ships not subject to the provisions of sub-paragraph 1.1.1 but constructed on or after 1 January 2009, the Administration shall:

- .1 ensure that the requirements in parts B, B-1, B-2 and B-4 which are applicable under chapter II-1 of the *International Convention for the Safety of Life at Sea, 1974*, as amended by resolutions MSC.216(82), MSC.269(85) and MSC.325(90) are complied with; and
- .2 ensure that the requirements of regulation 19-1 are complied with.”

2 *The existing paragraph 1.3.4 is deleted.*

3 *The existing paragraph 2 is replaced by the following:*

“2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall:

- .1 ensure that the requirements which are applicable under chapter II 1 of the *International Convention for the Safety of Life at Sea, 1974*, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with; and
- .2 ensure that the requirements of regulation 19-1 are complied with.”

Regulation 2

Definitions

4 *The existing paragraph 2 is replaced by the following:*

“2 *Amidships* is at the middle of the length (L).”

5 *The existing paragraphs 9 and 10 are replaced by the following:*

“9 *Draught (d) is the vertical distance from the keel line at:*

- .1 amidships, for ships subject to the provisions of regulation II-1/1.1.1.1; and
- .2 the mid-point of the subdivision length (L_s), for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009,

to the waterline in question.

10 *Deepest subdivision draught (d_s) is the summer load line draught of the ship.”*

6 *The existing paragraph 13 is replaced by the following:*

“13 *Trim is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft:*

- .1 perpendiculars respectively, as defined in the International Convention on Load Lines in force, for ships subject to the provisions of regulation II-1/1.1.1.1; and
- .2 terminals respectively, for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009,

disregarding any rake of keel.”

7 *The existing paragraph 19 is replaced by the following:*

“19 *Bulkhead deck in a passenger ship means the uppermost deck:*

- .1 to which the main bulkheads and the ship's shell are carried watertight, for ships subject to the provisions of regulation II-1/1.1.1.1; and
- .2 at any point in the subdivision length (L_s) to which the main bulkheads and the ship's shell are carried watertight and the lowermost deck from which passenger and crew evacuation will not be impeded by water in any stage of flooding for damage cases defined in regulation 8 and in part B-2 of this chapter, for ships not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009.

The bulkhead deck may be a stepped deck. In a cargo ship not subject to the provisions of regulation II-1/1.1.1.1 but constructed on or after 1 January 2009, the freeboard deck may be taken as the bulkhead deck.”

8 *The existing paragraph 26 is deleted and the remaining paragraphs are renumbered accordingly.*

Part B Subdivision and stability

Regulation 4

General

9 *The existing paragraph 1 and the footnote to existing paragraph 1 are deleted.*

10 *The following new paragraphs 1 and 2 are introduced before the existing paragraph 2:*

“1 Unless expressly provided otherwise, the requirements in parts B-1 to B-4 shall apply to passenger ships.

2 For cargo ships, the requirements in parts B-1 to B-4 shall apply as follows:

- .1 In part B-1:
 - .1 unless expressly provided otherwise, regulation 5 shall apply to cargo ships and regulation 5-1 shall apply to cargo ships other than tankers, as defined in regulation I/2(h);

- .2 regulation 6 to regulation 7-3 shall apply to cargo ships having a length (L) of 80 m and upwards, but may exclude those ships subject to the following instruments and shown to comply with the subdivision and damage stability requirements of that instrument:
- .1 Annex I to MARPOL, except that combination carriers (as defined in SOLAS regulation II-2/3.14) with type B freeboards shall be in compliance with regulation 6 to regulation 7-3;* or
 - .2 the *International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk* (IBC Code);* or
 - .3 the *International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk* (IGC Code);* or
 - .4 the damage stability requirements of regulation 27 of the 1966 Load Lines Convention as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of cargo ships to which regulation 27(9) applies, main transverse watertight bulkheads, to be considered effective, are spaced according to paragraph (12)(f) of resolution A.320(IX), except that ships intended for the carriage of deck cargo shall be in compliance with regulation 6 to regulation 7-3; or
 - .5 the damage stability requirements of regulation 27 of the 1988 Load Lines Protocol, except that ships intended for the carriage of deck cargo shall be in compliance with regulation 6 to regulation 7-3; or
 - .6 the subdivision and damage stability standards in other instruments[†] developed by the Organization.
- .2 Unless expressly provided otherwise, the requirements in parts B-2 and B-4 shall apply to cargo ships.

* Refer to Guidelines for verification of damage stability requirements for tankers (MSC.1/Circ.1461).

[†] .1 For offshore supply vessels of not more than 100 m in length (L), the *Guidelines for the design and construction of offshore supply vessels, 2006* (resolution MSC.235(82), as amended by resolution MSC.335(90)); or

.2 For special purpose ships, the *Code of safety for special purpose ships, 2008* (resolution MSC.266(84), as amended)."

11 *The existing paragraphs 2 to 4 are renumbered accordingly.*

Part B-1 Stability

Regulation 5

Intact stability

12 *The footnote to the title is deleted and the existing paragraphs 1 and 2 are replaced by the following:*

"1 Every passenger ship, regardless of size, and every cargo ship having a length (L) of 24 m and upwards, shall be inclined upon its completion. The lightship displacement and the longitudinal, transverse and vertical position of its centre of gravity shall be determined. In addition to any other applicable requirements of the present regulations, ships having a length of 24 m and upwards shall as a minimum comply with the requirements of part A of the 2008 IS Code.

2 The Administration may allow the inclining test of an individual cargo ship to be dispensed with, provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by regulation 5-1. A lightweight survey shall be carried out upon completion and the ship shall be inclined whenever, in comparison with the data derived from the sister ship, a deviation from the lightship displacement exceeding 1% for ships of 160 m or more in length and 2% for ships of 50 m or less in length and as determined by linear interpolation for intermediate lengths or a deviation from the lightship longitudinal centre of gravity exceeding 0.5% of L is found."

13 *The existing paragraph 5 is replaced by the following:*

"5 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined

whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L is found or anticipated.”

Regulation 5-1

Stability information to be supplied to the master

14 *The existing footnote to the title of the regulation is replaced by the following:*

“* Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456) and the Revised guidance to the master for avoiding dangerous situations in adverse weather and sea conditions (MSC.1/Circ.1228).”

15 *The existing paragraph 1 is replaced by the following:*

“1 The master shall be supplied with such information to the satisfaction of the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.”

16 *The existing paragraph 2.1 is replaced by the following:*

“1 curves or tables of minimum operational metacentric height (GM) and maximum permissible trim versus draught which assures compliance with the intact and damage stability requirements where applicable, alternatively corresponding curves or tables of the maximum allowable vertical centre of gravity (KG) and maximum permissible trim versus draught, or with the equivalents of either of these curves or tables;”.

17 *The existing paragraphs 3 and 4 are replaced by the following:*

“3 The intact and damage stability information required by regulation 5-1.2 shall be presented as consolidated data and encompass the full operating range of draught and trim. Applied trim values shall coincide in all stability information intended for use on board. Information not required for determination of stability and trim limits should be excluded from this information.

4 If the damage stability is calculated in accordance with regulation 6 to regulation 7-3 and, if applicable, with regulations 8 and 9.8, a stability limit curve is to be determined using linear interpolation between the minimum required GM assumed for each of the three draughts d_s , d_p and d_l . When additional subdivision indices are calculated for different trims, a single envelope curve based on the minimum values from these calculations shall be presented. When it is intended to develop curves of maximum permissible KG it shall be ensured that the resulting maximum KG curves correspond with a linear variation of GM.

5 As an alternative to a single envelope curve, the calculations for additional trims may be carried out with one common GM for all of the trims assumed at each subdivision draught. The lowest values of each partial index A_s , A_p and A_l across these trims shall then be used in the summation of the attained subdivision index A according to regulation 7.1. This will result in one GM limit curve based on the GM used at each draught. A trim limit diagram showing the assumed trim range shall be developed.”

18 *The existing paragraph 5 is renumbered as paragraph 6 and amended to read as follows:*

“6 When curves or tables of minimum operational metacentric height (GM) or maximum allowable KG versus draught are not provided, the master shall ensure that the operating condition does not deviate from approved loading conditions, or verify by calculation that the stability requirements are satisfied for this loading condition.”

Regulation 6

Required subdivision index R

19 *The existing chapeau in paragraph 2 is replaced by the following:*

“2 For ships to which the damage stability requirements of this part apply, the degree of subdivision to be provided shall be determined by the required subdivision index R , as follows:”.

20 The existing chapeau in paragraph 2.2 is replaced by the following:
 “2 In the case of cargo ships not less than 80 m in length (L) and not greater than 100 m in length (L_s):”.

21 The text of existing paragraph 2.3 is replaced by the following:

“2.3 In the case of passenger ships:

Persons on board	R
$N < 400$	$R = 0.722$
$400 \leq N \leq 1,350$	$R = \frac{N}{7,580} + 0.66923$
$1,350 < N \leq 6,000$	$R = 0.0369 \times \ln(N + 89.048) + 0.579$
$N > 6,000$	$R = 1 - \frac{852.5 + 0.03875 \times N}{N + 5,000}$

Where:

N = total number of persons on board.”

22 The existing paragraph 2.4 is deleted.

Regulation 7

Attained subdivision index A

23 The first sentence of the existing paragraph 1 is replaced by the following:

“1 An attained subdivision index A is obtained by the summation of the partial indices A_s , A_p and A_l , weighted as shown and calculated for the draughts d_s , d_p and d_l defined in regulation 2 in accordance with the following formula:”.

24 The existing paragraphs 2 and 3 are replaced by the following:

“2 As a minimum, the calculation of A shall be carried out at the level trim for the deepest subdivision draught d_s and the partial subdivision draught d_p . The estimated service trim may be used for the light service draught d_l . If, in any anticipated service condition within the draught range from d_s to d_l , the trim variation in comparison with the calculated trims is greater than 0.5% of L , one or more additional calculations of A are to be performed for the same draughts but including sufficient trims to ensure that, for all intended service conditions, the difference in trim in comparison with the reference trim used for one calculation will be not more than 0.5% of L . Each additional calculation of A shall comply with regulation 6.1.

3 When determining the positive righting lever (GZ) of the residual stability curve in the intermediate and final equilibrium stages of flooding, the displacement used should be that of the intact loading condition. All calculations should be done with the ship freely trimming.”

Regulation 7-1*Calculation of p_i*

25 In the existing paragraph 1, the text of the notation for the mean transverse distance b is replaced by the following:

“ b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision draught between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane shall be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision draught the vertical plane used for determination of b is assumed to extend upwards to the deepest subdivision waterline. In any case, b is not to be taken greater than $B/2$.”

Regulation 7-2*Calculation of the factor s_i*

26 The existing paragraphs 2 to 4.1.2 are replaced by the following:

“2 For passenger ships, and cargo ships fitted with cross-flooding devices, the factor $s_{\text{intermediate},i}$ is taken as the least of the s -factors obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows:

$$s_{\text{intermediate},i} = \left(\frac{GZ_{\text{max}}}{0.05} \cdot \frac{\text{Range}}{7} \right)^{\frac{1}{4}}$$

where GZ_{max} is not to be taken as more than 0.05 m and Range as not more than $7^\circ \cdot s_{\text{intermediate},i} = 0$, if the intermediate heel angle exceeds 15° for passenger ships and 30° for cargo ships.

For cargo ships not fitted with cross-flooding devices the factor $s_{\text{intermediate},i}$ is taken as unity, except if the Administration considers that the stability in intermediate stages of flooding may be insufficient, it should require further investigation thereof.

For passenger and cargo ships, where cross-flooding devices are fitted, the time for equalization shall not exceed 10 min.

3 The factor $s_{\text{final},i}$ shall be obtained from the formula:

$$s_{\text{final},i} = K \cdot \left(\frac{GZ_{\text{max}}}{TGZ_{\text{max}}} \cdot \frac{\text{Range}}{TRange} \right)^{\frac{1}{4}}$$

where:

GZ_{max} is not to be taken as more than TGZ_{max} ;

Range is not to be taken as more than $TRange$;

$TGZ_{\text{max}} = 0.20$ m, for ro-ro passenger ships each damage case that involves a ro-ro space,

$TGZ_{\text{max}} = 0.12$ m, otherwise;

$TRange = 20^\circ$, for ro-ro passenger ships each damage case that involves a ro-ro space,

$TRange = 16^\circ$, otherwise;

$K = 1$ if $\theta_e \leq \theta_{\text{min}}$

$K = 0$ if $\theta_e \geq \theta_{\text{max}}$

$K = \sqrt{\frac{\theta_{\text{max}} - \theta_e}{\theta_{\text{max}} - \theta_{\text{min}}}}$ otherwise,

where:

θ_{\min} is 7° for passenger ships and 25° for cargo ships; and

θ_{\max} is 15° for passenger ships and 30° for cargo ships.

4 The factor $s_{\text{mom},i}$ is applicable only to passenger ships (for cargo ships $s_{\text{mom},i}$ shall be taken as unity) and shall be calculated at the final equilibrium from the formula:

$$s_{\text{mom},i} = \frac{(GZ_{\max} - 0.04) \cdot \text{Displacement}}{M_{\text{heel}}}$$

where:

Displacement is the intact displacement at the respective draught (d_s , d_p or d_l);

M_{heel} is the maximum assumed heeling moment as calculated in accordance with sub-paragraph 4.1; and

$$s_{\text{mom},i} \leq 1$$

4.1 The heeling moment M_{heel} is to be calculated as follows:

$$M_{\text{heel}} = \text{maximum} (M_{\text{passenger}} \text{ or } M_{\text{wind}} \text{ or } M_{\text{survivalcraft}})$$

4.1.1 $M_{\text{passenger}}$ is the maximum assumed heeling moment resulting from movement of passengers, and is to be obtained as follows:

$$M_{\text{passenger}} = (0.075 \cdot N_p) \cdot (0.45 \cdot B) \quad (\text{t} \cdot \text{m})$$

where:

N_p is the maximum number of passengers permitted to be on board in the service condition corresponding to the deepest subdivision draught under consideration; and

B is the breadth of the ship as defined in regulation 2.8.

Alternatively, the heeling moment may be calculated assuming the passengers are distributed with 4 persons per square metre on available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment. In doing so, a weight of 75 kg per passenger is to be assumed.

4.1.2 M_{wind} is the maximum assumed wind moment acting in a damage situation:

$$M_{\text{wind}} = \frac{P \cdot A \cdot Z}{9,806} \quad (\text{t} \cdot \text{m})$$

where:

$$P = 120 \text{ N/m}^2;$$

A = projected lateral area above waterline;

Z = distance from centre of lateral projected area above waterline to $T/2$; and

T = respective draught (d_s , d_p or d_l).

27 *The existing paragraph 5 is replaced by the following:*

5 Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements. Where it is necessary to correct large angles of heel, the means adopted shall, where practicable, be self-acting, but in any case where controls to equalization devices are provided they shall be operable from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. These fittings together with their controls shall be acceptable to the Administration.* Suitable information concerning the use of equalization devices shall be supplied to the master of the ship.

* Reference is made to the Revised recommendation on a standard method for evaluating cross-flooding arrangements, adopted by the Organization by resolution MSC.362(92), as may be amended."

28 *The existing chapeau of paragraph 5.2 is replaced by the following:*

“5.2 The factor s_i is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:”.

29 *The existing paragraph 5.3 is replaced by the following:*

“5.3 The factor s_i is to be taken as zero if, taking into account sinkage, heel and trim, any of the following occur in any intermediate stage or in the final stage of flooding:

- .1** immersion of any vertical escape hatch in the bulkhead deck of passenger ships and the freeboard deck of cargo ships intended for compliance with chapter II-2;
- .2** any controls intended for the operation of watertight doors, equalization devices, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships become inaccessible or inoperable; and
- .3** immersion of any part of piping or ventilation ducts located within the assumed extent of damage and carried through a watertight boundary if this can lead to the progressive flooding of compartments not assumed as flooded.”

30 *The existing paragraph 5.5 is replaced by the following:*

“5.5 Except as provided in paragraph 5.3.1, openings closed by means of watertight manhole covers and flush scuttles, remotely operated sliding watertight doors, sidescuttles of the non-opening type as well as watertight access doors and watertight hatch covers required to be kept closed at sea need not be considered.”

Regulation 8

Special requirements concerning passenger ship stability

31 *The existing paragraphs 1 and 2 and the chapeau of paragraph 3 are replaced by the following:*

“1 A passenger ship intended to carry 400 or more persons shall have watertight subdivision abaft the collision bulkhead so that $s_i = 1$ for a damage involving all the compartments within $0.08L$ measured from the forward perpendicular for the three loading conditions used to calculate the attained subdivision index A . If the attained subdivision index A is calculated for different trims, this requirement shall also be satisfied for those loading conditions.

2 A passenger ship intended to carry 36 or more persons is to be capable of withstanding damage along the side shell to an extent specified in paragraph 3. Compliance with this regulation is to be achieved by demonstrating that s_i , as defined in regulation 7-2, is not less than 0.9 for the three loading conditions used to calculate the attained subdivision index A . If the attained subdivision index A is calculated for different trims, this requirement shall also be satisfied for those loading conditions.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2 is to be dependent on the total number of persons carried, and L , such that:”.

32 *The existing paragraph 3.2 is replaced by the following:*

- “2** where 400 or more persons are to be carried, a damage length of $0.03L$, but not less than 3 m is to be assumed at any position along the side shell, in conjunction with a penetration inboard of $0.1B$ but not less than 0.75 m measured inboard from the ship side, at right angles to the centreline at the level of the deepest subdivision draught;”.

33 *The existing paragraph 3.4 is replaced by the following:*

- “4** where 36 persons are carried, a damage length of $0.015L$ but not less than 3 m is to be assumed, in conjunction with a penetration inboard of $0.05B$ but not less than 0.75 m; and”.

Regulation 8-1

System capabilities and operational information after a flooding casualty on passenger ships

2 Availability of essential systems in case of flooding damage

34 *The existing text of paragraph 2 is replaced by the following:*

“A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational when the ship is subject to flooding of any single watertight compartment.”

3 Operational information after a flooding casualty

35 *The text of the existing chapeau of paragraph 3 is replaced by the following:*

“For the purpose of providing operational information to the Master for safe return to port after a flooding casualty, passenger ships shall have:”.

36 *The existing footnote to the regulation is replaced by the following:*

“*Refer to the Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow (MSC.1/Circ.1400) and the Revised guidelines on operational information for masters of passenger ships for safe return to port (MSC.1/Circ.1532/Rev.1).”

Part B-2**Subdivision, watertight and weathertight integrity****Regulation 9**

Double bottoms in passenger ships and cargo ships other than tankers

37 *The existing paragraph 3 is replaced by the following:*

3.1 Small wells constructed in the double bottom in connection with drainage arrangements shall not extend downward more than necessary. The vertical distance from the bottom of such a well to a plane coinciding with the keel line shall not be less than $h/2$ or 500 mm, whichever is greater, or compliance with paragraph 8 of this regulation shall be shown for that part of the ship.

3.2 Other wells (e.g. for lubricating oil under main engines) may be permitted by the Administration if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

3.2.1 For a cargo ship of 80 m in length and upwards or for a passenger ship, proof of equivalent protection is to be shown by demonstrating that the ship is capable of withstanding bottom damages as specified in paragraph 8. Alternatively, wells for lubricating oil below main engines may protrude into the double bottom below the boundary line defined by the distance h provided that the vertical distance between the well bottom and a plane coinciding with the keel line is not less than $h/2$ or 500 mm, whichever is greater.

3.2.2 For cargo ships of less than 80 m in length the arrangements shall provide a level of safety to the satisfaction of the Administration.”

38 *The existing paragraphs 6 to 8 are replaced by the following:*

6 Any part of a cargo ship of 80 m in length and upwards or of a passenger ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5, as specified in paragraph 2, shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.

7 In the case of unusual bottom arrangements in a cargo ship of 80 m in length and upwards or a passenger ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8. For cargo ships of less than 80 m in length the alternative arrangements shall provide a level of safety to the satisfaction of the Administration.

8 Compliance with paragraphs 3.1, 3.2.1, 6 or 7 is to be achieved by demonstrating that s_{ij} , when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to bottom damage with an extent specified in sub-paragraph .2 below for any position in the affected part of the ship:

- .1 Flooding of such spaces shall not render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.
- .2 Assumed extent of damage shall be as follows:

	For 0.3L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	$1/3L^{2/3}$ or 14.5 m, whichever is less	$1/3L^{2/3}$ or 14.5 m, whichever is less
Transverse extent	$B/6$ or 10 m, whichever is less	$B/6$ or 5 m, whichever is less
Vertical extent, measured from the keel line	$B/20$, to be taken not less than 0.76 m and not more than 2 m	$B/20$, to be taken not less than 0.76 m and not more than 2 m

- .3 If any damage of a lesser extent than the maximum damage specified in .2 would result in a more severe condition, such damage should be considered."

Regulation 10

Construction of watertight bulkheads

39 *The existing paragraph 1 is replaced by the following:*

"1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed having scantlings as specified in regulation 2.17. In all cases, watertight subdivision bulkheads shall be capable of supporting at least the pressure due to a head of water up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships."

Regulation 12

Peak and machinery space bulkheads, shaft tunnels, etc.

40 *The existing paragraph 1 is replaced by the following:*

"1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. This bulkhead shall be located at a distance from the forward perpendicular of not less than $0.05L$ or 10 m, whichever is less, and, except as may be permitted by the Administration, not more than $0.08L$ or $0.05L + 3$ m, whichever is the greater.

2 The ship shall be so designed that s_i calculated in accordance with regulation 7-2 will not be less than 1 at the deepest subdivision draught loading condition, level trim or any forward trim loading conditions, if any part of the ship forward of the collision bulkhead is flooded without vertical limits."

41 *The existing paragraphs 2 to 10 are replaced by the following:*

"3 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g. a bulbous bow, the distances stipulated in paragraph 1 shall be measured from a point either:

- .1 at the mid-length of such extension;
- .2 at a distance $0.015L$ forward of the forward perpendicular; or
- .3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

4 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 3.

5 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

6.1 Except as provided in paragraph 6.2, the collision bulkhead may be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the valve being located inside the forepeak at the collision bulkhead. The Administration may, however, authorize the fitting of this valve on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. Alternatively, for cargo ships, the pipe may be fitted with a butterfly valve suitably supported by a seat or flanges and capable of being operated from above the freeboard deck. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

6.2 If the forepeak is divided to hold two different kinds of liquids, the Administration may allow the collision bulkhead to be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by two pipes, each of which is fitted as required by paragraph 6.1, provided the Administration is satisfied that there is no practical alternative to the fitting of such a second pipe and that, having regard to the additional subdivision provided in the forepeak, the safety of the ship is maintained.

7 Where a long forward superstructure is fitted, the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. The extension need not be fitted directly above the bulkhead below provided that all parts of the extension, including any part of the ramp attached to it, are located within the limits prescribed in paragraph 1 or 3, with the exception permitted by paragraph 8, and that the part of the deck which forms the step is made effectively weathertight. The extension shall be so arranged as to preclude the possibility of the bow door or ramp, where fitted, causing damage to it in the case of damage to, or detachment of, a bow door or any part of the ramp.

8 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the ramp shall be weathertight over its complete length. In cargo ships, the part of the ramp which is more than 2.3 m above the freeboard deck may extend forward of the limit specified in paragraph 1 or 3. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

9 The number of openings in the extension of the collision bulkhead above the freeboard deck shall be restricted to the minimum compatible with the design and normal operation of the ship. All such openings shall be capable of being closed weathertight.

10 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck of passenger ships and the freeboard deck of cargo ships. An afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck or the freeboard deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck or the freeboard deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

11 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. In passenger ships the stern gland shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such volume that, if flooded by leakage through the stern gland, the bulkhead deck will not be immersed. In cargo ships other measures to minimize the danger of water penetrating into the ship in case of damage to stern tube arrangements may be taken at the discretion of the Administration."

Regulation 13

Openings in watertight bulkheads below the bulkhead deck in passenger ships

42 *The existing paragraph 11.1 is replaced by the following:*

"11.1 Where trunkways or tunnels for access from crew accommodation to the machinery spaces, for piping or for any other purpose, are carried through watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 16-1. The access to at least one end of each such tunnel or trunkway, if used as a passage at sea, shall be through a trunk extending watertight to a height sufficient to permit access above the bulkhead deck. The access to the other end of the trunkway or tunnel may be through a watertight door of the type required by its location in the ship. Such trunkways or tunnels shall not extend through the first subdivision bulkhead abaft the collision bulkhead."

Regulation 15

Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

43 *The existing paragraphs 4 and 5.1 are replaced by the following:*

4 Efficient hinged inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be fitted to all sidescuttles except that, abaft one eighth of the ship's length from the forward perpendicular and above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 m plus 2.5% of the breadth of the ship above the deepest subdivision draught, the deadlights may be portable in passenger accommodation, unless the deadlights are required by the International Convention on Load Lines in force to be permanently attached in their proper positions. Such portable deadlights shall be stowed adjacent to the sidescuttles they serve.

5.1 No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo."

44 *The existing paragraph 8.2.1 is replaced by the following:*

8.2.1 Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 8.3, each separate discharge led through the shell plating from spaces below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be provided with either one automatic non-return valve fitted with a positive means of closing it from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships or with two automatic non-return valves without positive means of closing, provided that the inboard valve is situated above the deepest subdivision draught and is always accessible for examination under service conditions. Where a valve with positive means of closing is fitted, the operating position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed."

45 *The existing paragraph 8.4 is replaced by the following:*

8.4 Moving parts penetrating the shell plating below the deepest subdivision draught shall be fitted with a watertight sealing arrangement acceptable to the Administration. The inboard gland shall be located within a watertight space of such volume that, if flooded, the bulkhead deck of passenger ships and the freeboard deck of cargo ships will not be submerged. The Administration may require that if such compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices must remain available in other parts of the ship."

Regulation 16

Construction and initial tests of watertight doors, sidescuttles, etc.

46 *The existing title of regulation 16 is replaced by the following:*

"Regulation 16

Construction and initial tests of watertight closures".

47 *The existing paragraphs 1 and 2 are replaced by the following:*

1.1 The design, materials and construction of all watertight closures such as doors, hatches, sidescuttles, gangway and cargo ports, valves, pipes, ash-chutes and rubbish chutes referred to in these regulations shall be to the satisfaction of the Administration.

1.2 Such valves, doors, hatches and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety.

1.3 The frames of vertical watertight doors shall have no groove at the bottom in which dirt might lodge and prevent the door closing properly.

2 Watertight doors and hatches shall be tested by water pressure to the maximum head of water they might sustain in a final or intermediate stage of flooding. For cargo ships not covered by damage stability requirements, watertight doors and hatches shall be tested by water pressure to a head of water measured from the lower edge of the opening to 1 m above the freeboard deck. Where testing of individual doors and hatches is not carried out because of possible damage to insulation or outfitting items, testing of individual doors and hatches may be replaced

by a prototype pressure test of each type and size of door or hatch with a test pressure corresponding at least to the head required for the individual location. The prototype test shall be carried out before the door or hatch is fitted. The installation method and procedure for fitting the door or hatch on board shall correspond to that of the prototype test. When fitted on board, each door or hatch shall be checked for proper seating between the bulkhead, the frame and the door or between deck, the coaming and the hatch."

Regulation 16-1

Construction and initial tests of watertight decks, trunks, etc.

48 *The existing paragraphs 2 and 3 are replaced by the following:*

"2 In passenger ships, where a ventilation trunk passing through a structure penetrates a watertight area of the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle during flooding, in accordance with regulation 7-2.

3 In ro-ro passenger ships, where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck."

Regulation 17

Internal watertight integrity of passenger ships above the bulkhead deck

49 *The existing paragraph 3 is replaced by the following:*

"3 Air pipes terminating within a superstructure which are not fitted with watertight means of closure shall be considered as unprotected openings when applying regulation 7-2.6.1.1."

Part B-4 **Stability management**

Regulation 19

Damage control information

50 *The existing paragraph 2 is deleted and the remaining paragraphs are renumbered accordingly.*

51 *The following new regulation 19-1 is introduced after the existing regulation 19:*

"Regulation 19-1

Damage control drills for passenger ships

1 This regulation applies to passenger ships constructed before, on or after 1 January 2020.

2 A damage control drill shall take place at least every three months. The entire crew need not participate in every drill, but only those crew members with damage control responsibilities.

3 The damage control drill scenarios shall vary each drill so that emergency conditions are simulated for different damage conditions and shall, as far as practicable, be conducted as if there were an actual emergency.

4 Each damage control drill shall include:

- .1 for crew members with damage control responsibilities, reporting to stations and preparing for the duties described in the muster list required by regulation III/8;
- .2 use of the damage control information and the onboard damage stability computer, if fitted, to conduct stability assessments for the simulated damage conditions;
- .3 establishment of the communications link between the ship and shore-based support, if provided;
- .4 operation of watertight doors and other watertight closures;
- .5 demonstrating proficiency in the use of the flooding detection system, if fitted, in accordance with muster list duties;

- .6 demonstrating proficiency in the use of cross-flooding and equalization systems, if fitted, in accordance with muster list duties;
 - .7 operation of bilge pumps and checking of bilge alarms and automatic bilge pump starting systems; and
 - .8 instruction in damage survey and use of the ship's damage control systems.
- 5 At least one damage control drill each year shall include activation of the shore-based support, if provided in compliance with regulation II-1/8-1.3, to conduct stability assessments for the simulated damage conditions.
- 6 Every crew member with assigned damage control responsibilities shall be familiarized with their duties and about the damage control information before the voyage begins.
- 7 A record of each damage control drill shall be maintained in the same manner as prescribed for the other drills in regulation III/19.5."

Regulation 20

Loading of passenger ships

52 *The existing title and paragraph 1 of regulation 20 are replaced by the following:*

"Regulation 20

Loading of ships

1 On completion of loading of the ship and prior to its departure, the master shall determine the ship's trim and stability and also ascertain and record that the ship is upright and in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation or by ensuring that the ship is loaded according to one of the precalculated loading conditions within the approved stability information. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose."

Regulation 21

Periodical operation and inspection of watertight doors, etc., in passenger ships

53 *The existing paragraph 1 is replaced by the following:*

"1 Operational tests of watertight doors, sidescuttles, valves and closing mechanisms of scuppers, ash-chutes and rubbish-chutes shall take place weekly. In ships in which the voyage exceeds one week in duration a complete set of operational tests shall be held before the voyage commences, and others thereafter at least once a week during the voyage."

54 *The existing paragraph 4 is replaced by the following:*

"4 A record of all operational tests and inspections required by this regulation shall be recorded in the logbook with an explicit record of any defects which may be disclosed."

Regulation 22

Prevention and control of water ingress, etc.

55 *In the existing paragraph 1, at the end of the first sentence, the words "paragraphs 3 and 4" are replaced by "paragraph 3".*

56 *The existing paragraph 2 is replaced by the following:*

"2 Watertight doors located below the bulkhead deck of passenger ships and the freeboard deck of cargo ships having a maximum clear opening width of more than 1.2 m shall be kept closed during navigation, except for limited periods when absolutely necessary as determined by the Administration."

57 *The existing paragraph 3 is replaced by the following:*

"3 A watertight door may be opened during navigation to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when

transit through the door is complete or when the task which necessitated it being open is finished. The Administration shall authorize that such a watertight door may be opened during navigation only after careful consideration of the impact on ship operations and survivability taking into account guidance issued by the Organization.* A watertight door permitted to be opened during navigation shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

* Refer to the Revised guidance for watertight doors on passenger ships which may be opened during navigation (MSC.1/Circ.1564)."

58 *The existing paragraphs 4 to 8 are replaced by the following:*

4 Portable plates on bulkheads shall always be in place before the voyage commences, and shall not be removed during navigation except in case of urgent necessity at the discretion of the master. The necessary precautions shall be taken in replacing them to ensure that the joints are watertight. Power-operated sliding watertight doors permitted in machinery spaces in accordance with regulation 13.10 shall be closed before the voyage commences and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

5 Watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with regulation 13.9.1 shall be closed before the voyage commences and shall be kept closed during navigation. The time at which such doors are opened or closed shall be recorded in such logbook as may be prescribed by the Administration.

6 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be effectively closed and secured watertight before voyage commences, and shall be kept closed during navigation.

7 The following doors, located above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, shall be closed and locked before the voyage commences and shall remain closed and locked until the ship is at its next berth:

- .1** cargo loading doors in the shell or the boundaries of enclosed superstructures;
- .2** bow visors fitted in positions as indicated in paragraph 7.1;
- .3** cargo loading doors in the collision bulkhead; and
- .4** ramps forming an alternative closure to those defined in paragraphs 7.1 to 7.3 inclusive."

59 *The existing paragraph 9 is renumbered as paragraph 8, and the existing paragraphs 10 to 16 are replaced by the following:*

9 Notwithstanding the requirements of paragraphs 7.1 and 7.4, the Administration may authorize that particular doors can be opened at the discretion of the master, if necessary for the operation of the ship or the embarking and disembarking of passengers when the ship is at safe anchorage and provided that the safety of the ship is not impaired.

10 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 7 is implemented.

11 The master shall ensure, before any voyage commences, that an entry in such logbook as may be prescribed by the Administration is made of the time the doors specified in paragraph 12 are closed and the time at which particular doors are opened in accordance with paragraph 13.

12 Hinged doors, portable plates, sidescuttles, gangway, cargo and bunkering ports and other openings, which are required by these regulations to be kept closed during navigation, shall be closed before the voyage commences. The time at which such doors are opened and closed (if permissible under these regulations) shall be recorded in such logbook as may be prescribed by the Administration.

13 Where in a between-deck, the sills of any of the sidescuttles referred to in regulation 15.3.2 are below a line drawn parallel to the bulkhead deck at side of passenger ships and the freeboard deck at side of cargo ships, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the voyage commences, all the sidescuttles in that between-deck shall be closed watertight and locked before the voyage commences, and they shall not be opened before the ship arrives at the next port. In the application of this paragraph the appropriate allowance for fresh water may be made when applicable.

- .1** The time at which such sidescuttles are opened in port and closed and locked before the voyage commences shall be recorded in such logbook as may be prescribed by the Administration.

- .2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 13 would apply when it was floating at its deepest subdivision draught, the Administration may indicate the limiting mean draught at which these sidescuttles will have their sills above the line drawn parallel to the bulkhead deck at side of passenger ships and the freeboard deck at side of cargo ships, and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible for the voyage to commence without them being closed and locked and to be opened during navigation on the responsibility of the master during navigation. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

14 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the voyage commences.

15 If cargo is carried in spaces referred to in regulation 15.5.2, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and the time at which such scuttles and deadlights are closed and locked shall be recorded in such logbook as may be prescribed by the Administration."

60 *The existing paragraph 17 is renumbered as paragraph 16.*

Regulation 22-1

Flooding detection systems for passenger ships carrying 36 or more persons constructed on or after 1 July 2010

61 *In regulation 22-1, the words "constructed on or after 1 July 2010" are removed from the end of the existing title.*

Regulation 23

Special requirements for ro-ro passenger ships

62 *The existing text of this regulation is replaced by the following:*

"1 Special category spaces and ro-ro spaces shall be continuously patrolled or monitored by effective means, such as television surveillance, so that any movement of vehicles in adverse weather conditions and unauthorized access by passengers thereto can be detected during navigation.

2 Documented operating procedures for closing and securing all shell doors, loading doors and other closing appliances which, if left open or not properly secured, could, in the opinion of the Administration, lead to flooding of a special category space or ro-ro space, shall be kept on board and posted at an appropriate place.

3 All accesses from the ro-ro deck and vehicle ramps that lead to spaces below the bulkhead deck shall be closed before the voyage commences and shall remain closed until the ship is at its next berth.

4 The master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in paragraph 3 is implemented.

5 The master shall ensure, before the voyage commences, that an entry in the logbook, as required by regulation 22.12, is made of the time of the last closing of the accesses referred to in paragraph 3.

6 Notwithstanding the requirements of paragraph 3, the Administration may permit some accesses to be opened during the voyage, but only for a period sufficient to permit through passage and, if required, for the essential working of the ship.

7 All transverse or longitudinal bulkheads which are taken into account as effective to confine the seawater accumulated on the ro-ro deck shall be in place and secured before the voyage commences and remain in place and secured until the ship is at its next berth.

8 Notwithstanding the requirements of paragraph 7, the Administration may permit some accesses within such bulkheads to be opened during the voyage but only for sufficient time to permit through passage and, if required, for the essential working of the ship.

9 In all ro-ro passenger ships, the master or the designated officer shall ensure that, without the expressed consent of the master or the designated officer, no passengers are allowed access to an enclosed ro-ro deck during navigation."

Regulation 24*Prevention and control of water ingress, etc., in cargo ships*

63 *In regulation 24, the existing title and paragraph 1 are replaced by the following:*

“Regulation 24*Additional requirements for prevention and control of water ingress, etc. in cargo ships*

1 Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed during navigation.”

64 *The existing paragraph 3 is replaced by the following:*

“3 Watertight doors or ramps fitted to internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation. The time at which such doors are opened or closed shall be recorded in such logbook as may be prescribed by the Administration.”

Part C Machinery installations

Regulation 35-1*Bilge pumping arrangements***2 Passenger ships and cargo ships**

65 *The following new sentence is added at the end of the existing paragraph 2.6:*

“For ships subject to the provisions of regulation II-1/1.1.1.1, for the special hazards associated with loss of stability when fitted with fixed pressure water-spraying fire-extinguishing systems refer to regulation II-2/20.6.1.4.”.

3 Passenger ships

66 *In paragraph 3.2, the existing text of the whole volume of the passenger and crew spaces below the bulkhead deck P is replaced by the following:*

“*P* = the whole volume of the passenger and crew spaces below the bulkhead deck (cubic metres), which are provided for the accommodation and use of passengers and crew, excluding baggage, store and provision rooms;”.

67 *In paragraph 3.4, the existing chapeau is replaced by the following:*

“3.4 On a ship of 91.5 m in length *L* and upwards or having a bilge pump numeral, calculated in accordance with paragraph 3.2, of 30 or more, the arrangements shall be such that at least one power bilge pump shall be available for use in all flooding conditions which the ship is required to withstand, and, for ships subject to the provisions of regulation II-1/1.1.1.1, in all flooding conditions derived from consideration of minor damages as specified in regulation 8 as follows:”.

68 *The following new sentence is added at the end of the existing paragraph 3.10:*

“For ships subject to the provisions of regulation II-1/1.1.1.1, the deepest subdivision load line shall be taken as the deepest subdivision draught.”

Chapter II-2 Construction – Fire protection, fire detection and fire extinction

Part A General

Regulation 3

Definitions

69 *The text of paragraph 56 is replaced as follows:*

“56 *Vehicle carrier* means a cargo ship which only carries cargo in ro-ro spaces or vehicle spaces, and which is designed for the carriage of unoccupied motor vehicles without cargo, as cargo.”

Part C Suppression of fire

Regulation 9

Containment of fire

4 Protection of openings in fire-resisting divisions

4.1 Openings in bulkheads and decks in passenger ships

4.1.3 Windows and sidescuttles

70 *The following new paragraphs 4.1.3.4 to 4.1.3.6 are added after the existing paragraph 4.1.3.3:*

“4.1.3.4 Notwithstanding the requirement in paragraph 4.1.3.3, the requirements in paragraphs 4.1.3.5 and 4.1.3.6 shall apply to ships constructed on or after 1 January 2020.

4.1.3.5 For ships carrying more than 36 passengers, windows facing survival craft, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity as required in table 9.1. Where automatic dedicated sprinkler heads are provided for windows, “A-0” windows may be accepted as equivalent. To be considered under this paragraph, the sprinkler heads must either be:

- .1 dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or
- .2 conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 L/min/m² and the additional window area is included in the calculation of the area of coverage; or
- .3 water-mist nozzles that have been tested and approved in accordance with the guidelines approved by the Organization;* and

windows located in the ship’s side below the lifeboat embarkation area shall have fire integrity at least equal to “A-0” class.

4.1.3.6 For ships carrying not more than 36 passengers, windows facing survival craft and escape slide, embarkation areas and windows situated below such areas shall have fire integrity at least equal to “A-0” class.

* Refer to the Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12 (resolution A.800(19), as amended).”

Part G Special requirements

Regulation 20

Protection of vehicle, special category and ro-ro spaces

2 General requirements

2.1 Application

71 *The existing text under section 2.1 is renumbered as 2.1.1 and the following paragraph 2.1.2 is added after it:*

“2.1.2 On all ships, vehicles with fuel in their tanks for their own propulsion may be carried in cargo spaces other than vehicle, special category or ro-ro spaces, provided that all the following conditions are met:

- .1 the vehicles do not use their own propulsion within the cargo spaces;
- .2 the cargo spaces are in compliance with the appropriate requirements of regulation 19; and
- .3 the vehicles are carried in accordance with the IMDG Code, as defined in regulation VII/1.1.”

Regulation 20-1

Requirements for vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo

2 Application

72 *The existing paragraph 2.1 is replaced by the following:*

“2.1 In addition to complying with the requirements of regulation 20, as appropriate, vehicle carriers constructed on or after 1 January 2016 intended for the carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion as cargo shall comply with the requirements in paragraphs 3 to 5 of this regulation.”

Chapter III Life-saving appliances and arrangements

Part A General

Regulation 1

Application

73 *The existing paragraph 4 is replaced by the following:*

“4 For ships constructed before 1 July 1998, the Administration shall:

- .1 ensure that, subject to the provisions of paragraph 4.2, the requirements which are applicable under chapter III of the *International Convention for the Safety of Life at Sea, 1974*, in force prior to 1 July 1998 to new or existing ships as prescribed by that chapter are complied with;
- .2 ensure that when life-saving appliances or arrangements on such ships are replaced or such ships undergo repairs, alterations or modifications of a major character which involve replacement of, or any addition to, their existing life-saving appliances or arrangements, such life-saving appliances or arrangements, in so far as is reasonable and practicable, comply with the requirements of this chapter. However, if a survival craft other than an inflatable liferaft is replaced without replacing its launching appliance, or vice versa, the survival craft or launching appliance may be of the same type as that replaced; and
- .3 ensure that the requirements of regulations 30.3 and 37.3.9 are complied with.”

Part B Requirements for ships and life-saving appliances

Section II

Passenger ships (additional requirements)

Regulation 30

Drills

74 *The following new paragraph 3 is added after the existing paragraph 2:*

“3 Damage control drills shall be conducted as required in regulation II-1/19-1.”

Section V

Miscellaneous

Regulation 37

Muster list and emergency instructions

75 *In paragraph 3, the existing sub-paragraphs .7 and .8 are replaced by the following:*

“.7 manning of fire parties assigned to deal with fires;

.8 special duties assigned in respect to the use of fire-fighting equipment and installations; and

.9 for passenger ships only, damage control for flooding emergencies.”

Appendix Certificates

Form of safety certificate for passenger ships

RECORD OF EQUIPMENT FOR PASSENGER SHIP SAFETY (FORM P)

5 Details of navigational systems and equipment

76 *In section 5, the existing description of item 3.1 is amended to read as follows:*

“3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver^{3, 4}.”

Form of safety equipment certificate for cargo ships

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM E)

3 Details of navigational systems and equipment

77 *In section 3, the existing description of item 3.1 is amended to read as follows:*

“3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver^{2, 3}.”

Form of safety certificate for nuclear cargo ships

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM C)

5 Details of navigational systems and equipment

78 *In section 5, the existing description of item 3.1 is amended to read as follows:*

“3.1 Receiver for a global navigation satellite system/terrestrial radionavigation system/multi-system shipborne radionavigation receiver^{2, 3}.”

Resolution MSC.436(99)

adopted on 24 May 2018

Chapter II-1

Construction – Structure, subdivision and stability, machinery and electrical installations

Part A

General

Regulation 1

Application

1 *The following new paragraphs 1.1.1 and 1.1.2 are inserted after the existing paragraph 1.1:*

“1.1.1 Unless expressly provided otherwise, parts B, B-1, B-2 and B-4 of this chapter shall only apply to ships:

- .1** for which the building contract is placed on or after 1 January 2020; or
- .2** in the absence of a building contract, the keel of which is laid or which are at a similar stage of construction on or after 1 July 2020; or
- .3** the delivery of which is on or after 1 January 2024.

1.1.2 Unless expressly provided otherwise, for ships not subject to the provisions of sub-paragraph 1.1.1 but constructed on or after 1 January 2009, the Administration shall:

- .1** ensure that the requirements for parts B, B-1, B-2 and B-4 which are applicable under chapter II-1 of the *International Convention for the Safety of Life at Sea, 1974*, as amended by resolutions MSC.216(82), MSC.269(85) and MSC.325(90) are complied with; and
- .2** ensure that the requirements of regulations 8-1.3 and 19-1 are complied with.”

2 *The existing paragraph 1.3.4 is deleted.*

3 *The existing paragraph 2 is replaced by the following:*

“2 Unless expressly provided otherwise, for ships constructed before 1 January 2009, the Administration shall:

- .1** ensure that the requirements which are applicable under chapter II-1 of the *International Convention for the Safety of Life at Sea, 1974*, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57), MSC.19(58), MSC.26(60), MSC.27(61), resolution 1 of the 1995 SOLAS Conference, MSC.47(66), MSC.57(67), MSC.65(68), MSC.69(69), MSC.99(73), MSC.134(76), MSC.151(78) and MSC.170(79) are complied with; and
- .2** ensure that the requirements of regulations 8-1.3 and 19-1 are complied with.”

Part B-1 Stability

Regulation 8-1

System capabilities and operational information after a flooding casualty on passenger ships

4 *The existing text of regulation 8-1 is amended to read as follows:*

"1 Application

Passenger ships having length, as defined in regulation II-1/2.5, of 120 m or more or having three or more main vertical zones shall comply with the provisions of this regulation.

2 Availability of essential systems in case of flooding damage*

A passenger ship shall be designed so that the systems specified in regulation II-2/21.4 remain operational when the ship is subject to flooding of any single watertight compartment.

3 Operational information after a flooding casualty

3.1 For the purpose of providing operational information to the master for safe return to port after a flooding casualty, passenger ships, as specified in paragraph 1, shall have:

- .1 an onboard stability computer; or
- .2 shore-based support,

based on the guidelines developed by the Organization.†

3.2 Passenger ships constructed before 1 January 2014 shall comply with the provisions in paragraph 3.1 not later than the first renewal survey after 1 January 2025.

* Refer to the Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or flooding casualty (MSC.1/Circ.1369).

† Refer to the Guidelines on operational information for masters of passenger ships for safe return to port by own power or under tow (MSC.1/Circ.1400) for ships constructed on or after 1 January 2014 but before 13 May 2016, or the Revised guidelines on operational information for masters of passenger ships for safe return to port (MSC.1/Circ.1532/Rev.1) for ships constructed on or after 13 May 2016, or the Guidelines on operational information for masters in case of flooding for passenger ships constructed before 1 January 2014 (MSC.1/Circ.1589)."

Chapter IV Radiocommunications

Part A General

Regulation 2

Terms and definitions

5 *In paragraph 1, the existing sub-paragraph .16 is amended and a new sub-paragraph .17 is added as follows:*

- “.16** *Global maritime distress and safety system (GMDSS) identities* means maritime mobile services identity, the ship's call sign, recognized mobile satellite service identities and serial number identity which may be transmitted by the ship's equipment and used to identify the ship.
- .17** *Recognized mobile satellite service* means any service which operates through a satellite system and is recognized by the Organization, for use in the global maritime distress and safety system (GMDSS)."

Part C

Ship requirements

Regulation 7

Radio equipment: General

6 *In paragraph 1, the existing sub-paragraph .5 is amended to read as follows:*

“.5 a radio facility for reception of maritime safety information by a recognized mobile satellite service enhanced group calling system if the ship is engaged in voyages in sea area A1, or A2 or A3 but in which an international NAVTEX service is not provided. However, ships engaged exclusively in voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.*

* Refer to the Recommendation on promulgation of maritime safety information adopted by the Organization by resolution A.705(17), as amended.”

Regulation 8

Radio equipment: Sea area A1

7 *In paragraph 1, the existing sub-paragraph .5 is amended to read as follows:*

“.5 through a recognized mobile satellite service; this requirement may be fulfilled by:

.5.1 a ship earth station;* or

.5.2 the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated.

* This requirement can be met by recognized mobile satellite service ship earth stations capable of two-way communications, such as Fleet-77 (resolutions A.808(19) and MSC.130(75)) or Inmarsat-C (resolution A.807(19), as amended) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for a recognized mobile satellite service ship earth station prescribed by this chapter.”

Regulation 9

Radio equipment: Sea areas A1 and A2

8 *In paragraph 1, the existing sub-paragraph .3.3 is amended to read as follows:*

“.3.3 through a recognized mobile satellite service by a ship earth station.”

9 *In paragraph 3, the existing sub-paragraph .2 is amended to read as follows:*

“.2 a recognized mobile satellite service ship earth station.”

Regulation 10

Radio equipment: Sea areas A1, A2 and A3

10 *In paragraph 1, the existing chapeau of sub-paragraph .1 is amended to read as follows:*

“.1 a recognized mobile satellite service ship earth station capable of:”.

11 *In paragraph 1, the existing sub-paragraph .4.3 is amended to read as follows:*

“.4.3 through a recognized mobile satellite service by an additional ship earth station.”

12 *In paragraph 2, the existing sub-paragraph .3.2 is amended to read as follows:*

“.3.2 through a recognized mobile satellite service by a ship earth station; and”.

Regulation 12

Watches

13 *In paragraph 1, the existing sub-paragraph .4 is amended to read as follows:*

“.4 for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of regulation 10.1.1, is fitted with a recognized mobile satellite service ship earth station.”

Regulation 13

Sources of energy

14 *In paragraph 2, the word “Inmarsat” is deleted from the second sentence.*

Appendix Certificates

Form of safety certificate for passenger ships

RECORD OF EQUIPMENT FOR PASSENGER SHIP SAFETY (FORM P)

3 Details of radio facilities

15 *In section 3, the existing description of item 1.4 is amended to read as follows:*

“1.4 Recognized mobile satellite service ship earth station”.

Form of safety radio certificate for cargo ships

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY RADIO (FORM R)

2 Details of radio facilities

16 *In section 2, the existing description of item 1.4 is amended to read as follows:*

“1.4 Recognized mobile satellite service ship earth station”.

Form of safety certificate for nuclear cargo ships

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM C)

3 Details of radio facilities

17 *In section 3, the existing description of item 1.4 is replaced by the following:*

“1.4 Recognized mobile satellite service ship earth station”.