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Amendments

to the International Convention for the Safety of Life at Sea, 1974

For Adoption dates – see page 3

[For entry into force dates - see page 4]

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AMENDMENTS
TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

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Resolution MSC.380(94) adopted on 21 November 2014

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Resolution MSC.291(87) adopted on 21 May 2010

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Resolution MSC.291(87) – 1 January 2012

Resolution MSC.308(88) – 1 January 2012

Resolution MSC.282(86) – 1 January 2011

Resolution MSC.269(85) – 1 January 2011

Resolution MSC.257(84) – 1 January 2010

Resolution MSC.239(83) – 1 July 2009

Resolution MSC.216(82) – 1 January 2008

Resolution MSC.194(80) – 1 January 2007

Resolution MSC.87(71) – 1 January 2001

ANNEX 1

RESOLUTION MSC.409(97)
(adopted on 25 November 2016)

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO Article VIII(b) of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

HAVING CONSIDERED, at its ninety-seventh session, amendments to the Convention proposed and circulated in accordance with Article VIII(b)(i) of the Convention,

1 ADOPTS, in accordance with Article VIII(b)(iv) of the Convention, amendments to the Convention the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with Article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2019, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified the Secretary-General of their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with Article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2020 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of Article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 REQUESTS ALSO the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A
GENERAL

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 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 – Firefighting

3 In paragraph 5.1.2.2, the last sentence is replaced with 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 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 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."

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ANNEX 2

RESOLUTION MSC.392(95)
(adopted on 11 June 2015)

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b)(vi)(2) of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

HAVING CONSIDERED, at its ninety-fifth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2016, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified to the Secretary-General their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2017 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention; and

5 REQUESTS ALSO the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A
General

Regulation 2 – Definitions

1 The following new paragraphs 29 and 30 are added after the existing paragraph 28:

"29 *IGF Code* means the International Code of safety for ships using gases or other low-flashpoint fuels as adopted by the Maritime Safety Committee of the Organization by resolution MSC.391(95), 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.

30 *Low-flashpoint fuel* means gaseous or liquid fuel having a flashpoint lower than otherwise permitted under regulation II-2/4.2.1.1."

Part F
Alternative design and arrangements

Regulation 55 – Alternative design and arrangements

2 The existing paragraphs 1 to 3 are replaced with the following:

"1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for machinery, electrical installations and low-flashpoint fuel storage and distribution systems.

2 General

2.1 Machinery, electrical installation and low-flashpoint fuel storage and distribution systems design and arrangements may deviate from the requirements set out in parts C, D, E or G, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this chapter.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of parts C, D, E or G, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

.1 determination of the ship type, machinery, electrical installations, low-flashpoint fuel storage and distribution systems and space(s) concerned;

.2 identification of the prescriptive requirement(s) with which the machinery, electrical installations and low-flashpoint fuel storage and distribution systems will not comply;

.3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

.4 determination of the performance criteria for the ship, machinery, electrical installation, low-flashpoint fuel storage and distribution system or the space(s) concerned addressed by the relevant prescriptive requirement(s):

.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in parts C, D, E or G; and

.2 performance criteria shall be quantifiable and measurable;

.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;

.6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

.7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

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* Refer to the *Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III* (MSC.1/Circ.1212) and the *Guidelines for the approval of alternatives and equivalents as provided for in various IMO instruments* (MSC.1/Circ.1455)."

3 The new part G is added after the existing part F as follows:

"**Part G**
Ships using low-flashpoint fuels

Regulation 56 – Application

1 Except as provided for in paragraphs 4 and 5, this part shall apply to ships using low-flashpoint fuels:

.1 for which the building contract is placed on or after 1 January 2017;

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or

.3 the delivery of which is on or after 1 January 2021.

Such ships using low-flashpoint fuels shall comply with the requirements of this part in addition to any other applicable requirements of the present regulations.

2 Except as provided for in paragraphs 4 and 5, a ship, irrespective of the date of construction, including one constructed before 1 January 2009, which converts to using low-flashpoint fuels on or after 1 January 2017 shall be treated as a ship using low-flashpoint fuels on the date on which such conversion commenced.

3 Except as provided for in paragraphs 4 and 5, a ship using low-flashpoint fuels, irrespective of the date of construction, including one constructed before 1 January 2009, which, on or after 1 January 2017, undertakes to use low-flashpoint fuels different from those which it was originally approved to use before 1 January 2017 shall be treated as a ship using low-flashpoint fuels on the date on which such undertaking commenced.

4 This part shall not apply to gas carriers, as defined in regulation VII/11.2:

.1 using their cargoes as fuel and complying with the requirements of the IGC Code, as defined in regulation VII/11.1; or

.2 using other low-flashpoint gaseous fuels provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of the IGC Code for gas as a cargo.

5 This part shall not apply to ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service. However, ships owned or operated by a Contracting Government and used, for the time being, only in Government non-commercial service are encouraged to act in a manner consistent, so far as reasonable and practicable, with this part.

Regulation 57 – Requirements for ships using low-flashpoint fuels

Except as provided in regulations 56.4 and 56.5, ships using low-flashpoint fuels shall comply with the requirements of the IGF Code."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part B
Prevention of fire and explosion

Regulation 4 – Probability of ignition

4 In paragraph 2.1.3.4, the word "and" is deleted.

5 In paragraph 2.1, the existing subparagraph .4 is replaced with the following:

".4 in cargo ships, to which part G of chapter II-1 is not applicable, the use of oil fuel having a lower flashpoint than otherwise specified in paragraph 2.1.1, for example crude oil, may be permitted provided that such fuel is not stored in any machinery space and subject to the approval by the Administration of the complete installation; and

.5 in ships, to which part G of chapter II-1 is applicable, the use of oil fuel having a lower flashpoint than otherwise specified in paragraph 2.1.1 is permitted."

6 At the end of existing paragraph 5.3.2.2, the following sentence is added:

"For tankers constructed on or after 1 January 2017, any isolation shall also continue to permit the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging in accordance with regulation 11.6.1.2."

Part C
Suppression of fire

Regulation 11 – Structural integrity

7 At the end of existing paragraph 6.2, the following sentence is added:

"For tankers constructed on or after 1 January 2017, the openings shall be arranged in accordance with regulation 4.5.3.4.1."

8 In paragraph 6.3.2, the following text is added between the first and the second sentences:

"In addition, for tankers constructed on or after 1 January 2017, the secondary means shall be capable of preventing over-pressure or under-pressure in the event of damage to, or inadvertent closing of, the means of isolation required in regulation 4.5.3.2.2."

Part G
Special requirements

Regulation 20 – Protection of vehicle, special category and ro-ro spaces

9 The existing paragraph 3.1.2 is replaced with the following:

"**3.1.2** ***Performance of ventilation systems***

3.1.2.1 In passenger ships, the power ventilation system shall be separate from other ventilation systems. The power ventilation system shall be operated to give at least the number of air changes required in paragraph 3.1.1 at all times when vehicles are in such spaces, except where an air quality control system in accordance with paragraph 3.1.2.4 is provided. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.2 In cargo ships, the ventilation fans shall normally be run continuously and give at least the number of air changes required in paragraph 3.1.1 whenever vehicles are on board, except where an air quality control system in accordance with paragraph 3.1.2.4 is provided. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period the ro-ro or vehicle space shall be proved gas-free. One or more portable combustible gas detecting instruments shall be carried for this purpose. The system shall be entirely separate from other ventilation systems. Ventilation ducts serving ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

3.1.2.3 The ventilation system shall be such as to prevent air stratification and the formation of air pockets.

3.1.2.4 For all ships, where an air quality control system is provided based on the guidelines developed by the Organization,[*] the ventilation system may be operated at a decreased number of air changes and/or a decreased amount of ventilation. This relaxation does not apply to spaces to which at least ten air changes per hour is required by paragraph 3.2.2 of this regulation and spaces subject to regulations 19.3.4.1 and 20-1.

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[*] Refer to the *Revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces* (MSC/Circ.1515)."

APPENDIX

CERTIFICATES

FORM OF SAFETY CERTIFICATE FOR PASSENGER SHIPS

PASSSENGER SHIP SAFETY CERTIFICATE

10 The following new paragraph 2.2 is added after the existing paragraph 2.1:

"2.2 the ship complied with part G of chapter II-1 of the Convention using …… as fuel/N.A.[1]"

11 The existing paragraphs 2.2 to 2.11 are renumbered accordingly.

FORM OF SAFETY CONSTRUCTION CERTIFICATE FOR CARGO SHIPS

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

12 The existing paragraph 2 is replaced with the following:

"2. That the survey showed that:

.1 the condition of the structure, machinery and equipment as defined in the above regulation was satisfactory and the ship complied with the relevant requirements of chapters II-1 and II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans); and

.2 the ship complied with part G of chapter II-1 of the Convention using ……. as fuel/N.A[4]."

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ANNEX 1

RESOLUTION MSC.380(94)
(adopted on 21 November 2014)

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS), 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b)(vi)(2) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

HAVING CONSIDERED, at its ninety-fourth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 January 2016 unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments, the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified to the Secretary-General of the Organization their objections to the amendments;

3 INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2016 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention; and

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS), 1974, AS AMENDED

CHAPTER II-2
CONSTRUCTION – PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part C
Suppression of fire

Regulation 10 – Fire fighting

1 The title of existing paragraph 5.2 is replaced as follows:

"**5.2 Machinery spaces of category A containing internal combustion machinery**"

CHAPTER VI
CARRIAGE OF CARGOES AND OIL FUELS

Part A
General Provisions

Regulation 2 – Cargo information

2 The following new paragraphs 4 to 6 are added after existing paragraph 3:

"4 In the case of cargo carried in a container*, except for containers carried on a chassis or a trailer when such containers are driven on or off a ro-ro ship engaged in short international voyages as defined in regulation III/3, the gross mass according to paragraph 2.1 of this regulation shall be verified by the shipper, either by:

.1 weighing the packed container using calibrated and certified equipment; or

.2 weighing all packages and cargo items, including the mass of pallets, dunnage and other securing material to be packed in the container and adding the tare mass of the container to the sum of the single masses, using a certified method approved by the competent authority of the State in which packing of the container was completed.

5 The shipper of a container shall ensure the verified gross mass** is stated in the shipping document. The shipping document shall be:

.1 signed by a person duly authorized by the shipper; and

.2 submitted to the master or his representative and to the terminal representative sufficiently in advance, as required by the master or his representative, to be used in the preparation of the ship stowage plan***.

6 If the shipping document, with regard to a packed container, does not provide the verified gross mass and the master or his representative and the terminal representative have not obtained the verified gross mass of the packed container, it shall not be loaded on to the ship.

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* The term "container" should be considered as having the same meaning as defined and applied in the International Convention for Safe Containers (CSC), 1972, as amended, taking into account the *Guidelines for the approval of offshore containers handled in open seas* (MSC/Circ.860) and the *Revised recommendations on harmonized interpretation and implementation of the International Convention for Safe Containers, 1972, as amended* (CSC.1/Circ.138/Rev.1).

** Refer to the *Guidelines regarding the verified gross mass of a container carrying cargo* (MSC.1/Circ.1475).

*** This document may be presented by means of EDP or EDI transmission techniques. The signature may be an electronic signature or may be replaced by the name, in capitals, of the person authorized to sign."

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

3 The following new regulation 7 is added after existing regulation 6:

"**Regulation 7 – Atmosphere testing instrument for enclosed spaces**

Every ship to which chapter I applies shall carry an appropriate portable atmosphere testing instrument or instruments*. As a minimum, these shall be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces**. Instruments carried under other requirements may satisfy this regulation. Suitable means shall be provided for the calibration of all such instruments.

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* Refer to the *Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7* (MSC.1/Circ.1477).

** Refer to the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27)).

APPENDIX

CERTIFICATES

Record of Equipment for Cargo Ship Safety (Form C)
Record of Equipment for Cargo Ship Safety (Form E)

4 Section 2 of the Record of Equipment for Cargo Ship Safety (Form C) and the Record of Equipment for Cargo Ship Safety (Form E), is replaced with the following:

"2 ***Details of life-saving appliances***

1	Total number of persons for which life-saving appliances are provided ……		
		Port Side	Starboard Side
2	Total number of davit launched lifeboats	……	……..
2.1	Total number of persons accommodated by them	……	……..
2.2	Number of self-righting partially enclosed lifeboats (regulation III/43[1])	……	……
2.3	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.6)	……	……
2.4	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)	……	……
2.5	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)	……	……
2.6	Other lifeboats		
2.6.1	Number	……	……
2.6.2	Type	……	……
3	Total number of free-fall lifeboats	……	
3.1	Total number of persons accommodated by them	……	
3.2	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.7)	……	
3.3	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)	……	
3.4	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)	……	
4	Number of motor lifeboats (included in the total lifeboats shown in 2 and 3 above)	……	
4.1	Number of lifeboats fitted with searchlights	……	
5	Number of rescue boats	……	
5.1	Number of boats which are included in the total lifeboats shown in 2 and 3 above	……	
6	Liferafts	……	
6.1	Those for which approved launching appliances are required	……	
6.1.1	Number of liferafts	……	

1 Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998.

2 ***Details of life-saving appliances*** (continued)

1	Total number of persons for which life-saving appliances are provided ……		
		Port Side	Starboard Side
6.1.2	Number of persons accommodated by them	……	
6.2	Those for which approved launching appliances are not required	……	
6.2.1	Number of liferafts	……	
6.2.2	Number of persons accommodated by them	……	
6.3	Number of liferafts required by regulation III/31.1.4	……	
7	Number of lifebuoys	……	
8	Number of lifejackets	……	
9	Immersion suits	……	
9.1	Total number	……	
9.2	Number of suits complying with the requirements for lifejackets	……	
10	Number of anti-exposure suits	……	
11	Radio installations used in life-saving appliances	……	
11.1	Number of search and rescue locating devices	……	
11.1.1	Radar search and rescue transponders (SART)	……	
11.1.2	AIS search and rescue transmitters (AIS-SART)	……	
11.2	Number of two-way VHF radiotelephone apparatus	……	

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ANNEX 1

RESOLUTION MSC.365(93)
(adopted on 22 May 2014)

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its ninety-third session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2015, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3 INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2016 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 REQUESTS ALSO the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part C
Machinery installations

Regulation 29 – Steering gear

1 At the end of paragraph 3.2, the following new text is added:

"where it is impractical to demonstrate compliance with this requirement during sea trials with the ship at its deepest seagoing draught and running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch, ships regardless of date of construction may demonstrate compliance with this requirement by one of the following methods:

.1 during sea trials the ship is at even keel and the rudder fully submerged whilst running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch; or

.2 where full rudder immersion during sea trials cannot be achieved, an appropriate ahead speed shall be calculated using the submerged rudder blade area in the proposed sea trial loading condition. The calculated ahead speed shall result in a force and torque applied to the main steering gear which is at least as great as if it was being tested with the ship at its deepest seagoing draught and running ahead at the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch; or

.3 the rudder force and torque at the sea trial loading condition have been reliably predicted and extrapolated to the full load condition. The speed of the ship shall correspond to the number of maximum continuous revolutions of the main engine and maximum design pitch of the propeller;"

2 The word "and" at the end of paragraph 4.2 is deleted and the following new text is added:

"where it is impractical to demonstrate compliance with this requirement during sea trials with the ship at its deepest seagoing draught and running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater, ships regardless of date of construction, including those constructed before

1 January 2009, may demonstrate compliance with this requirement by one of the following methods:

.1 during sea trials the ship is at even keel and the rudder fully submerged whilst running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater; or

.2 where full rudder immersion during sea trials cannot be achieved, an appropriate ahead speed shall be calculated using the submerged rudder blade area in the proposed sea trial loading condition. The calculated ahead speed shall result in a force and torque applied to the auxiliary steering gear which is at least as great as if it was being tested with the ship at its deepest seagoing draught and running ahead at one half of the speed corresponding to the number of maximum continuous revolutions of the main engine and maximum design pitch or 7 knots, whichever is greater; or

.3 the rudder force and torque at the sea trial loading condition have been reliably predicted and extrapolated to the full load condition; and"

CHAPTER II-2
CONSTRUCTION – PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A
General

Regulation 1 – Application

3 The following three new paragraphs are added after paragraph 2.5:

"2.6 Vehicle carriers constructed before 1 January 2016, including those constructed before 1 July 2012, shall comply with paragraph 2.2 of regulation 20-1, as adopted by resolution MSC.365(93).

2.7 Tankers constructed before 1 January 2016, including those constructed before 1 July 2012, shall comply with regulation 16.3.3 except 16.3.3.3.

2.8 Regulations 4.5.5.1.1 and 4.5.5.1.3 apply to ships constructed on or after 1 July 2002 but before 1 January 2016, and regulation 4.5.5.2.1 applies to all ships constructed before 1 January 2016."

Regulation 3 – Definitions

4 The following three new paragraphs are added after paragraph 53:

"54 *Fire damper* is, for the purpose of implementing regulation 9.7 adopted by resolution MSC.365(93), as may be amended, a device installed in a ventilation duct, which under normal conditions remains open allowing flow in the duct, and is

closed during a fire, preventing the flow in the duct to restrict the passage of fire. In using the above definition the following terms may be associated:

.1 *automatic fire damper* is a fire damper that closes independently in response to exposure to fire products;

.2 *manual fire damper* is a fire damper that is intended to be opened or closed by the crew by hand at the damper itself; and

.3 *remotely operated fire damper* is a fire damper that is closed by the crew through a control located at a distance away from the controlled damper.

55 *Smoke damper* is, for the purpose of implementing regulation 9.7 adopted by resolution MSC.365(93), as may be amended, a device installed in a ventilation duct, which under normal conditions remains open allowing flow in the duct, and is closed during a fire, preventing the flow in the duct to restrict the passage of smoke and hot gases. A smoke damper is not expected to contribute to the integrity of a fire rated division penetrated by a ventilation duct. In using the above definition the following terms may be associated:

.1 *automatic smoke damper* is a smoke damper that closes independently in response to exposure to smoke or hot gases;

.2 *manual smoke damper* is a smoke damper intended to be opened or closed by the crew by hand at the damper itself; and

.3 *remotely operated smoke damper* is a smoke damper that is closed by the crew through a control located at a distance away from the controlled damper.

56 *Vehicle carrier* means a cargo ship with multi deck ro-ro spaces designed for the carriage of empty cars and trucks as cargo."

Part B
Prevention of fire and explosion

Regulation 4 – Probability of ignition

5 Paragraph 5.5 is replaced with the following:

"**5.5 Inert gas systems**

5.5.1 Application

5.5.1.1 For tankers of 20,000 tonnes deadweight and upwards constructed on or after 1 July 2002 but before 1 January 2016, the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, as adopted by resolution MSC.98(73), except that the Administration may accept other equivalent systems or arrangements, as described in paragraph 5.5.4.

5.5.1.2 For tankers of 8,000 tonnes deadweight and upwards constructed on or after 1 January 2016 when carrying cargoes described in regulation 1.6.1 or 1.6.2, the protection of the cargo tanks shall be achieved by a fixed inert gas system

in accordance with the requirements of the Fire Safety Systems Code, except that the Administration may accept other equivalent systems or arrangements, as described in paragraph 5.5.4.

5.5.1.3 Tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the Fire Safety Systems Code and with fixed tank washing machines. However, inert gas systems fitted on tankers constructed on or after 1 July 2002 but before 1 January 2016 shall comply with the Fire Safety Systems Code, as adopted by resolution MSC.98(73).

5.5.1.4 Tankers required to be fitted with inert gas systems shall comply with the following provisions:

.1 double-hull spaces shall be fitted with suitable connections for the supply of inert gas;

.2 where hull spaces are connected to a permanently fitted inert gas distribution system, means shall be provided to prevent hydrocarbon gases from the cargo tanks entering the double hull spaces through the system; and

.3 where such spaces are not permanently connected to an inert gas distribution system, appropriate means shall be provided to allow connection to the inert gas main.

5.5.2 Inert gas systems of chemical tankers and gas carriers

5.5.2.1 The requirements for inert gas systems contained in the Fire Safety Systems Code need not be applied to chemical tankers constructed before 1 January 2016, including those constructed before 1 July 2012, and all gas carriers:

.1 when carrying cargoes described in regulation 1.6.1, provided that they comply with the requirements for inert gas systems on chemical tankers established by the Administration, based on the guidelines developed by the Organization*; or

.2 when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in chapters 17 and 18 of the International Bulk Chemical Code, provided that the capacity of tanks used for their carriage does not exceed 3,000 m^3 and the individual nozzle capacities of tank washing machines do not exceed 17.5 m^3/h and the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 m^3/h.

* Refer to the *Regulation for inert gas systems on chemical tankers*, adopted by the Organization by resolution A.567(14), and Corr.1.

5.5.3 General requirements for inert gas systems

5.5.3.1 The inert gas system shall be capable of inerting, purging and gas-freeing empty tanks and maintaining the atmosphere in cargo tanks with the required oxygen content.

5.5.3.2 Tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

5.5.4 Requirements for equivalent systems

5.5.4.1 The Administration may, after having given consideration to the ship's arrangement and equipment, accept other fixed installations, in accordance with regulation I/5 and paragraph 5.5.4.3.

5.5.4.2 For tankers of 8,000 tonnes deadweight and upwards but less than 20,000 tonnes deadweight constructed on or after 1 January 2016, in lieu of fixed installations as required by paragraph 5.5.4.1, the Administration may accept other equivalent arrangements or means of protection in accordance with regulation I/5 and paragraph 5.5.4.3.

5.5.4.3 Equivalent systems or arrangements shall:

.1 be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and

.2 be so designed as to minimize the risk of ignition from the generation of static electricity by the system itself."

Part C
Suppression of fire

Regulation 9 – Containment of fire

6 Paragraph 7 is replaced with the following:

"**7 Ventilation systems**

(This paragraph applies to ships constructed on or after 1 January 2016)

7.1 General

7.1.1 Ventilation ducts, including single and double wall ducts, shall be of steel or equivalent material except flexible bellows of short length not exceeding 600 mm used for connecting fans to the ducting in air-conditioning rooms. Unless expressly provided otherwise in paragraph 7.1.6, any other material used in the construction of ducts, including insulation, shall also be non-combustible. However, short ducts, not generally exceeding 2 m in length and with a free cross-sectional area* not exceeding 0.02 m^2, need not be of steel or equivalent material, subject to the following conditions:

.1 the ducts shall be made of non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value** not exceeding 45 MJ/m^2 of their surface area for the thickness used;

.2 the ducts are only used at the end of the ventilation device; and

.3 the ducts are not situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division, including continuous "B" class ceiling.

7.1.2 The following arrangements shall be tested in accordance with the Fire Test Procedures Code:

.1 fire dampers, including their relevant means of operation, however, the testing is not required for dampers located at the lower end of the duct in exhaust ducts for galley ranges, which must be of steel and capable of stopping the draught in the duct; and

.2 duct penetrations through "A" class divisions. However, the test is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed connections or by welding.

7.1.3 Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection hatch on which the identification number of the fire damper is marked. The fire damper identification number shall also be marked on any remote controls provided.

7.1.4 Ventilation ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

7.1.5 The main inlets and outlets of ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate the operating position of the closing device.

7.1.6 Combustible gaskets in flanged ventilation duct connections are not permitted within 600 mm of openings in "A" or "B" class divisions and in ducts required to be of "A" class construction.

7.1.7 Ventilation openings or air balance ducts between two enclosed spaces shall not be provided except as permitted by paragraphs 4.1.2.1 and 4.2.3.

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* The term *free cross-sectional area* means, even in the case of a pre-insulated duct, the area calculated on the basis of the inner dimensions of the duct itself and not the insulation.

** Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, Reaction to the fire tests for building products – Determination of the heat of combustion.

7.2 Arrangement of ducts

7.2.1 The ventilation systems for machinery spaces of category A, vehicle spaces, ro-ro spaces, galleys, special category spaces and cargo spaces shall, in general, be separated from each other and from the ventilation systems serving other spaces. However, the galley ventilation systems on cargo ships of less than 4,000 gross tonnage and in passenger ships carrying not more than 36 passengers need not be completely separated from other ventilation systems, but may be served by separate ducts from a ventilation unit serving other spaces. In such a case, an automatic fire damper shall be fitted in the galley ventilation duct near the ventilation unit.

7.2.2 Ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces shall not pass through accommodation spaces, service spaces, or control stations unless they comply with paragraph 7.2.4.

7.2.3 Ducts provided for the ventilation of accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces unless they comply with paragraph 7.2.4.

7.2.4 As permitted by paragraphs 7.2.2 and 7.2.3 ducts shall be either:

1.1 constructed of steel having a thickness of at least 3 mm for ducts with a free cross-sectional area of less than 0.075 m^2, at least 4 mm for ducts with a free cross-sectional area of between 0.075 m^2 and 0.45 m^2, and at least 5 mm for ducts with a free cross-sectional area of over 0.45 m^2;

1.2 suitably supported and stiffened;

1.3 fitted with automatic fire dampers close to the boundaries penetrated; and

1.4 insulated to "A-60" class standard from the boundaries of the spaces they serve to a point at least 5 m beyond each fire damper;

or

2.1 constructed of steel in accordance with paragraphs 7.2.4.1.1 and 7.2.4.1.2; and

2.2 insulated to "A-60" class standard throughout the spaces they pass through, except for ducts that pass through spaces of category (9) or (10) as defined in paragraph 2.2.3.2.2.

7.2.5 For the purposes of paragraphs 7.2.4.1.4 and 7.2.4.2.2, ducts shall be insulated over their entire cross-sectional external surface. Ducts that are outside but adjacent to the specified space, and share one or more surfaces with it, shall be considered to pass through the specified space, and shall be insulated over the surface they share with the space for a distance of 450 mm past the duct*.

7.2.6 Where it is necessary that a ventilation duct passes through a main vertical zone division, an automatic fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The control location shall be readily accessible and be clearly and prominently marked. The duct between the division and the damper shall be constructed of steel in accordance with paragraphs 7.2.4.1.1 and 7.2.4.1.2 and insulated to at least the same fire integrity as the division penetrated. The damper shall be fitted on at least one side of the division with a visible indicator showing the operating position of the damper.

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* Sketches of such arrangements are contained in the Unified Interpretations of SOLAS chapter II-2 (MSC.1/Circ.1276).

7.3 Details of fire dampers and duct penetrations

7.3.1 Ducts passing through "A" class divisions shall meet the following requirements:

.1 where a thin plated duct with a free cross sectional area equal to, or less than, 0.02 m^2 passes through "A" class divisions, the opening shall be fitted with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of a bulkhead or, in the case of a deck, wholly laid on the lower side of the decks penetrated;

.2 where ventilation ducts with a free cross-sectional area exceeding 0.02 m^2, but not more than 0.075 m^2, pass through "A" class divisions, the openings shall be lined with steel sheet sleeves. The ducts and sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the division through which the duct passes; and

.3 automatic fire dampers shall be fitted in all ducts with a free cross-sectional area exceeding 0.075 m^2 that pass through "A" class divisions. Each damper shall be fitted close to the division penetrated and the duct between the damper and the division penetrated shall be constructed of steel in accordance with paragraphs 7.2.4.2.1 and 7.2.4.2.2. The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the division. The damper shall be fitted with a visible indicator which shows the operating position of the damper. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they penetrate. A duct of cross-sectional area exceeding 0.075 m^2 shall not be divided into smaller ducts at the penetration of an "A" class division and then recombined into the original duct once through the division to avoid installing the damper required by this provision.

7.3.2 Ventilation ducts with a free cross-sectional area exceeding 0.02 m^2 passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 mm in length, divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length.

7.3.3 All fire dampers shall be capable of manual operation. The dampers shall have a direct mechanical means of release or, alternatively, be closed by electrical, hydraulic, or pneumatic operation. All dampers shall be manually operable from both sides of the division. Automatic fire dampers, including those capable of remote operation, shall have a failsafe mechanism that will close the damper in a fire even upon loss of electrical power or hydraulic or pneumatic pressure loss. Remotely operated fire dampers shall be capable of being reopened manually at the damper.

7.4 Ventilation systems for passenger ships carrying more than 36 passengers

7.4.1 In addition to the requirements in sections 7.1, 7.2 and 7.3, the ventilation system of a passenger ship carrying more than 36 passengers shall also meet the following requirements.

7.4.2 In general, the ventilation fans shall be so arranged that the ducts reaching the various spaces remain within a main vertical zone.

7.4.3 Stairway enclosures shall be served by an independent ventilation fan and duct system (exhaust and supply) which shall not serve any other spaces in the ventilation systems.

7.4.4 A duct, irrespective of its cross-section, serving more than one 'tween-deck accommodation space, service space or control station, shall be fitted, near the penetration of each deck of such spaces, with an automatic smoke damper that shall also be capable of being closed manually from the protected deck above the damper. Where a fan serves more than one 'tween-deck space through separate ducts within a main vertical zone, each dedicated to a single 'tween-deck space, each duct shall be provided with a manually operated smoke damper fitted close to the fan.

7.4.5 Vertical ducts shall, if necessary, be insulated as required by tables 9.1 and 9.2. Ducts shall be insulated as required for decks between the space they serve and the space being considered, as applicable.

7.5 Exhaust ducts from galley ranges

7.5.1 *Requirements for passenger ships carrying more than 36 passengers*

7.5.1.1 In addition to the requirements in sections 7.1, 7.2 and 7.3, exhaust ducts from galley ranges shall be constructed in accordance with paragraphs 7.2.4.2.1 and 7.2.4.2.2 and insulated to "A-60" class standard throughout accommodation spaces, service spaces, or control stations they pass through. They shall also be fitted with:

.1 a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;

.2 a fire damper located in the lower end of the duct at the junction between the duct and the galley range hood which is automatically and remotely operated and, in addition, a remotely operated fire damper located in the upper end of the duct close to the outlet of the duct;

.3 a fixed means for extinguishing a fire within the duct*;

.4 remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in paragraph 7.5.1.1.2 and for operating the fire-extinguishing system, which shall be placed in a position outside the galley close to the entrance to the galley. Where a multi-branch system is installed, a remote means located with the above controls shall be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and

.5 suitably located hatches for inspection and cleaning, including one provided close to the exhaust fan and one fitted in the lower end where grease accumulates.

7.5.1.2 Exhaust ducts from ranges for cooking equipment installed on open decks shall conform to paragraph 7.5.1.1, as applicable, when passing through accommodation spaces or spaces containing combustible materials.

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* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and marine technology – Fire-extinguishing systems for protection of galley cooking equipment.

7.5.2 *Requirements for cargo ships and passenger ships carrying not more than 36 passengers*

When passing through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed in accordance with paragraphs 7.2.4.1.1 and 7.2.4.1.2. Each exhaust duct shall be fitted with:

.1 a grease trap readily removable for cleaning;

.2 an automatically and remotely operated fire damper located in the lower end of the duct at the junction between the duct and the galley range hood and, in addition, a remotely operated fire damper in the upper end of the duct close to the outlet of the duct;

.3 arrangements, operable from within the galley, for shutting off the exhaust and supply fans; and

.4 fixed means for extinguishing a fire within the duct.*

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* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and marine technology – Fire-extinguishing systems for protection of galley cooking equipment.

7.6 Ventilation rooms serving machinery spaces of category A containing internal combustion machinery

7.6.1 Where a ventilation room serves only such an adjacent machinery space and there is no fire division between the ventilation room and the machinery space, the means for closing the ventilation duct or ducts serving the machinery space shall be located outside of the ventilation room and machinery space.

7.6.2 Where a ventilation room serves such a machinery space as well as other spaces and is separated from the machinery space by a "A-0" class division, including penetrations, the means for closing the ventilation duct or ducts for the machinery space can be located in the ventilation room.

7.7 Ventilation systems for laundries in passenger ships carrying more than 36 passengers

Exhaust ducts from laundries and drying rooms of category (13) spaces as defined in paragraph 2.2.3.2.2 shall be fitted with:

.1 filters readily removable for cleaning purposes;

.2 a fire damper located in the lower end of the duct which is automatically and remotely operated;

.3 remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in paragraph 7.7.2; and

.4 suitably located hatches for inspection and cleaning."

Regulation 10 – Firefighting

7 Paragraph 1 is replaced with the following:

"**1 Purpose**

1.1 The purpose of this regulation is to suppress and swiftly extinguish a fire in the space of origin, except for paragraph 1.2. For this purpose, the following functional requirements shall be met:

.1 fixed fire-extinguishing systems shall be installed having due regard to the fire growth potential of the protected spaces; and

.2 fire-extinguishing appliances shall be readily available.

1.2 For open-top container holds* and on deck container stowage areas on ships designed to carry containers on or above the weather deck, constructed on or after 1 January 2016, fire protection arrangements shall be provided for the purpose of containing a fire in the space or area of origin and cooling adjacent areas to prevent fire spread and structural damage.

* For a definition of this term, refer to the Interim guidelines for open-top containerships (MSC/Circ.608/Rev.1)."

8 In paragraph 2.1.3, the words ", other than those included in paragraph 7.3.2," are added between the words "cargo ships" and "the diameter".

9 In paragraph 2.2.4.1.2, the words ", other than those included in paragraph 7.3.2," are added between the words "cargo ship" and "need".

10 The following new paragraph is added after paragraph 7.2:

"7.3 *Firefighting for ships constructed on or after 1 January 2016 designed to carry containers on or above the weather deck*

7.3.1 Ships shall carry, in addition to the equipment and arrangements required by paragraphs 1 and 2, at least one water mist lance.

7.3.1.1 The water mist lance shall consist of a tube with a piercing nozzle which is capable of penetrating a container wall and producing water mist inside a confined space (container, etc.) when connected to the fire main.

7.3.2 Ships designed to carry five or more tiers of containers on or above the weather deck shall carry, in addition to the requirements of paragraph 7.3.1, mobile water monitors* as follows:

.1 ships with breadth less than 30 m: at least two mobile water monitors; or

.2 ships with breadth of 30 m or more: at least four mobile water monitors.

7.3.2.1 The mobile water monitors, all necessary hoses, fittings and required fixing hardware shall be kept ready for use in a location outside the cargo space area not likely to be cut-off in the event of a fire in the cargo spaces.

7.3.2.2 A sufficient number of fire hydrants shall be provided such that:

.1 all provided mobile water monitors can be operated simultaneously for creating effective water barriers forward and aft of each container bay;

.2 the two jets of water required by paragraph 2.1.5.1 can be supplied at the pressure required by paragraph 2.1.6; and

.3 each of the required mobile water monitors can be supplied by separate hydrants at the pressure necessary to reach the top tier of containers on deck.

7.3.2.3 The mobile water monitors may be supplied by the fire main, provided the capacity of fire pumps and fire main diameter are adequate to simultaneously operate the mobile water monitors and two jets of water from fire hoses at the required pressure values. If carrying dangerous goods, the capacity of fire pumps and fire main diameter shall also comply with regulation 19.3.1.5, as far as applicable to on-deck cargo areas.

7.3.2.4 The operational performance of each mobile water monitor shall be tested during initial survey on board the ship to the satisfaction of the Administration. The test shall verify that:

.1 the mobile water monitor can be securely fixed to the ship structure ensuring safe and effective operation; and

.2 the mobile water monitor jet reaches the top tier of containers with all required monitors and water jets from fire hoses operated simultaneously.

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* Refer to the *Guidelines for the design, performance, testing and approval of mobile water monitors used for the protection of on-deck cargo areas of ships designed and constructed to carry five or more tiers of containers on or above the weather deck* (MSC.1/Circ.1472)."

Part D
Escape

Regulation 13 – Means of escape

11 The following two new paragraphs are added after paragraph 4.1.4:

"*4.1.5 Inclined ladders and stairways*

For ships constructed on or after 1 January 2016, all inclined ladders/stairways fitted to comply with paragraph 4.1.1 with open treads in machinery spaces being part of or providing access to escape routes but not located within a protected enclosure shall be made of steel. Such ladders/stairways shall be fitted with steel shields attached to their undersides, such as to provide escaping personnel protection against heat and flame from beneath.

4.1.6 Escape from main workshops within machinery spaces

For ships constructed on or after 1 January 2016, two means of escape shall be provided from the main workshop within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space."

12 The following three new paragraphs are added after paragraph 4.2.3:

"*4.2.4 Inclined ladders and stairways*

For ships constructed on or after 1 January 2016, all inclined ladders/stairways fitted to comply with paragraph 4.2.1 with open treads in machinery spaces being part of or providing access to escape routes but not located within a protected enclosure shall be made of steel. Such ladders/stairways shall be fitted with steel shields attached to their undersides, such as to provide escaping personnel protection against heat and flame from beneath.

4.2.5 Escape from machinery control rooms in machinery spaces of category "A"

For ships constructed on or after 1 January 2016, two means of escape shall be provided from the machinery control room located within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space.

4.2.6 Escape from main workshops in machinery spaces of category "A"

For ships constructed on or after 1 January 2016, two means of escape shall be provided from the main workshop within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space."

Part E
Operational requirements

Regulation 16 – Operations

13 The following new paragraph is added after paragraph 3.2:

"**3.3 Operation of inert gas system**

3.3.1 The inert gas system for tankers required in accordance with regulation 4.5.5.1 shall be so operated as to render and maintain the atmosphere of the cargo tanks non-flammable, except when such tanks are required to be gas-free.

3.3.2 Notwithstanding the above, for chemical tankers, the application of inert gas, may take place after the cargo tank has been loaded, but before commencement of unloading and shall continue to be applied until that cargo tank has been purged of all flammable vapours before gas-freeing. Only nitrogen is acceptable as inert gas under this provision.

3.3.3 Notwithstanding regulation 1.2.2.2, the provisions of this paragraph shall only apply to tankers constructed on or after 1 January 2016. If the oxygen content of the inert gas exceeds 5% by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the gas improves, all operations in those cargo tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the cargo tanks, the gas regulating valve, if fitted, shall be closed and the off-specification gas shall be vented to atmosphere.

3.3.4 In the event that the inert gas system is unable to meet the requirement in paragraph 16.3.3.1 and it has been assessed that it is impractical to effect a repair, then cargo discharge and cleaning of those cargo tanks requiring inerting shall only be resumed when suitable emergency procedures have been followed, taking into account guidelines developed by the Organization[*].

[*] Refer to the *Clarification of inert gas system requirements under the Convention* (MSC/Circ.485) and to the *Revised Guidelines for inert gas systems* (MSC/Circ.353), as amended by MSC/Circ.387."

Part G
Special requirements

Regulation 20 – Protection of vehicle, special category and ro-ro spaces

14 In paragraph 3.1.4.2, the words "9.7.2.1.1 and 9.7.2.1.2" are replaced with "9.7.2.4.1.1 and 9.7.2.4.1.2".

New 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

15 The following new regulation 20-1 is added after regulation 20:

"**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**

1 Purpose

The purpose of this regulation is to provide additional safety measures in order to address the fire safety objectives of this chapter for vehicle carriers with vehicle and ro-ro spaces intended for carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion as cargo.

2 Application

2.1 In addition to complying with the requirements of regulation 20, as appropriate, vehicle spaces of 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.

2.2 In addition to complying with the requirements of regulation 20, as appropriate, vehicle carriers constructed before 1 January 2016, including those constructed before 1 July 2012*, shall comply with the requirements in paragraph 5 of this regulation.

* Refer to the Recommendation on safety measures for existing vehicle carriers carrying motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion as cargo (MSC.1/Circ.1471).

3 Requirements for spaces intended for carriage of motor vehicles with compressed natural gas in their tanks for their own propulsion as cargo

3.1 Electrical equipment and wiring

All electrical equipment and wiring shall be of a certified safe type for use in an explosive methane and air mixture*.

* Refer to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60079.

3.2 Ventilation arrangement

3.2.1 Electrical equipment and wiring, if installed in any ventilation duct, shall be of a certified safe type for use in explosive methane and air mixtures.

3.2.2 The fans shall be such as to avoid the possibility of ignition of methane and air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings.

3.3 Other ignition sources

Other equipment which may constitute a source of ignition of methane and air mixtures shall not be permitted.

4 Requirements for spaces intended for carriage of motor vehicles with compressed hydrogen in their tanks for their own propulsion as cargo

4.1 Electrical equipment and wiring

All electrical equipment and wiring shall be of a certified safe type for use in an explosive hydrogen and air mixture*.

* Refer to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60079.

4.2 Ventilation arrangement

4.2.1 Electrical equipment and wiring, if installed in any ventilation duct, shall be of a certified safe type for use in explosive hydrogen and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

4.2.2 The fans shall be designed such as to avoid the possibility of ignition of hydrogen and air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings.

4.3 Other ignition sources

Other equipment which may constitute a source of ignition of hydrogen and air mixtures shall not be permitted.

5 Detection

When a vehicle carrier carries as cargo one or more motor vehicles with either compressed hydrogen or compressed natural gas in their tanks for their own propulsion, at least two portable gas detectors shall be provided. Such detectors shall be suitable for the detection of the gas fuel and be of a certified safe type for use in the explosive gas and air mixture."

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ANNEX 4

RESOLUTION MSC.290(87)
(adopted on 21 May 2010)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

RECALLING FURTHER that among the strategic directions of the Organization relating to developing and maintaining a comprehensive framework for safe, secure, efficient and environmentally sound shipping is the establishment of goal-based standards for the design and construction of new ships,

CONSIDERING that ships should be designed and constructed for a specified design life to be safe and environmentally friendly, so that, if properly operated and maintained under specified operating and environmental conditions, they can remain safe throughout their service life,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization which are not Contracting Governments to the Convention;

6. RESOLVES to review the progress towards the implementation of SOLAS regulation II-1/3-10 in 2014 and, if proven necessary, to adjust the time periods set forth in paragraph 1 of the regulation.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A
General

Regulation 2 – Definitions

1 The following new paragraph 28 is added after the existing paragraph 27:

"28 *Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers* means the International Goal-Based Ship Construction Standards for Bulk Carriers and Oil Tankers, adopted by the Maritime Safety Committee by resolution MSC.287(87), 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 thereof."

Part A-1
Structure of ships

2 The following new regulation 3-10 is added after the existing regulation 3-9:

"**Regulation 3-10**
Goal-based ship construction standards for bulk carriers and oil tankers

1 This regulation shall apply to oil tankers of 150 m in length and above and to bulk carriers of 150 m in length and above, constructed with single deck, top-side tanks and hopper side tanks in cargo spaces, excluding ore carriers and combination carriers:

.1 for which the building contract is placed on or after 1 July 2016; or

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2017; or

.3 the delivery of which is on or after 1 July 2020.

2 Ships shall be designed and constructed for a specified design life to be safe and environmentally friendly, when properly operated and maintained under the specified operating and environmental conditions, in intact and specified damage conditions, throughout their life.

2.1 *Safe and environmentally friendly* means the ship shall have adequate strength, integrity and stability to minimize the risk of loss of the ship or pollution to the marine environment due to structural failure, including collapse, resulting in flooding or loss of watertight integrity.

2.2 *Environmentally friendly* also includes the ship being constructed of materials for environmentally acceptable recycling.

2.3 *Safety* also includes the ship's structure, fittings and arrangements providing for safe access, escape, inspection and proper maintenance and facilitating safe operation.

2.4 *Specified operating and environmental conditions* are defined by the intended operating area for the ship throughout its life and cover the conditions, including intermediate conditions, arising from cargo and ballast operations in port, waterways and at sea.

2.5 *Specified design life* is the nominal period that the ship is assumed to be exposed to operating and/or environmental conditions and/or the corrosive environment and is used for selecting appropriate ship design parameters. However, the ship's actual service life may be longer or shorter depending on the actual operating conditions and maintenance of the ship throughout its life cycle.

3 The requirements of paragraphs 2 to 2.5 shall be achieved through satisfying applicable structural requirements of an organization which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or national standards of the Administration, conforming to the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers.

4 A Ship Construction File with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction shall be provided upon delivery of a new ship, and kept on board the ship and/or ashore* and updated as appropriate throughout the ship's service. The contents of the Ship Construction File shall, at least, conform to the guidelines developed by the Organization.*

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* Refer to the Guidelines for the information to be included in a Ship Construction File (MSC.1/Circ.1343)."

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ANNEX 5

RESOLUTION MSC.291(87)
(adopted on 21 May 2010)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-seventh session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2011, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2012 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A-1
Structure of ships

1 The following new regulation 3-11 is added after regulation 3-10:

"Regulation 3-11
Corrosion protection of cargo oil tanks of crude oil tankers

1 Paragraph 3 shall apply to crude oil tankers*, as defined in regulation 1 of Annex I to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, of 5,000 tonnes deadweight and above:

.1 for which the building contract is placed on or after 1 January 2013; or

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 July 2013; or

.3 the delivery of which is on or after 1 January 2016.

2 Paragraph 3 shall not apply to combination carriers or chemical tankers as defined in regulations 1 of Annexes I and II, respectively, to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto. For the purpose of this regulation, chemical tankers also include chemical tankers certified to carry oil.

3 All cargo oil tanks of crude oil tankers shall be:

.1 coated during the construction of the ship in accordance with the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by the Maritime Safety Committee by resolution MSC.288(87), 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; or

.2 protected by alternative means of corrosion protection or utilization of corrosion resistance material to maintain required structural integrity for 25 years in accordance with the Performance standard for alternative means of corrosion protection for cargo oil tanks of crude oil tankers, adopted by the Maritime Safety Committee by resolution MSC.289(87), 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.

4 The Administration may exempt a crude oil tanker from the requirements of paragraph 3 to allow the use of novel prototype alternatives to the coating system specified in paragraph 3.1, for testing, provided they are subject to suitable controls, regular assessment and acknowledgement of the need for immediate remedial action if the system fails or is shown to be failing. Such exemption shall be recorded on an exemption certificate.

5 The Administration may exempt a crude oil tanker from the requirements of paragraph 3 if the ship is built to be engaged solely in the carriage of cargoes and cargo handling operations not causing corrosion**. Such exemption and conditions for which it is granted shall be recorded on an exemption certificate.

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* Refer to items 1.11.1 or 1.11.4 of the Supplement to the International Oil Pollution Prevention Certificate (Form B).

** Refer to the guidelines to be developed by the Organization."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A
General

Regulation 1 – Application

2 In paragraph 2.2, in subparagraph .4, the word "and" is deleted; in subparagraph .5 the word "and" is added at the end; and the following new subparagraph .6 is added after the existing subparagraph .5:

".6 regulation 4.5.7.1."

Part B
Prevention of fire and explosion

Regulation 4 – Probability of ignition

3 The existing paragraph 5.7 is replaced by the following:

"**5.7 Gas measurement and detection**

5.7.1 ***Portable instrument***

Tankers shall be equipped with at least one portable instrument for measuring oxygen and one for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

5.7.2 ***Arrangements for gas measurement in double-hull spaces and double-bottom spaces***

5.7.2.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations in double-hull spaces and double-bottom spaces shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in paragraph 5.7.2.2.

5.7.2.2 Where the atmosphere in double-hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of gas sampling lines shall be adapted to the design of such spaces.

5.7.2.3 The materials of construction and dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

5.7.3 ***Arrangements for fixed hydrocarbon gas detection systems indouble-hull and double-bottom spaces of oil tankers***

5.7.3.1 In addition to the requirements in paragraphs 5.7.1 and 5.7.2, oil tankers of 20,000 tonnes deadweight and above, constructed on or after 1 January 2012, shall be provided with a fixed hydrocarbon gas detection system complying with the Fire Safety Systems Code for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

5.7.3.2 Oil tankers provided with constant operative inerting systems for such spaces need not be equipped with fixed hydrocarbon gas detection equipment.

5.7.3.3 Notwithstanding the above, cargo pump-rooms subject to the provisions of paragraph 5.10 need not comply with the requirements of this paragraph."

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ANNEX 2

RESOLUTION MSC.308(88)
(adopted on 3 December 2010)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-eighth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 January 2012, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2012 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part D
Electrical installations

Regulation 41 – Main source of electrical power and lighting systems

1 In paragraph 6, the words "constructed on or after 1 July 2010" are inserted after the words "In passenger ships".

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A
General

Regulation 1 – Application

2 In paragraph 1.1, the date "1 July 2002" is replaced by the date "1 July 2012".

3 In paragraph 1.2.2, the date "1 July 2002" is replaced by the date "1 July 2012".

4 The existing paragraph 2.1 is replaced by the following:

"2.1 Unless expressly provided otherwise, for ships constructed before 1 July 2012, the Administration shall ensure that the requirements which are applicable under chapter II-2 of the International Convention for the Safety of Life at Sea, 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.13(57), MSC.22(59), MSC.24(60), MSC.27(61), MSC.31(63), MSC.57(67), MSC.99(73), MSC.134(76), MSC.194(80), MSC.201(81), MSC.216(82), MSC.256(84), MSC.269(85) and MSC.291(87) are complied with."

5 In paragraph 3.1, the date "1 July 2002" is replaced by the date "1 July 2012".

6 In paragraph 3.2, the date "1 July 2002" is replaced by the date "1 July 2012".

Regulation 3 – Definitions

7 The existing paragraph 23 is replaced by the following:

"23 *Fire Test Procedures Code* means the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code) as adopted by the Maritime Safety Committee of the Organization by resolution MSC.307(88), 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 C
Suppression of fire

Regulation 7 – Detection and alarm

8 In paragraph 4.1, at the end of subparagraph .1, the word "and" is deleted; at the end of subparagraph .2.2, the period "." is replaced by the word "; and"; and the following new subparagraph .3 is added after the existing subparagraph .2.2:

".3 enclosed spaces containing incinerators".

CHAPTER V
SAFETY OF NAVIGATION

Regulation 18 – Approval, surveys and performance standards of navigation systems and equipment and voyage data recorder

9 The following new paragraph 9 is added after the existing paragraph 8:

"9 The automatic identification system (AIS) shall be subjected to an annual test. The test shall be conducted by an approved surveyor or an approved testing or servicing facility. The test shall verify the correct programming of the ship static information, correct data exchange with connected sensors as well as verifying the radio performance by radio frequency measurement and on-air test using, e.g., a Vessel Traffic Service (VTS). A copy of the test report shall be retained on board the ship."

Regulation 23 – Pilot transfer arrangements

10 The existing text of regulation 23 is replaced by the following:

"**1 Application**

1.1 Ships engaged on voyages in the course of which pilots may be employed shall be provided with pilot transfer arrangements.

1.2 Equipment and arrangements for pilot transfer which are installed[1] on or after 1 July 2012 shall comply with the requirements of this regulation, and due regard shall be paid to the standards adopted by the Organization[2].

1.3 Except as provided otherwise, equipment and arrangements for pilot transfer which are provided on ships before 1 July 2012 shall at least comply with the requirements of regulation 17[3] or 23, as applicable, of the International Convention for the Safety of Life at Sea, 1974, in force prior to that date, and due regard shall be paid to the standards adopted by the Organization prior to that date.

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1 Refer to the Unified interpretation of SOLAS regulation V/23 (MSC.1/Circ.1375).

2 Refer to the Assembly resolution on Pilot transfer arrangements, to be adopted by the Organization.

3 Refer to resolution MSC.99(73), renumbering previous regulation 17 as regulation 23, which entered into force on 1 July 2002.

1.4 Equipment and arrangements installed on or after 1 July 2012, which are a replacement of equipment and arrangements provided on ships before 1 July 2012, shall, in so far as is reasonable and practicable, comply with the requirements of this regulation.

1.5 With respect to ships constructed before 1 January 1994, paragraph 5 shall apply not later than the first survey[4] on or after 1 July 2012.

1.6 Paragraph 6 applies to all ships.

2 General

2.1 All arrangements used for pilot transfer shall efficiently fulfil their purpose of enabling pilots to embark and disembark safely. The appliances shall be kept clean, properly maintained and stowed and shall be regularly inspected to ensure that they are safe to use. They shall be used solely for the embarkation and disembarkation of personnel.

2.2 The rigging of the pilot transfer arrangements and the embarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge and who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. Personnel engaged in rigging and operating any mechanical equipment shall be instructed in the safe procedures to be adopted and the equipment shall be tested prior to use.

2.3 A pilot ladder shall be certified by the manufacturer as complying with this regulation or with an international standard acceptable to the Organization[5]. Ladders shall be inspected in accordance with regulations I/6, 7 and 8.

2.4 All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record keeping. A record shall be kept on the ship as to the date the identified ladder is placed into service and any repairs effected.

2.5 Reference in this regulation to an accommodation ladder includes a sloping ladder used as part of the pilot transfer arrangements.

3 Transfer arrangements

3.1 Arrangements shall be provided to enable the pilot to embark and disembark safely on either side of the ship.

3.2 In all ships, where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 m, and when it is intended to embark and disembark pilots by means of the accommodation ladder[6], or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such

4 Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

5 Refer to the recommendations by the International Organization for Standardization, in particular publication ISO 799:2004, *Ships and marine technology – Pilot ladders*.

6 Refer to regulation II-1/3-9 on Means of embarkation on and disembarkation from ships, adopted by resolution MSC.256(84), together with the associated Guidelines (MSC.1/Circ.1331).

equipment on each side, unless the equipment is capable of being transferred for use on either side.

3.3 Safe and convenient access to, and egress from, the ship shall be provided by either:

.1 a pilot ladder requiring a climb of not less than 1.5 m and not more than 9 m above the surface of the water so positioned and secured that:

.1 it is clear of any possible discharges from the ship;

.2 it is within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship;

.3 each step rests firmly against the ship's side; where constructional features, such as rubbing bands, would prevent the implementation of this provision, special arrangements shall, to the satisfaction of the Administration, be made to ensure that persons are able to embark and disembark safely;

.4 the single length of pilot ladder is capable of reaching the water from the point of access to, or egress from, the ship and due allowance is made for all conditions of loading and trim of the ship, and for an adverse list of 15°; the securing strong point, shackles and securing ropes shall be at least as strong as the side ropes; or

.2 an accommodation ladder in conjunction with the pilot ladder (i.e. a combination arrangement), or other equally safe and convenient means, whenever the distance from the surface of the water to the point of access to the ship is more than 9 m. The accommodation ladder shall be sited leading aft. When in use, means shall be provided to secure the lower platform of the accommodation ladder to the ship's side, so as to ensure that the lower end of the accommodation ladder and the lower platform are held firmly against the ship's side within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length and clear of all discharges.

.1 when a combination arrangement is used for pilot access, means shall be provided to secure the pilot ladder and manropes to the ship's side at a point of nominally 1.5 m above the bottom platform of the accommodation ladder. In the case of a combination arrangement using an accommodation ladder with a trapdoor in the bottom platform (i.e. embarkation platform), the pilot ladder and man ropes shall be rigged through the trapdoor extending above the platform to the height of the handrail.

4 Access to the ship's deck

Means shall be provided to ensure safe, convenient and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder or other appliance, and the ship's deck. Where such passage is by means of:

.1 a gateway in the rails or bulwark, adequate handholds shall be provided;

.2 a bulwark ladder, two handhold stanchions rigidly secured to the ship's structure at or near their bases and at higher points shall be fitted. The bulwark ladder shall be securely attached to the ship to prevent overturning.

5 Shipside doors

Shipside doors used for pilot transfer shall not open outwards.

6 Mechanical pilot hoists

Mechanical pilot hoists shall not be used.

7 Associated equipment

7.1 The following associated equipment shall be kept at hand ready for immediate use when persons are being transferred:

.1 two man-ropes of not less than 28 mm and not more than 32 mm in diameter properly secured to the ship if required by the pilot; man-ropes shall be fixed at the rope end to the ring plate fixed on deck and shall be ready for use when the pilot disembarks, or upon request from a pilot approaching to board (the manropes shall reach the height of the stanchions or bulwarks at the point of access to the deck before terminating at the ring plate on deck);

.2 a lifebuoy equipped with a self-igniting light;

.3 a heaving line.

7.2 When required by paragraph 4 above, stanchions and bulwark ladders shall be provided.

8 Lighting

Adequate lighting shall be provided to illuminate the transfer arrangements overside and the position on deck where a person embarks or disembarks."

APPENDIX
CERTIFICATES

Form of Safety Certificate for Passenger Ships

11 The following new paragraphs 2.10 and 2.11 are added after the existing paragraph 2.9:

"2.10 the ship was/was not[1] subjected to an alternative design and arrangements in pursuance of regulation(s) II-1/55 / II-2/17 / III/38[1] of the Convention;

2.11 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[1] is/is not[1] appended to this Certificate.

---

[1] Delete as appropriate."

Form of Safety Construction Certificate for Cargo Ships

12 The following new paragraphs 4 and 5 are added after the existing paragraph 3:

"4 That the ship was/was not[4] subjected to an alternative design and arrangements in pursuance of regulation(s) II-1/55 / II-2/17[4] of the Convention.

5 That a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection[4] is/is not[4] appended to this Certificate.

---

[4] Delete as appropriate."

Form of Safety Equipment Certificate for Cargo Ships

13 The following new paragraphs 2.7 and 2.8 are added after the existing paragraph 2.6:

"2.7 the ship was/was not[4] subjected to an alternative design and arrangements in pursuance of regulation(s) II-2/17 / III/38[4] of the Convention;

2.8 a Document of approval of alternative design and arrangements for fire protection/life-saving appliances and arrangements[4] is/is not[4] appended to this Certificate.

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[4] Delete as appropriate."

Form of Nuclear Passenger Ship Safety Certificate

14 The existing paragraphs 2.11 and 2.12 are replaced by the following:

"2.11 the ship was/was not[1] subjected to an alternative design and arrangements in pursuance of regulation(s) II-1/55 / II-2/17 / III/38[1] of the Convention;

2.12 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[1] is/is not[1] appended to this Certificate.

_____

[1] Delete as appropriate."

Form of Nuclear Cargo Ship Safety Certificate

15 The existing paragraphs 2.10 and 2.11 are replaced by the following:

"2.10 the ship was/was not[3] subjected to an alternative design and arrangements in pursuance of regulation(s) II-1/55 / II-2/17 / III/38/[3] of the Convention;

2.11 a Document of approval of alternative design and arrangements for machinery and electrical installations/fire protection/life-saving appliances and arrangements[3] is/is not[3] appended to this Certificate.

_____

[3] Delete as appropriate."

***

ANNEX 1

RESOLUTION MSC.282(86)
(adopted on 5 June 2009)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-sixth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2010, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2011 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A-1
Structure of ships

Regulation 3-5 – New installation of materials containing asbestos

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

"From 1 January 2011, for all ships, new installation of materials which contain asbestos shall be prohibited."

Part C
Machinery installations

Regulation 35-1 - Bilge pumping arrangements

2 The following new paragraph 2.6.3 is added after the existing paragraph 2.6.2:

"2.6.3 Provisions for the drainage of closed vehicle and ro-ro spaces and special category spaces shall also comply with regulations II-2/20.6.1.4 and II-2/20.6.1.5."

CHAPTER V
SAFETY OF NAVIGATION

Regulation 19 - Carriage requirements for shipborne navigational systems and equipment

3 In paragraph 2.1, the existing subparagraph .4 is replaced by the following:

".4 nautical charts and nautical publications to plan and display the ship's route for the intended voyage and to plot and monitor positions throughout the voyage. An electronic chart display and information system (ECDIS) is also accepted as meeting the chart carriage requirements of this subparagraph. Ships to which paragraph 2.10 applies shall comply with the carriage requirements for ECDIS detailed therein;".

4 In paragraph 2.2, the new subparagraphs .3 and .4 are added after the existing subparagraph .2 as follows:

".3 a bridge navigational watch alarm system (BNWAS), as follows:

.1 cargo ships of 150 gross tonnage and upwards and passenger ships irrespective of size constructed on or after 1 July 2011;

.2 passenger ships irrespective of size constructed before 1 July 2011, not later than the first survey* after 1 July 2012;

.3 cargo ships of 3,000 gross tonnage and upwards constructed before 1 July 2011, not later than the first survey* after 1 July 2012;

.4 cargo ships of 500 gross tonnage and upwards but less than 3,000 gross tonnage constructed before 1 July 2011, not later than the first survey* after 1 July 2013; and

.5 cargo ships of 150 gross tonnage and upwards but less than 500 gross tonnage constructed before 1 July 2011, not later than the first survey* after 1 July 2014.

The bridge navigational watch alarm system shall be in operation whenever the ship is underway at sea;

.4 a bridge navigational watch alarm system (BNWAS) installed prior to 1 July 2011 may subsequently be exempted from full compliance with the standards adopted by the Organization, at the discretion of the Administration."

* Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

5 After the existing paragraph 2.9, the new paragraphs 2.10 and 2.11 are added as follows:

"2.10 Ships engaged on international voyages shall be fitted with an Electronic Chart Display and Information System (ECDIS) as follows:

.1 passenger ships of 500 gross tonnage and upwards constructed on or after 1 July 2012;

.2 tankers of 3,000 gross tonnage and upwards constructed on or after 1 July 2012;

.3 cargo ships, other than tankers, of 10,000 gross tonnage and upwards constructed on or after 1 July 2013;

.4 cargo ships, other than tankers, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage constructed on or after 1 July 2014;

.5 passenger ships of 500 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey* on or after 1 July 2014;

.6 tankers of 3,000 gross tonnage and upwards constructed before 1 July 2012, not later than the first survey* on or after 1 July 2015;

.7 cargo ships, other than tankers, of 50,000 gross tonnage and upwards constructed before 1 July 2013, not later than the first survey* on or after 1 July 2016;

.8 cargo ships, other than tankers, of 20,000 gross tonnage and upwards but less than 50,000 gross tonnage constructed before 1 July 2013, not later than the first survey* on or after 1 July 2017; and

.9 cargo ships, other than tankers, of 10,000 gross tonnage and upwards but less than 20,000 gross tonnage constructed before 1 July 2013, not later than the first survey* on or after 1 July 2018.

2.11 Administrations may exempt ships from the application of the requirements of paragraph 2.10 when such ships will be taken permanently out of service within two years after the implementation date specified in subparagraphs .5 to .9 of paragraph 2.10."

* Refer to the Unified interpretation of the term "first survey" referred to in SOLAS regulations (MSC.1/Circ.1290).

CHAPTER VI
CARRIAGE OF CARGOES

6 The title of chapter VI is replaced by the following:

"CARRIAGE OF CARGOES AND OIL FUELS"

Regulation 1 - Application

7 At the beginning of paragraph 1, the words "Unless expressly provided otherwise," are added and the existing word "This" is replaced by the word "this".

Regulation 5-1 - Material safety data sheets

8 The existing text of the regulation is replaced by the following:

"Ships carrying oil or oil fuel, as defined in regulation 1 of Annex 1 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, shall be provided with material safety data sheets, based on the recommendations developed by the Organization*, prior to the loading of such oil as cargo in bulk or bunkering of oil fuel."

* Refer to the Recommendations for material safety data sheets (MSDS) for MARPOL Annex I oil cargo and oil fuel, adopted by the Organization by resolution MSC.286(86), as may be amended.

APPENDIX
CERTIFICATES

Record of Equipment for the Passenger Ship Safety Certificate (Form P)

9 In the Record of Equipment for the Passenger Ship Safety Certificate (Form P), in section 5, a new item 14 is inserted as follows:

"14 Bridge navigational watch alarm system (BNWAS)".

Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

10 In the Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E), in section 3, a new item 14 is inserted as follows:

"14 Bridge navigational watch alarm system (BNWAS)".

Record of Equipment for the Nuclear Passenger Ship Safety Certificate (Form PNUC)

11 In the Record of Equipment for Nuclear Passenger Ship Safety Certificate (Form PNUC), in section 5, a new item 15 is inserted as follows:

"15 Bridge navigational watch alarm system (BNWAS)".

Record of Equipment for the Nuclear Cargo Ship Safety Certificate (Form CNUC)

12 In the Record of Equipment for Nuclear Cargo Ship Safety Certificate (Form CNUC), in section 5, a new item 14 is inserted as follows:

"14 Bridge navigational watch alarm system (BNWAS)".

* * *

FOOTNOTE TO BE ADDED TO SOLAS REGULATION V/18

In the existing footnote to paragraph 2, the following reference is added after the last reference:

"Performance standards for a bridge navigational watch alarm system (BNWAS) (resolution MSC.128(75))".

***

ANNEX 4

RESOLUTION MSC.269(85)
(adopted on 4 December 2008)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-fifth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in Annexes 1 and 2 to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that:

(a) the said amendments, set out in Annex 1, shall be deemed to have been accepted on 1 January 2010; and

(b) the said amendments, set out in Annex 2, shall be deemed to have been accepted on 1 July 2010,

unless, prior to those dates, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention:

(a) the amendments, set out in Annex 1, shall enter into force on 1 July 2010; and

(b) the amendments, set out in Annex 2, shall enter into force on 1 January 2011,

upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in Annexes 1 and 2 to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annexes 1 and 2 to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX 1

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

Part A
General

Regulation 2 – Definitions

1 The following new paragraph 27 is added after the existing paragraph 26:

"27 *2008 IS Code* means the International Code on Intact Stability, 2008, consisting of an introduction, part A (the provisions of which shall be treated as mandatory) and part B (the provisions of which shall be treated as recommendatory), as adopted by resolution MSC.267(85), provided that:

.1 amendments to the introduction and part A of the Code 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 thereof; and

.2 amendments to part B of the Code are adopted by the Maritime Safety Committee in accordance with its Rules of Procedure."

Part B-1
Stability

Regulation 5 – Intact stability information

2 In the existing title of the regulation, the word "information" is deleted.

3 In paragraph 1, the following new sentence is added after the existing sentence:

"In addition to any other applicable requirements of the present regulations, ships having a length of 24 m and upwards constructed on or after 1 July 2010 shall as a minimum comply with the requirements of part A of the 2008 IS Code."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A
General

Regulation 1 – Application

4 The following new paragraph 2.3 is added:

"2.3 Ships constructed on or after 1 July 2002 and before 1 July 2010 shall comply with paragraphs 7.1.1, 7.4.4.2, 7.4.4.3 and 7.5.2.1.2 of regulation 9, as adopted by resolution MSC.99(73)."

Part C
Suppression of fire

Regulation 9 – Containment of fire

5 The last sentence of paragraph 4.1.1.2 is moved to a new separate paragraph 4.1.1.3 and the existing following paragraphs are renumbered accordingly.

6 The following text is added at the end of paragraph 4.1.1.2:

"Doors approved without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 12 mm. A non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door."

7 The following text is added at the end of paragraph 4.1.2.1:

"Doors approved without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 25 mm."

8 In paragraph 4.2.1, the following text is added after the first sentence:

"Doors approved as "A" class without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 12 mm and a non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door. Doors approved as "B" class without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 25 mm."

9 In paragraph 7.1.1, in the first and second sentences, the words "non-combustible" are replaced by the words "steel or equivalent".

10 At the beginning of paragraph 7.1.1.1, the words "subject to paragraph 7.1.1.2" are added and the word "a" before the word "material" is replaced by the word "any".

11 The following new paragraph 7.1.1.2 is added after the existing paragraph 7.1.1.1 and the existing subsequent paragraphs are renumbered accordingly:

".2 on ships constructed on or after 1 July 2010, the ducts shall be made of heat resisting non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value** not exceeding 45 MJ/m^2 of their surface area for the thickness used;"

** Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, *Determination of calorific potential.*

12 In paragraph 7.4.4.2, the words "non-combustible" are replaced by the words "steel or equivalent".

13 In paragraph 7.4.4.3, the words "non-combustible" are replaced by the words "steel or equivalent".

14 At the beginning of paragraph 7.4.4.3.1, the words "subject to paragraph 7.4.4.3.2" are added and the word "a" before the word "material" is replaced by the word "any".

15 The following new paragraph 7.4.4.3.2 is added after the existing paragraph 7.4.4.3.1 and the existing subsequent paragraphs are renumbered accordingly:

".3.2 on ships constructed on or after 1 July 2010, the ducts shall be made of heat resisting non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value* not exceeding 45 MJ/m^2 of their surface area for the thickness used;"

* Refer to the recommendations published by the International Organization for Standardization, in particular publication ISO 1716:2002, *Determination of calorific potential.*

16 At the end of paragraph 7.5.2.1.2, the words "and, in addition, a fire damper in the upper end of the duct" are added.

Regulation 10 – Fire fighting

17 The following new paragraph 10.2.6 is inserted after the existing paragraph 10.2.5:

"10.2.6 Passenger ships carrying more than 36 passengers constructed on or after 1 July 2010 shall be fitted with a suitably located means for fully recharging breathing air cylinders, free from contamination. The means for recharging shall be either:

.1 breathing air compressors supplied from the main and emergency switchboard, or independently driven, with a minimum capacity of 60 *l*/min per required breathing apparatus, not to exceed 420 *l*/min; or

.2 self-contained high-pressure storage systems of suitable pressure to recharge the breathing apparatus used on board, with a capacity of at least 1,200 *l* per required breathing apparatus, not to exceed 50,000 *l* of free air."

ANNEX 2

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Part A
General

Regulation 1 – Application

1 The following new paragraph 2.4 is added after the existing paragraph 2.3:

"2.4 The following ships, with cargo spaces intended for the carriage of packaged dangerous goods, shall comply with regulation 19.3, except when carrying dangerous goods specified as classes 6.2 and 7 and dangerous goods in limited quantities* and excepted quantities** in accordance with tables 19.1 and 19.3, not later than the date of the first renewal survey on or after the 1 January 2011:

.1 cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1 September 1984 but before 1 January 2011; and

.2 cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 but before 1 January 2011,

and notwithstanding these provisions:

.3 cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1 September 1984 but before 1 July 1986 need not comply with regulation 19.3.3 provided that they comply with regulation 54.2.3 as adopted by resolution MSC.1(XLV);

.4 cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1 July 1986 but before 1 February 1992 need not comply with regulation 19.3.3 provided that they comply with regulation 54.2.3 as adopted by resolution MSC.6(48);

.5 cargo ships of 500 gross tonnage and upwards and passenger ships constructed on or after 1 September 1984 but before 1 July 1998 need not comply with regulations 19.3.10.1 and 19.3.10.2; and

.6 cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 but before 1 July 1998 need not comply with regulations 19.3.10.1 and 19.3.10.2."

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* Refer to chapter 3.4 of the IMDG Code.

** Refer to chapter 3.5 of the IMDG Code.

Part E
Operational requirements

Regulation 16 – Operations

2 In paragraph 2.1, the reference to "the Code of Safe Practice for Solid Bulk Cargoes" is replaced by the reference to "the International Maritime Solid Bulk Cargoes (IMSBC) Code".

Part G
Special requirements

Regulation 19 – Carriage of dangerous goods

3 The existing note 1 to table 19.1 is replaced by the following:

> "[1] For classes 4 and 5.1 solids not applicable to closed freight containers. For classes 2, 3, 6.1 and 8 when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. For classes 4 and 5.1 liquids when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. For the purpose of this requirement, a portable tank is a closed freight container."

4 In note 10 to table 19.2, the words "the Code of Safe Practice for Solid Bulk Cargoes, adopted by resolution A.434(XI)" are replaced by the words "the International Maritime Solid Bulk Cargoes (IMSBC) Code".

5 The existing table 19.3 is replaced by the following table:

"**Table 19.3 – Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk**

Class / Regulation 19	1.1 to 1.6	1.4S	2.1	2.2	2.3 *flammable*[20]	2.3 *non-flammable*	3 FP[15] < *23°C*	3 FP[15] ≥ *23°C* to ≤ *60°C*	4.1	4.2	4.3 *liquids*[21]	4.3 *solids*	5.1	5.2[16]	6.1 liquids FP[15] < *23°C*	6.1 liquids FP[15] ≥ *23°C* to ≤ *60°C*	*6.1 liquids*	6.1 solids	8 liquids FP[15] < *23°C*	8 liquids FP[15] ≥ *23°C* to ≤ *60°C*	*8 liquids*	8 solids	9
3.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-
3.1.3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1.4	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2	X	-	X	-	X	-	X	-	-	-	X[18]	-	-	-	X	-	-	-	X	-	-	-	X[17]
3.3	X	X	X	X	-	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	-
3.4.1	-	-	X	-	-	X	X	-	X[11]	X[11]	X	X	X[11]	-	X	X	-	X[11]	X	X	-	-	X[11]
3.4.2	-	-	X	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	X[17]
3.5	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	X	X	-	X	X[19]	X[19]	-	-
3.6	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[14]
3.7	-	-	-	-	-	-	X	X	X	X	X	X	X	-	X	X	-	-	X	X	-	-	-
3.8	X[12]	-	X	X	X	X	X	X	X	X	X	X	X[13]	X	X	X	-	-	X	X	-	-	-
3.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.10.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

[11] When "mechanically-ventilated spaces" are required by the IMDG Code.

[12] Stow 3 m horizontally away from the machinery space boundaries in all cases.

[13] Refer to the IMDG Code.

[14] As appropriate for the goods to be carried.

[15] FP means flashpoint.

[16] Under the provisions of the IMDG Code, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.

[17] Only applicable to dangerous goods evolving flammable vapour listed in the IMDG Code.

[18] Only applicable to dangerous goods having a flashpoint less than 23ºC listed in the IMDG Code.

[19] Only applicable to dangerous goods having a subsidiary risk class 6.1.

[20] Under the provisions of the IMDG Code, stowage of class 2.3 having subsidiary risk class 2.1 under deck or in enclosed ro-ro spaces is prohibited.

[21] Under the provisions of the IMDG Code, stowage of class 4.3 liquids having a flashpoint less than 23ºC under deck or in enclosed ro-ro spaces is prohibited."

6 In paragraph 2.1, after the words "except when carrying dangerous goods in limited quantities", the following words are added:

"and excepted quantities[*]".

[*] Refer to chapter 3.5 of the IMDG Code.

7 In paragraph 3.4, the existing title is replaced as follows:

"3.4 *Ventilation arrangement*".

8 The following text is added at the end of the first sentence of paragraph 3.6.1:

"and shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the Organization according to the class and physical state[*]."

[*] For solid bulk cargoes, the protective clothing should satisfy the equipment provisions specified in the respective schedules of the IMSBC Code for the individual substances. For packaged goods, the protective clothing should satisfy the equipment provisions specified in emergency procedures (EmS) of the Supplement to the IMDG Code for the individual substances.

9 At the end of paragraph 4, the words "and excepted quantities" are added.

CHAPTER VI
CARRIAGE OF CARGOES

Part A
General provisions

10 The following new regulations 1-1 and 1-2 are added after the existing regulation 1:

"**Regulation 1-1**
Definitions

For the purpose of this chapter, unless expressly provided otherwise, the following definitions shall apply:

1 *IMSBC Code* means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.268(85), 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.

2 *Solid bulk cargo* means any cargo, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition, which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

Regulation 1-2
Requirements for the carriage of solid bulk cargoes other than grain

The carriage of solid bulk cargoes other than grain shall be in compliance with the relevant provisions of the IMSBC Code."

Regulation 2 – Cargo information

11 The existing subparagraph .2 of paragraph 2 is replaced by the following:

".2 in the case of solid bulk cargo, information as required by section 4 of the IMSBC Code."

12 The existing paragraph 2.3 is deleted.

Regulation 3 – Oxygen analysis and gas detection equipment

13 In paragraph 1, the word "solid" is inserted in the first sentence, after the words "When transporting a".

Part B
Special provisions for bulk cargoes other than grain

14 The title of part B is replaced as follows:

"**Special provisions for solid bulk cargoes**"

Regulation 6 – Acceptability for shipment

15 In existing paragraph 1, the word "solid" is inserted in the first sentence after the words "Prior to loading a".

16 The existing paragraphs 2 and 3 are deleted.

Regulation 7 – Loading, unloading and stowage of bulk cargoes

17 In the heading of the regulation, the word "solid" is inserted after the words "stowage of".

18 The existing paragraphs 4 and 5 are deleted and the subsequent paragraphs are renumbered accordingly.

CHAPTER VII
CARRIAGE OF DANGEROUS GOODS

Part A-1
Carriage of dangerous goods in solid form in bulk

Regulation 7-1 − Application

19 In paragraph 3 of the regulation, the words "detailed instructions on the safe carriage of dangerous goods in solid form in bulk which shall include" are deleted.

20 The following new regulation 7-5 is inserted after regulation 7-4:

"**Regulation 7-5**
Requirements for the carriage of dangerous goods in solid form in bulk

The carriage of dangerous goods in solid form in bulk shall be in compliance with the relevant provisions of the IMSBC Code, as defined in regulation VI/1-1.1."

***

RESOLUTION MSC.257(84)
(adopted on 16 May 2008)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-fourth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2009, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2010 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

1 The following new regulation 6 is added after the existing regulation 5:

"**Regulation 6**
Additional requirements for the investigation of marine casualties and incidents

Taking into account regulation I/21, each Administration shall conduct investigations of marine casualties and incidents, in accordance with the provisions of the present Convention, as supplemented by the provisions of the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) adopted by resolution MSC.255(84), and:

.1 the provisions of parts I and II of the Casualty Investigation Code shall be fully complied with;

.2 the related guidance and explanatory material contained in part III of the Casualty Investigation Code should be taken into account to the greatest possible extent in order to achieve a more uniform implementation of the Casualty Investigation Code;

.3 amendments to parts I and II of the Casualty Investigation Code shall be 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; and

.4 part III of the Casualty Investigation Code shall be amended by the Maritime Safety Committee in accordance with its rules of procedure."

ANNEX 1

RESOLUTION MSC.239(83)
(adopted on 12 October 2007)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-third session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 January 2009, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 July 2009 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER IV
RADIOCOMMUNICATIONS

PART A
GENERAL

1 The following new regulation 4-1 is added after the existing regulation 4:

"**Regulation 4-1**
GMDSS satellite providers

The Maritime Safety Committee shall determine the criteria, procedures and arrangements for the evaluation, recognition, review and oversight of the provision of mobile satellite communication services in the Global Maritime Distress and Safety System (GMDSS) pursuant to the provisions of this chapter."

CHAPTER VI
CARRIAGE OF CARGOES

2 The following new regulation 5-1 is added after the existing regulation 5:

"**Regulation 5-1**
Material safety data sheets

Ships carrying MARPOL Annex I cargoes, as defined in Appendix I to Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, and marine fuel oils shall be provided with a material safety data sheet prior to the loading of such cargoes based on the recommendations developed by the Organization.[*]

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[*] Refer to the Recommendation for material safety data sheets (MSDS) for MARPOL Annex I cargoes and marine fuel oils, adopted by the Organization by resolution MSC.150(77), as may be amended."

APPENDIX
CERTIFICATES

Form of Safety Certificate for Passenger Ships

3 In the table of paragraph 2.1.3 in the section commencing with the words "THIS IS TO CERTIFY:", the reference to "regulation II-1/13" is replaced by the reference to "regulation II-1/18[4]", the words "C.1, C.2, C.3" are replaced by "P.1, P.2, P.3" and the following footnote is added:

"[4] For ships constructed before 1 January 2009, the applicable subdivision notation "C.1, C.2 and C.3" should be used."

Form of Nuclear Passenger Ship Safety Certificate

4 In the table of paragraph 2.1.3 in the section commencing with the words "THIS IS TO CERTIFY:" of the Form of Nuclear Passenger Ship Safety Certificate, the reference to "regulation II-1/13" is replaced by "regulation II-1/18[3]", the words "C.1, C.2, C.3" are replaced by "P.1, P.2, P.3" and the following footnote is added:

"[3] For ships constructed before 1 January 2009, the applicable subdivision notation "C.1, C.2 and C.3" should be used."

5 After the existing paragraph 2.10 in the section commencing with the words "THIS IS TO CERTIFY:", the following new paragraphs 2.11 and 2.12 are added:

"2.11. the ship was/was not/[1] subjected to an alternative design and arrangements in pursuance of regulation II-2/17 of the Convention;

2.12 a Document of approval of alternative design and arrangements for fire safety is/is not/[1] appended to this Certificate.

[1] Delete as appropriate."

Form of Nuclear Cargo Ship Safety Certificate

6 After the existing paragraph 2.9 in the section commencing with the words "THIS IS TO CERTIFY:", the following new paragraphs 2.10 and 2.11 are added:

"2.10 the ship was/was not/[3] subjected to an alternative design and arrangements in pursuance of regulation II-2/17 of the Convention;

2.11 a Document of approval of alternative design and arrangements for fire safety is/is not/[3] appended to this Certificate.

[3] Delete as appropriate."

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ANNEX 2

RESOLUTION MSC.216(82)

(adopted on 8 December 2006)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than to the provisions of chapter I thereof,

HAVING CONSIDERED, at its eighty-second session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in Annexes 1, 2 and 3 to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that:

(a) the said amendments, set out in Annex 1, shall be deemed to have been accepted on 1 January 2008;

(b) the said amendments, set out in Annex 2, shall be deemed to have been accepted on 1 July 2008; and

(c) the said amendments, set out in Annex 3, shall be deemed to have been accepted on 1 January 2010,

unless, prior to those dates, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention:

(a) the amendments, set out in Annex 1, shall enter into force on 1 July 2008;

(b) the amendments, set out in Annex 2, shall enter into force on 1 January 2009; and

(c) the amendments, set out in Annex 3, shall enter into force on 1 July 2010,

upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in Annexes 1, 2 and 3 to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annexes 1, 2 and 3 to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX 1

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A-1
STRUCTURE OF SHIPS

Regulation 3-2 – Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers

1 The existing text and the heading of regulation 3-2 are replaced by the following:

"**Protective coatings of dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers**

1 Paragraphs 2 and 4 of this regulation shall apply to ships of not less than 500 gross tonnage:

.1 for which the building contract is placed on or after 1 July 2008; or

.2 in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009; or

.3 the delivery of which is on or after 1 July 2012.

2 All dedicated seawater ballast tanks arranged in ships and double-side skin spaces arranged in bulk carriers of 150 m in length and upwards shall be coated during construction in accordance with the Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.215(82), 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.

3 All dedicated seawater ballast tanks arranged in oil tankers and bulk carriers constructed on or after 1 July 1998, for which paragraph 2 is not applicable, shall comply with the requirements of regulation II-1/3-2 adopted by resolution MSC.47(66).

4 Maintenance of the protective coating system shall be included in the overall ship's maintenance scheme. The effectiveness of the protective coating system shall be verified during the life of a ship by the Administration or an organization recognized by the Administration, based on the guidelines developed by the Organization.[*]"

[*] Refer to the guidelines to be developed by the Organization.

CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 1 – Application

2 In paragraph 2.2.3, the second occurrence of the word "and" is deleted.

3 In paragraph 2.2.4, "." is replaced by "; and".

4 In paragraph 2.2, the following new subparagraph .5 is added after the existing subparagraph .4:

".5 regulations 5.3.1.3.2 and 5.3.4 to passenger ships not later than the date of the first survey after 1 July 2008."

Regulation 3 – Definitions

5 The following new paragraph 53 is added after the existing paragraph 52:

"53 *Cabin balcony* is an open deck space which is provided for the exclusive use of the occupants of a single cabin and has direct access from such a cabin."

Regulation 4 – Probability of ignition

6 The following text is added at the end of paragraph 5.2.3:

"except that "A-0" class standard is acceptable for windows and sidescuttles outside the limit specified in regulation 9.2.4.2.5."

7 In paragraph 4.4, the words "or if applied on cabin balconies of passenger ships constructed on or after 1 July 2008," are added between the words "stations" and "shall".

Regulation 5 – Fire growth potential

8 In paragraph 3.1.2.1, the last sentence is deleted.

9 The following new paragraph 3.1.3 is inserted:

"3.1.3 *Partial bulkheads and decks on passenger ships*

3.1.3.1 Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall be of non-combustible materials.

3.1.3.2 Linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies shall be of non-combustible materials. Cabin balconies on passenger ships constructed before 1 July 2008 shall comply with the requirements of this paragraph by the first survey after 1 July 2008."

10 In the first sentence of paragraph 3.2.1.1, the words "and cabin balconies" are added between the words "spaces" and "which", and the following new sentence is added at the end of the paragraph:

"However, the provisions of paragraph 3.2.3 need not be applied to cabin balconies."

11 The following new subparagraph .3 is added to the existing paragraph 3.2.4.1:

".3 exposed surfaces of cabin balconies, except for natural hard wood decking systems."

12 The following new paragraph 3.4 is added after the existing paragraph 3.3:

"3.4 *Furniture and furnishings on cabin balconies of passenger ships*

On passenger ships, furniture and furnishings on cabin balconies shall comply with regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7 unless such balconies are protected by a fixed pressure water-spraying and fixed fire detection and fire alarm systems complying with regulations 7.10 and 10.6.1.3. Passenger ships constructed before 1 July 2008 shall comply with the requirements of this paragraph by the first survey after 1 July 2008."

Regulation 6 – Smoke generation potential and toxicity

13 The existing paragraph 2 is renumbered as paragraph 2.1.

14 The following new paragraph 2.2 is added after the renumbered paragraph 2.1:

"2.2 On passenger ships constructed on or after 1 July 2008, paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code."

15 The existing paragraph 3 is renumbered as paragraph 3.1.

16 The following new paragraph 3.2 is added after the renumbered paragraph 3.1:

"3.2 On passenger ships constructed on or after 1 July 2008, primary deck coverings on cabin balconies shall not give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code."

Regulation 7 – Detection and alarm

17 The following new paragraph 10 is added after the existing paragraph 9.4:

"**10 Protection of cabin balconies on passenger ships**

A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which regulation 5.3.4 applies, when furniture and furnishings on such balconies are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7."

Regulation 9 – Containment of fire

18 The following new paragraph 2.2.7 is added after the existing paragraph 2.2.6:

"2.2.7 *Arrangement of cabin balconies*

On passenger ships constructed on or after 1 July 2008, non-load bearing partial bulkheads which separate adjacent cabin balconies shall be capable of being opened by the crew from each side for the purpose of fighting fires."

Regulation 10 – Fire fighting

19 The heading of paragraph 6.1 is replaced by the following:

"6.1 *Sprinkler and water spray systems in passenger ships"*

20 The following new paragraph 6.1.3 is added after the existing paragraph 6.1.2:

"6.1.3 A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which regulation 5.3.4 applies, where furniture and furnishings on such balconies are not as defined in regulations 3.40.1, 3.40.2, 3.40.3, 3.40.6 and 3.40.7."

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation 6 – Communications

21 Paragraph 4.3 is replaced by the following:

"4.3 The general emergency alarm system shall be audible throughout all the accommodation and normal crew working spaces. On passenger ships, the system shall also be audible on all open decks."

Regulation 11 – Survival craft muster and embarkation arrangements

22 In the first sentence of paragraph 7, the word "unfavourable" is replaced by the word "all" and the unit "°" is inserted after the terms "10" and "20".

Regulation 14 – Stowage of rescue boats

23 The words ", and if the inflated type, in a fully inflated condition at all times" are added at the end of subparagraph .1.

Regulation 19 – Emergency training and drills

24 Paragraph 3.3.4 is replaced by the following:

"3.3.4 In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to but not including the

actual release of the lifeboat (i.e., the release hook shall not be released). The lifeboat shall then either be free-fall launched with only the required operating crew on board, or lowered into the water by means of the secondary means of launching with or without the operating crew on board. In both cases the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization*."

* Refer to Measures to prevent accidents with lifeboats (MSC.1/Circ.1206).

Regulation 20 – Operational readiness, maintenance and inspections

25 Paragraphs 4.1 and 4.2 are replaced by the following:

"Falls used in launching shall be inspected periodically* with special regard for areas passing through sheaves, and renewed when necessary due to deterioration of the falls or at intervals of not more than 5 years, whichever is the earlier."

* Refer to Measures to prevent accidents with lifeboats (MSC.1/Circ.1206).

26 In the third sentence of paragraph 6.2, the words "it should be run for such period as prescribed in the manufacturer's handbook" are replaced by the words "a suitable water supply may be provided".

27 The heading of paragraph 8 is replaced by the following:

"8 Servicing of inflatable liferafts, inflatable lifejackets, marine evacuation systems and maintenance and repair of inflated rescue boats"

28 The second sentence of paragraph 11.1.3 is replaced by the following:

"The load to be applied shall be the mass of the survival craft or rescue boat without persons on board, except that, at intervals not exceeding 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."

29 The chapeau of paragraph 11.2 is replaced by the following:

"11.2 Lifeboat or rescue boat on-load release gear, including free-fall lifeboat release systems, shall be:"

30 In the first sentence of paragraph 11.2.3, the word "lifeboat" is replaced by the word "boat".

31 The following new paragraph 11.3 is added to the regulation:

"11.3 Davit-launched liferaft automatic release hooks shall be:

.1 maintained in accordance with instructions for on-board maintenance as required by regulation 36;

.2 subject to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8 by properly trained personnel familiar with the system; and

.3 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 over-hauling and test shall be carried out at least once every five years.[*]"

[*] Refer to the Recommendation on testing of life-saving appliances, as adopted by the Organization by resolution A.689(17). For life-saving appliances installed on board on or after 1 July 1999, refer to the Revised Recommendations on testing of life-saving appliances, as adopted by the Maritime Safety Committee of the Organization by resolution MSC.81(70)."

Regulation 21 – Survival craft and rescue boats

32 The chapeau of paragraph 1.2 is replaced by the following:

"1.2 Passenger ships engaged on short international voyages shall carry:"

33 Paragraph 1.3 is deleted and the remaining paragraphs are renumbered accordingly.

34 In paragraph 1.4, the words "after all persons have been assembled, with lifejackets donned" are added at the end of the paragraph.

35 Paragraph 2.3 is replaced by the following:

"2.3 A lifeboat may be accepted as a rescue boat provided that it and its launching and recovery arrangements also comply with the requirements for a rescue boat."

36 In paragraph 3.2, the words "and complying with the special standards of subdivision prescribed by regulation II-1/6.5" are deleted.

Regulation 26 – Additional requirements for ro-ro passenger ships

37 In paragraph 3.1, the words "approved by the Administration having regard for the recommendations approved by the Organization" are replaced by the words "complying with section 5.1.4 of the Code".

38 In paragraph 3.2, all the words after the word "appliance" are replaced by the words "complying with section 6.1.7 of the Code".

Regulation 31 – Survival craft and rescue boats

39 Subparagraph .2 of paragraph 1.1 is replaced by the following:

".2 in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the Code, of a mass of less than 185 kg and

stowed in a position providing for easy side-to-side transfer at a single open deck level, and of such aggregate capacity as will accommodate the total number of persons on board. If the liferaft or liferafts are not of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, the total capacity available on each side shall be sufficient to accommodate the total number of persons on board."

40 Subparagraph .2 of paragraph 1.3 is replaced by the following:

".2 unless the liferafts required by paragraph 1.3.1 are of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, additional liferafts shall be provided so that the total capacity available on each side will accommodate 150% of the total number of persons on board;"

41 Subparagraph .4 of paragraph 1.3 is replaced by the following:

".4 in the event of any one survival craft being lost or rendered unserviceable, there shall be sufficient survival craft available for use on each side, including any which are of a mass of less than 185 kg and stowed in a position providing for easy side-to-side transfer at a single open deck level, to accommodate the total number of persons on board."

42 The second sentence of paragraph 2 is replaced by the following:

"A lifeboat may be accepted as a rescue boat, provided that it and its launching and recovery arrangements also comply with the requirements for a rescue boat."

Regulation 32 – Personal life-saving appliances

43 In the first sentence of paragraph 3.2, the words "of an appropriate size," are inserted between the words "suits" and "complying".

44 In paragraph 3.3, the words "including remotely located survival craft carried in accordance with regulation 31.1.4", are inserted between the words "stowed," and "additional" and the words "of an appropriate size" are inserted between the words "suits" and "shall".

Regulation 35 – Training manual and on-board training aids

45 The following new paragraph 5 is added after the existing paragraph 4:

"5 The training manual shall be written in the working language of the ship."

CHAPTER XII
ADDITIONAL SAFETY MEASURES FOR BULK CARRIERS

Regulation 6 – Structural and other requirements for bulk carriers

46 The existing paragraph 3 is deleted and the existing paragraphs 4 and 5 are renumbered as paragraphs 3 and 4.

Regulation 12 – Hold, ballast and dry space water ingress alarms

47 In paragraph 1.2, the reference to "regulation II-1/11" is replaced by the reference to "regulation II-1/12".

Regulation 13 – Availability of pumping systems

48 In paragraph 1, the reference to "regulation II-1/11.4" is replaced by the reference to "regulation II-1/12".

APPENDIX
CERTIFICATES

49 In the Passenger Ship Safety Certificate, Cargo Ship Safety Construction Certificate and Cargo Ship Safety Certificate, the phrase "Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced " is replaced by the following:

"Date of build:

- Date of building contract .....
- Date on which keel was laid or ship was at similar stage of construction .....
- Date of delivery .....
- Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable) .....

All applicable dates shall be completed."

Record of Equipment for the Passenger Ship Safety Certificate (Form P)

50 In the Record of Equipment for the Passenger Ship Safety Certificate (Form P), the following new item 4.2 is inserted in section 5 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)

51 In the Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E), the following new item 4.2 is inserted in section 3 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Record of Equipment for the Cargo Ship Safety Certificate (Form C)

52 In the Record of Equipment for the Cargo Ship Safety Certificate (Form C), the following new item 4.2 is inserted in section 5 after item 4:

"4.2 Long-range identification and tracking system",

and item 4 (Automatic identification system (AIS)) is renumbered as item 4.1.

Form of Safety Certificate for Nuclear Passenger Ships

53 In the table of paragraph 2.1.3, in the section commencing with the words "THIS IS TO CERTIFY:", the reference to "regulation II-1/13" is replaced by the reference to "regulation II-1/18".

ANNEX 2

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

1 The existing text of parts A, B and B-1 of the chapter is replaced by the following:

"PART A
GENERAL

Regulation 1
Application

1.1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009.

1.2 For the purpose of this chapter, the term *a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *all ships* means ships constructed before, on or after 1 January 2009;

.3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences;

.4 the expression *alterations and modifications of a major character* means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the A/R ratio calculated for the ship after such modifications is not less than the A/R ratio calculated for the ship before the modification. However, in those cases where the ship's A/R ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an A value which is not less than R, calculated for the modified ship.

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

3 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before the date on which any relevant amendments enter into force, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable.

4 The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

.1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

.2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *Subdivision length (L_s)* of the ship is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.

2 *Mid-length* is the mid-point of the subdivision length of the ship.

3 *Aft terminal* is the aft limit of the subdivision length.

4 *Forward terminal* is the forward limit of the subdivision length.

5 *Length (L)* is the length as defined in the International Convention on Load Lines in force.

6 *Freeboard deck* is the deck as defined in the International Convention on Load Lines in force.

7 *Forward perpendicular* is the forward perpendicular as defined in the International Convention on Load Lines in force.

8 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision draught.

9 *Draught (d)* is the vertical distance from the keel line at mid-length to the waterline in question.

10 *Deepest subdivision draught (d_s)* is the waterline which corresponds to the summer load line draught of the ship.

11 *Light service draught (d_l)* is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew on board.

12 *Partial subdivision draught (d_p)* is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught.

13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel.

14 *Permeability (μ)* of a space is the proportion of the immersed volume of that space which can be occupied by water.

15 *Machinery spaces* are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

16 *Weathertight* means that in any sea conditions water will not penetrate into the ship.

17 *Watertight* means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding.

18 *Design pressure* means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.

19 *Bulkhead deck* in a passenger ship means the uppermost deck 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. The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck.

20 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship.

21 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

22 *Oil tanker* is the oil tanker defined in regulation 1 of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 *Ro-ro passenger ship* means a passenger ship with ro-ro spaces or special category spaces as defined in regulation II-2/3.

24 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1.

25 *Keel line* is a line parallel to the slope of the keel passing amidships through:

.1 the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell; or

.2 in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. When the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inward intersects the centreline amidships.

26 *Amidship* is at the middle of the length (L).

Regulation 3
Definitions relating to parts C, D and E

For the purpose of parts C, D and E, unless expressly provided otherwise:

1 *Steering gear control system* is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2 *Main steering gear* is the machinery, rudder actuators, steering gear, power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g. tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3 *Steering gear power unit* is:

.1 in the case of electric steering gear, an electric motor and its associated electrical equipment;

.2 in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump; or

.3 in the case of other hydraulic steering gear, a driving engine and connected pump.

4 *Auxiliary steering gear* is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.

5 *Normal operational and habitable condition* is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.

6 *Emergency condition* is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.

7 *Main source of electrical power* is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.

8 *Dead ship condition* is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power.

9 *Main generating station* is the space in which the main source of electrical power is situated.

10 *Main switchboard* is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.

11 *Emergency switchboard* is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.

12 *Emergency source of electrical power* is a source of electrical power, intended to supply the emergency switchboard in the event of a failure of the supply from the main source of electrical power.

13 *Power actuating system* is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may share common mechanical components (i.e. tiller, quadrant and rudder stock) or components serving the same purpose.

14 *Maximum ahead service speed* is the greatest speed which the ship is designed to maintain in service at sea at the deepest sea-going draught.

15 *Maximum astern speed* is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught.

16 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

.1 internal combustion machinery used for main propulsion;

.2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

.3 any oil-fired boiler or oil fuel unit.

18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

19 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

.1 chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as “the International Bulk Chemical Code”, as may be amended by the Organization; or

.2 chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as “the Bulk Chemical Code”, as has been or may be amended by the Organization,

whichever is applicable.

20 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

.1 chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organization; or

.2 chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organization,

whichever is applicable.

PART B
SUBDIVISION AND STABILITY

Regulation 4
General

1 The damage stability requirements in parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organization.

2 The Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.

3 Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the

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* Cargo ships shown to comply with the following regulations may be excluded from the application of part B-1:

.1 Annex I to MARPOL 73/78, except OBO ships with type B freeboards are not excluded;
.2 International Bulk Chemical Code;
.3 International Gas Carrier Code;
.4 Guidelines for the design and construction of offshore supply vessels (resolution A.469(XII));
.5 Code of Safety for Special Purpose Ships (resolution A.534(13), as amended);
.6 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 ships intended for the carriage of deck cargo; and
.7 Damage stability requirements of regulation 27 of the 1988 Load Lines Protocol, except ships intended for the carriage of deck cargo.

subdivision length (L_s) of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length (L_s), primarily engaged in the carriage of passengers.

4 Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

PART B-1
STABILITY

Regulation 5
Intact stability information*

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 and the elements of its stability determined.

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 weight 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_s is found.

3 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

4 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph 5.

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_s is found or anticipated.

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* Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the Organization by resolution A.749(18).

6 Every ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

Regulation 5-1
Stability information to be supplied to the master*

1 The master shall be supplied with such information satisfactory to 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.

2 The information should include:

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

.2 instructions concerning the operation of cross-flooding arrangements; and

.3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

3 The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s.

4 For ships which have to fulfil the stability requirements of part B-1, information referred to in paragraph 2 are determined from considerations related to the subdivision index, in the following manner: Minimum required *GM* (or maximum permissible vertical position of centre of gravity *KG*) for the three draughts d_s, d_p and d_l are equal to the *GM* (or *KG* values) of corresponding loading cases used for the calculation of survival factor s_i. For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the *GM* value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required *GM* values or the minimum of maximum permissible *KG* values for both criteria. If the subdivision index is calculated for different trims, several required *GM* curves will be established in the same way.

5 When curves or tables of minimum operational metacentric height (*GM*) versus draught are not appropriate, the master should ensure that the operating condition does

* Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456); Guidance on the intact stability of existing tankers during transfer operations (MSC/Circ.706); and the Revised guidance to the master for avoiding dangerous situations in following and quartering seas (MSC.1/Circ.1228).

not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

Regulation 6
Required subdivision index *R**

1 The subdivision of a ship is considered sufficient if the attained subdivision index *A*, determined in accordance with regulation 7, is not less than the required subdivision index *R* calculated in accordance with this regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than 0.9*R* for passenger ships and 0.5*R* for cargo ships.

2 For all ships to which the damage stability requirements of this chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index *R*, as follows:

.1 In the case of cargo ships greater than 100 m in length (L_s):

$$R = 1 - \frac{128}{L_s + 152}$$

.2 In the case of cargo ships not less than 80 m in length (L_s) and not greater than 100 m in length (L_s):

$$R = 1 - [1/(1 + \frac{L_s}{100} \times \frac{R_o}{1 - R_o})]$$

where R_o is the value *R* as calculated in accordance with the formula in subparagraph .1.

.3 In the case of passenger ships:

$$R = 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

where:

$N = N_1 + 2N_2$
N_1 = number of persons for whom lifeboats are provided
N_2 = number of persons (including officers and crew) the ship is permitted to carry in excess of N_1.

.4 Where the conditions of service are such that compliance with paragraph 2.3 of this regulation on the basis of $N = N_1 + 2N_2$ is impracticable and where the Administration considers that a suitably

* The Maritime Safety Committee, in adopting the regulations contained in parts B to B-4, invited Administrations to note that the regulations should be applied in conjunction with the explanatory notes developed by the Organization in order to ensure their uniform application.

reduced degree of hazard exists, a lesser value of N may be taken but in no case less than $N = N_1 + N_2$.

Regulation 7
Attained subdivision index *A*

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

$$A = 0.4A_s + 0.4A_p + 0.2A_l$$

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A = \Sigma\, p_i\, s_i$$

where:

i represents each compartment or group of compartments under consideration,

p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in regulation 7-1,

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in regulation 7-2.

2 In the calculation of A, the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s, one or more additional calculations of A are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s.

3 When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

4 The summation indicated by the above formula shall be taken over the ship's subdivision length (L_s) for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated A value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

5 Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are

involved. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth *B*, may be added. For the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

6 In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

7 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

Regulation 7-1
Calculation of the factor p_i

1 The factor p_i for a compartment or group of compartments shall be calculated in accordance with paragraphs 1.1 and 1.2 using the following notations:

j = the aftmost damage zone number involved in the damage starting with No.1 at the stern;

n = the number of adjacent damage zones involved in the damage;

k = is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has $k = 0$;

$x1$ = the distance from the aft terminal of L_s to the aft end of the zone in question;

$x2$ = the distance from the aft terminal of L_s to the forward end of the zone in question;

b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline 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 loadline 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 $B/2$.

If the damage involves a single zone only:

$$p_i = p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})]$$

If the damage involves two adjacent zones:

$$\begin{aligned} p_i = {} & p(x1_j,x2_{j+1}) \cdot [r(x1_j,x2_{j+1},b_k) - r(x1_j,x2_{j+1},b_{k-1})] \\ & - p(x1_j,x2_j) \cdot [r(x1_j,x2_j,b_k) - r(x1_j,x2_j,b_{k-1})] \\ & - p(x1_{j+1},x2_{j+1}) \cdot [r(x1_{j+1},x2_{j+1},b_k) - r(x1_{j+1},x2_{j+1},b_{k-1})] \end{aligned}$$

If the damage involves three or more adjacent zones:

$$\begin{aligned} p_i = {} & p(x1_j,x2_{j+n-1}) \cdot [r(x1_j,x2_{j+n-1},b_k) - r(x1_j,x2_{j+n-1},b_{k-1})] \\ & - p(x1_j,x2_{j+n-2}) \cdot [r(x1_j,x2_{j+n-2},b_k) - r(x1_j,x2_{j+n-2},b_{k-1})] \\ & - p(x1_{j+1},x2_{j+n-1}) \cdot [r(x1_{j+1},x2_{j+n-1},b_k) - r(x1_{j+1},x2_{j+n-1},b_{k-1})] \\ & + p(x1_{j+1},x2_{j+n-2}) \cdot [r(x1_{j+1},x2_{j+n-2},b_k) - r(x1_{j+1},x2_{j+n-2},b_{k-1})] \end{aligned}$$

and where $r(x1, x2, b_0) = 0$

1.1 The factor $p(x1, x2)$ is to be calculated according to the following formulae:

Overall normalized max damage length:	J_{max}	=	10/33
Knuckle point in the distribution:	J_{kn}	=	5/33
Cumulative probability at J_{kn}:	p_k	=	11/12
Maximum absolute damage length:	l_{max}	=	60 m
Length where normalized distribution ends:	L^*	=	260 m

Probability density at $J = 0$:

$$b_0 = 2\left(\frac{p_k}{J_{kn}} - \frac{1 - p_k}{J_{max} - J_{kn}}\right)$$

When $L_s \le L^*$:

$$J_m = \min\left\{J_{max}, \frac{l_{max}}{L_s}\right\}$$

$$J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k)b_0 J_m + \frac{1}{4} b_0^2 J_m^2}}{b_0}$$

$$b_{12} = b_0$$

When $L_s > L^*$:

$$J_m^* = \min\left\{J_{max}, \frac{l_{max}}{L^*}\right\}$$

$$J_k^* = \frac{J_m^*}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k) b_0 J_m^* + \frac{1}{4} b_0^2 J_m^{*2}}}{b_0}$$

$$J_m = \frac{J_m^* \cdot L^*}{L_s}$$

$$J_k = \frac{J_k^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{p_k}{J_k} - \frac{1 - p_k}{J_m - J_k} \right)$$

$$b_{11} = 4 \left(\frac{1 - p_k}{J_m - J_k} \right) J_k - 2 \frac{p_k}{J_k^2}$$

$$b_{21} = -2 \frac{1 - p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21} J_m$$

The non-dimensional damage length:

$$J = \frac{(x2 - x1)}{L_s}$$

The normalized length of a compartment or group of compartments:

J_n is to be taken as the lesser of J and J_m

2.1.1 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J = J_k$:

$$p(x1, x2) = p_1 = \frac{1}{6} J^2 (b_{11} J + 3 b_{12})$$

$J > J_k$:

$$p(x1, x2) = p_2 = -\frac{1}{3} b_{11} J_k^3 + \frac{1}{2} (b_{11} J - b_{12}) J_k^2 + b_{12} J J_k - \frac{1}{3} b_{21} (J_n^3 - J_k^3) + \frac{1}{2} (b_{21} J - b_{22}) (J_n^2 - J_k^2) + b_{22} J (J_n - J_k)$$

3.1.1 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J = J_k$:

$$p(x1, x2) = \frac{1}{2}(p_1 + J)$$

$J > J_k$:

$$p(x1, x2) = \frac{1}{2}(p_2 + J)$$

3.1.2 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$p(x1, x2) = 1$$

1.2 The factor $r(x1, x2, b)$ shall be determined by the following formulae:

$$r(x1, x2, b) = 1 - (1 - C) \cdot \left\lceil 1 - \frac{G}{p(x1, x2)} \right\rceil$$

where:

$$C = 12 \cdot J_b \cdot (-45 \cdot J_b + 4), \text{ where}$$

$$J_b = \frac{b}{15 \cdot B}$$

1.2.1 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$G = G_1 = \frac{1}{2} b_{11} J_b^2 + b_{12} J_b$$

1.2.2 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$$G = G_2 = -\frac{1}{3} b_{11} J_0^3 + \frac{1}{2}(b_{11} J - b_{12}) J_0^2 + b_{12} J J_0, \text{ where}$$

$$J_0 = \min(J, J_b)$$

1.2.3 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$$G = \frac{1}{2} \cdot (G_2 + G_1 \cdot J)$$

Regulation 7-2
Calculation of the factor s_i

1 The factor s_i shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this regulation.

θ_e is the equilibrium heel angle in any stage of flooding, in degrees;

1.

θ_v is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

2.

GZ_{max} is the maximum positive righting lever, in metres, up to the angle θ_v;

3.

Range is the range of positive righting levers, in degrees, measured from the angle θ_e. The positive range is to be taken up to the angle θ_v;

Flooding stage is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

1. 1.1 The factor s_i, for any damage case at any initial loading condition, d_i, shall be obtained from the formula:

2. s_i = minimum { $s_{intermediate,i}$ or $s_{final,i} \cdot s_{mom,i}$ }

3.

where:

$s_{intermediate,i}$ is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph 2;

$s_{final,i}$ is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph 3;

4.

$s_{mom,i}$ is the probability to survive heeling moments, and is calculated in accordance with paragraph 4.

2 The factor $s_{intermediate,i}$ is applicable only to passenger ships (for cargo ships $s_{intermediate,i}$ should be taken as unity) and shall be 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:

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

where GZ_{max} is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{intermediate}$ = 0, if the intermediate heel angle exceeds 15º. Where cross-flooding fittings are required, the time for equalization shall not exceed 10 min.

5. 3 The factor $s_{final,i}$ shall be obtained from the formula:

$$s_{\text{final,i}} = K \cdot \left\lceil \frac{GZ_{\max}}{0.12} \cdot \frac{Range}{16} \right\rceil^{\frac{1}{4}}$$

6.

where:

$GZ_{\max}$ is not to be taken as more than 0.12 m;

Range is not to be taken as more than 16°;

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

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

7.

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

where:

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

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

8.

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:

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

where:

Displacement is the intact displacement at the subdivision draught;

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

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

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

9. M_{heel} = maximum $\{M_{\text{passenger}}$ or M_{wind} or $M_{\text{Survivalcraft}}\}$

10.

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

$M_{\text{passenger}} = (0.075 \cdot N_p) \cdot (0.45 \cdot B)$ (tm)

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 beam of the ship.

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 force acting in a damage situation:

$$M_{wind} = (P \cdot A \cdot Z) / 9{,}806 \text{ (tm)}$$

where:

P = 120 N/m^2;

4. A = projected lateral area above waterline;
5.
6. Z = distance from centre of lateral projected area above waterline to $T/2$; and
7.
T = ship's draught, d_i.

4.1.3 $M_{Survivalcraft}$ is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

.1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

.2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

.3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

.4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and

.5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.

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. 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.

5.1 Tanks and compartments taking part in such equalization shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

5.2 In all cases, s_i is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:

.1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor s_i. Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and

.2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2.

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 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 become inaccessible or inoperable;

11.

.3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index A, if not fitted with watertight means of closure at each boundary.

5.4 However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of $s_{\text{intermediate,i}}$ may be calculated assuming equalization in additional flooding phases.

12.

5.5 Except as provided in paragraph 5.3.1, openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers, remotely operated

* Reference is made to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passengers ships, adopted by the Organization by resolution A.266(VIII), as may be amended.

sliding watertight doors, side scuttles of the non-opening type as well as watertight access doors and hatch covers required to be kept closed at sea need not be considered.

6 Where horizontal watertight boundaries are fitted above the waterline under consideration the s-value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph 1.1 by the reduction factor v_m according to paragraph 6.1, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

6.1 The factor v_m shall be obtained from the formula:

$$v_m = v(H_{j,\ n,\ m},\ d) - v(H_{j,\ n,\ m-1},\ d)$$

where:

$H_{j,\ n,\ m}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the m^{th} horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j,\ n,\ m-1}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the $(m-1)^{th}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

j signifies the aft terminal of the damaged compartments under consideration;

m represents each horizontal boundary counted upwards from the waterline under consideration;

d is the draught in question as defined in regulation 2; and

x_1 and x_2 represent the terminals of the compartment or group of compartments considered in regulation 7-1.

6.1.1 The factors $v(H_{j,\ n,\ m},\ d)$ and $v(H_{j,\ n,\ m-1},\ d)$ shall be obtained from the formulae:

$$v(H,d) = 0.8\,\frac{(H-d)}{7.8}$$, if $(H_m - d)$ is less than, or equal to, 7.8 m;

$$v(H,d) = 0.8 + 0.2\left\lceil \frac{(H-d)-7.8}{4.7} \right\rceil$$ in all other cases,

where:

$v(H_{j,\ n,\ m},\ d)$ is to be taken as 1, if H_m coincides with the uppermost watertight boundary of the ship within the range $(x1_{(j)}...x2_{(j+n-1)})$, and

$v(H_{j,\ n,\ 0},\ d)$ is to be taken as 0.

In no case is v_m to be taken as less than zero or more than 1.

6.2 In general, each contribution dA to the index A in the case of horizontal subdivisions is obtained from the formula:

$$dA = p_i \cdot \left[v_1 \cdot s_{\min 1} + (v_2 - v_1) \cdot s_{\min 2} + \cdots + (1 - v_{m-1}) \cdot s_{\min m} \right]$$

where:

v_m = the v-value calculated in accordance with paragraph 6.1;
$s_{\min}$ = the least s-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards.

Regulation 7-3
Permeability

1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each general compartment or part of a compartment shall be as follows:

Spaces	Permeability
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Intended for liquids	0 or 0.95[1]

[1] Whichever results in the more severe requirement.

2 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	Permeability at draught d_s	Permeability at draught d_p	Permeability at draught d_l
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

3 Other figures for permeability may be used if substantiated by calculations.

Regulation 8
Special requirements concerning passenger ship stability

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 the three loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartments within $0.08L$ measured from the forward perpendicular.

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 on which is based the calculation of the subdivision index.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on both N as defined in regulation 6, and L_s as defined in regulation 2, such that:

.1 the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in regulation 2, unless a lesser vertical extent of damage were to give a lower value of s_i, in which case this reduced extent is to be used;

.2 where 400 or more persons are to be carried, a damage length of $0.03L_s$ 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 angle to the centreline at the level of the deepest subdivision draught;

.3 where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph 2;

.4 where 36 persons are carried, a damage length of $0.015L_s$ 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

.5 where more than 36, but fewer than 400 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 400 persons as specified in subparagraphs .4 and .2.

Regulation 8-1
System capabilities after a flooding casualty on passenger ships

1 Application

This regulation applies to passenger ships constructed on or after 1 July 2010 to which regulation II-2/21 applies.

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.

PART B-2
SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY

Regulation 9
Double bottoms in passenger ships and cargo ships other than tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance h measured from the keel line, as calculated by the formula:

$$h = B/20$$

However, in no case is the value of h to be less than 760 mm, and need not be taken as more than 2,000 mm.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. 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. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

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* Refer to the Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty (MSC.1/Circ.1214).

4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

5 In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

6 Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5 shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship.

7 In the case of unusual bottom arrangements in a passenger ship or a cargo ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8.

8 Compliance with paragraphs 6 or 7 is to be achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in subparagraph .2 below for 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 0.3 L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ 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 or 2 m, whichever is less	*B*/20 or 2 m, whichever is less

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

9 In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than *B*/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.

Regulation 10
Construction of watertight bulkheads

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.

2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

Regulation 11
Initial testing of watertight bulkheads, etc.

1 Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case a thorough inspection of the watertight bulkheads shall be carried out.

2 The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of regulation 10.1.

3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

4 The tests referred to in paragraphs 2 and 3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

Regulation 12
Peak and machinery space bulkheads, shaft tunnels, etc.

1 A collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 0.05L or 10 m, whichever is the 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 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 0.015*L* forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

3 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 2.

4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

5.1 Except as provided in paragraph 5.2, the collision bulkhead may be pierced below the bulkhead deck 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, the valve chest being secured inside the forepeak to 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. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

5.2 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 by two pipes, each of which is fitted as required by paragraph 5.1, 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.

6 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 1 or 2 with the exception permitted by paragraph 7 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 causing damage to it in the case of damage to, or detachment of, a bow door.

7 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck 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 bulkhead deck may extend forward of the limit specified in paragraph 1 or 2. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

8 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.

9 Bulkheads shall be fitted separating the machinery space from cargo and accommodation spaces forward and aft and made watertight up to the bulkhead deck. In

passenger ships an afterpeak bulkhead shall also be fitted and made watertight up to the bulkhead deck. The afterpeak bulkhead may, however, be stepped below the bulkhead deck, provided the degree of safety of the ship as regards subdivision is not thereby diminished.

10 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

1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.

2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

2.2 Valves not forming part of a piping system shall not be permitted in watertight bulkheads.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

1. 3 No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 9.1 and in regulation 14.

4 Subject to paragraph 10, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

5.1 Watertight doors, except as provided in paragraph 9.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.
5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15^{o} either way. Consideration shall also be given to the forces which may act on either

side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6 All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only be at the navigation bridge as required by paragraph 7.1.5 and at the location where hand operation above the bulkhead deck is required by paragraph 7.1.4.

7.1 Each power-operated sliding watertight door:

.1 shall have a vertical or horizontal motion;

.2 shall, subject to paragraph 10, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:

.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and

.2 the door shall be located inboard the damage zone *B*/5;

.3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration;

.4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position;

.5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;

.6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

.7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

7.2 The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by regulation 42.3.1.3 in the event of failure of either the main or emergency source of electrical power.

7.3 Power-operated sliding watertight doors shall have either:

.1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15º. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or

.2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15º. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other

effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or

.3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by regulation 42.4.2 – in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in paragraphs 7.3.1, 7.3.2 and 7.3.3, provision should be made as follows: Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

7.4 Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

7.5 As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

7.6 The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.*

7.7 Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

7.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 7.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

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* Refer to the following IEC publication 529(1976):
.1 electrical motors, associated circuits and control components; protected to IPX 7 standard;
.2 door position indicators and associated circuit components; protected to IPX 8 standard; and
.3 door movement warning signals; protected to IPX 6 standard.

Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.

8.1 The central operating console at the navigation bridge shall have a "master mode" switch with two modes of control: a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode which shall automatically close any door that is open. The "doors closed" mode shall automatically close any door that is open. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the "master mode" switch.

8.2 The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

8.3 It shall not be possible to remotely open any door from the central operating console.

9.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

9.2 Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

10 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door in each watertight bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.

11.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, 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.

11.2 Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.

11.3 Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

Regulation 13-1
Openings in watertight bulkheads and internal decks in cargo ships

1 The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

2 Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimizing the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

3 Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled.* Should any of the doors or ramps be

* Refer to Interpretations of regulations of part B-1 of SOLAS chapter II-1 (MSC/Circ.651).

accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

5 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 14
Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

2 If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where A_d = total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 m, the provisions of regulations 13.9.1 and 13.9.2 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

3 The ship may not be certified for a higher number of passengers than assumed in paragraph 2, if a watertight door has been fitted in accordance with this regulation.

Regulation 15
Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1 Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision draught, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by paragraph 3.1, shall be of such construction as will effectively prevent any person opening them without the consent of the master of the ship.

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 other than that for steerage passengers, 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 or coal.

5.2 Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.

7 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

8.1 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

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 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 shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

8.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

8.3 Machinery space, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

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 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.

8.5 All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

9 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

10.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

10.2 If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the cover shall be watertight and, in addition, an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision draught.

Regulation 15-1
External openings in cargo ships

1 All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.

2 External openings required to be watertight in accordance with paragraph 1 shall, except for cargo hatch covers, be fitted with indicators on the bridge.

3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.

4 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 16
Construction and initial tests of watertight doors, sidescuttles, etc.

1 In all ships:

.1 the design, materials and construction of all watertight doors, 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;

.2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and

.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 In passenger ships and cargo ships watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

Regulation 16-1
Construction and initial tests of watertight decks, trunks, etc.

1 Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

2 Where a ventilation trunk passing through a structure penetrates 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 allowable during intermediate stages of flooding, in accordance with regulation 7-2.

3 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.

4 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 17
Internal watertight integrity of passenger ships above the bulkhead deck

1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the

immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.*

2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

3 The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15º, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

4 Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.**

5 Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 17-1
Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships

1.1 Subject to the provisions of paragraphs 1.2 and 1.3, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge.

1.3 The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

2 Indicators shall be provided on the navigation bridge for 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. The indicator system shall be designed on the fail-safe principle and shall show by

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* Refer to the Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS 1974, as amended (MSC/Circ.541, as may be amended).

** Refer to the Recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships, adopted by the Organization by resolution A.793(19).

visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.

3 Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro spaces.

PART B-3
SUBDIVISION LOAD LINE ASSIGNMENT FOR PASSENGER SHIPS

Regulation 18
Assigning, marking and recording of subdivision load lines for passenger ships

1 In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index *R* will have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

4 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.

PART B-4
STABILITY MANAGEMENT

Regulation 19
Damage control information

1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.*

2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers and crew.

5 In case of ships to which damage stability requirements of part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.**

Regulation 20
Loading of passenger 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 in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

2 Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

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* Refer to the Guidelines for damage control plans (MSC/Circ.919).

** Refer to the guidelines to be developed by the Organization.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 21
Periodical operation and inspection of watertight doors, etc., in passenger ships

1 Drills for the operating 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 drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

2 All watertight doors, both hinged and power operated, in watertight bulkheads, in use at sea, shall be operated daily.

3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.

4 A record of all drills and inspections required by this regulation shall be entered in the log-book with an explicit record of any defects which may be disclosed.

Regulation 22
Prevention and control of water ingress, etc.

1 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 3 and 4. Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by regulation 13.10 may only be opened in the circumstances detailed in that regulation. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration.

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.

4 Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only after careful consideration of the impact on ship operations and survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship’s stability information and shall always be ready to be immediately closed.

5 Portable plates on bulkheads shall always be in place before the ship leaves port, 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 ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

6 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 of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

7 Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage 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 8.1;

.3 cargo loading doors in the collision bulkhead; and

.4 ramps forming an alternative closure to those defined in paragraphs 8.1 to 8.3 inclusive.

9 Provided that where a door cannot be opened or closed while the ship is at the berth such a door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated. In any case, the inner bow door must be kept closed.

10 Notwithstanding the requirements of paragraphs 8.1 and 8.4, 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.

11 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 8 is implemented.

12 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book is made of the time of the last closing of the doors specified in paragraph 13 and the time of any opening of particular doors in accordance with paragraph 14.

13 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 ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.

14 Where in a between-decks, 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 and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, 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 of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log-book as may be prescribed by the Administration.

.2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 14 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, 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 to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

15 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

16 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 such closing and locking shall be recorded in such log-book as may be prescribed by the Administration.

17 When a rubbish-chute, etc. is not in use, both the cover and the valve required by regulation 15.10.2 shall be kept closed and secured.

Regulation 22-1*
Flooding detection systems for passenger ships carrying 36 or more persons constructed on or after 1 July 2010

A flooding detection system for watertight spaces below the bulkhead deck shall be provided based on the guidelines developed by the Organization.*

Regulation 23
Special requirements for ro-ro passenger ships

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 whilst the ship is underway.

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 ship leaves the berth on any voyage 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 ship leaves the berth on any voyage, that an entry in the log-book, as required by regulation 22.13, 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 ship leaves the berth 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 when the ship is under way.

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* Refer to the guidelines to be developed by the Organization.

Regulation 24
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 while at sea.

2 Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

3 Watertight doors or ramps fitted internally to subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

4 The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.

Regulation 25
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than 31 December 2009.

2 Ships having a length (L) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors*.

3 The water level detectors required by paragraph 2 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

4 The water level detectors required by paragraph 2 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

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* Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

PART D
ELECTRICAL INSTALLATIONS

Regulation 42 – Emergency source of electrical power in passenger ships

2 In the existing paragraph 2.6.1, the reference to regulation 15 is replaced with reference to regulation 13 and the following footnote is added to the reference to regulation 13:

"* Prior to 1 January 2009, regulation 13 was regulation 15."

3 In the first sentence of the existing paragraph 4.2, the reference to regulation 15.7.3.3 is replaced with reference to regulation 13.7.3.3 and the following footnote is added to the reference to regulation 13.7.3.3:

"* Prior to 1 January 2009, regulation 13.7.3.3 was regulation 15.7.3.3."

4 In the second sentence of the existing paragraph 4.2, the reference to regulation 15.7.2 is replaced with reference to regulation 13.7.2 and the following footnote is added to the reference to regulation 13.7.2:

"* Prior to 1 January 2009, regulation 13.7.2 was regulation 15.7.2."

(Added by corrigendum - MSC 82/24/Add.1/Corr.7.)

ANNEX 3

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1
CONSTRUCTION - STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART D
ELECTRICAL INSTALLATIONS

Regulation 41 – Main source of electrical power and lighting systems

1 The following new paragraph 6 is added after the existing paragraph 5:

"6 In passenger ships, supplementary lighting shall be provided in all cabins to clearly indicate the exit so that occupants will be able to find their way to the door. Such lighting, which may be connected to an emergency source of power or have a self-contained source of electrical power in each cabin, shall automatically illuminate when power to the normal cabin lighting is lost and remain on for a minimum of 30 min."

2 The following new part F is added after the existing regulation 54:

"PART F
ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 55
Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for machinery and electrical installations.

2 General

2.1 Machinery and electrical installation design and arrangements may deviate from the requirements set out in parts C, D and E, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this chapter.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of parts C, D and E, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

.1 determination of the ship type, machinery, electrical installations and space(s) concerned;

.2 identification of the prescriptive requirement(s) with which the machinery and electrical installations will not comply;

.3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

.4 determination of the performance criteria for the ship, machinery, electrical installation or the space(s) concerned addressed by the relevant prescriptive requirement(s):

.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in parts C, D and E; and

.2 performance criteria shall be quantifiable and measurable;

.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;

.6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

.7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

4 Evaluation of the alternative design and arrangements

4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.*

4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

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* Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 3 – Definitions

3 The following new paragraphs 51 and 52 are added after the existing paragraph 50:

"51 *Safe area in the context of a casualty* is, from the perspective of habitability, any area(s) which is not flooded or which is outside the main vertical zone(s) in which a fire has occurred such that it can safely accommodate all persons onboard to protect them from hazards to life or health and provide them with basic services.

52 *Safety centre* is a control station dedicated to the management of emergency situations. Safety systems' operation, control and/or monitoring are an integral part of the safety centre."

Regulation 7 – Detection and alarm

4 The following new paragraph 2.4 is added after the existing paragraph 2.3:

"2.4 A fixed fire detection and fire alarm system for passenger ships shall be capable of remotely and individually identifying each detector and manually operated call point."

5 In paragraphs 5.2 and 5.3.1, the following new text is added at the end of the paragraphs:

"Detectors fitted in cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located."

Regulation 8 – Control of smoke spread

6 In paragraph 2, the following new sentence is added at the end of the paragraph:

"The ventilation system serving safety centres may be derived from the ventilation system serving the navigation bridge, unless located in an adjacent main vertical zone."

Regulation 9 – Containment of fire

7 In paragraph 2.2.3.2.2 (7), the words "Sale shops" are deleted.

8 In paragraph 2.2.3.2.2 (8), the words "Sale shops" are added.

9 In the notes for tables 9.3 and 9.4, the following sentence is added at the end of subscript "c":

"No fire rating is required for those partitions separating the navigation bridge and the safety centre when the latter is within the navigation bridge."

10 The following new paragraph 2.2.6 is added after the existing paragraph 2.2.5.2:

"2.2.6 *Protection of atriums*

2.2.6.1 Atriums shall be within enclosures formed of "A" class divisions having a fire rating determined in accordance with tables 9.2 and 9.4, as applicable.

2.2.6.2 Decks separating spaces within atriums shall have a fire rating determined in accordance with tables 9.2 and 9.4, as applicable."

11 The existing paragraph 7.5.1 is renumbered as paragraph 7.5.1.1 and the following new paragraph 7.5.1.2 is added thereafter:

"7.5.1.2 Exhaust ducts from ranges for cooking equipment installed on open decks shall conform to paragraph 7.5.1.1, as applicable, when passing through accommodation spaces or spaces containing combustible materials."

12 The following new paragraph 7.6 is added after the existing paragraph 7.5.2.1:

"7.6 *Ventilation systems for main laundries in ships carrying more than 36 passengers*

Exhaust ducts from main laundries shall be fitted with:

.1 filters readily removable for cleaning purposes;

.2 a fire damper located in the lower end of the duct which is automatically and remotely operated;

.3 remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in paragraph 7.6.2; and

.4 suitably located hatches for inspection and cleaning."

Regulation 10 – Fire fighting

13 In the first sentence of paragraph 6.4, between the words "equipment" and "shall", the words "installed in enclosed spaces or on open decks" are added.

Regulation 13 – Means of escape

14 In paragraph 3.2.3, the words "public spaces" in the third sentence are deleted and the following new sentence is added before the fourth sentence:

"Public spaces may also have direct access to stairway enclosures except for the backstage of a theatre."

15 The following new paragraph 3.2.5.3 is added after the existing paragraph 3.2.5.2:

"3.2.5.3 In lieu of the escape route lighting system required by paragraph 3.2.5.1, alternative evacuation guidance systems may be accepted if approved by the Administration based on the guidelines developed by the Organization*."

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* Refer to the Functional requirements and performance standards for the assessment of evacuation guidance systems (MSC/Circ.1167) and the Interim guidelines for the testing, approval and maintenance of evacuation guidance systems used as an alternative to low-location lighting systems (MSC/Circ.1168).

16 The following new regulations 21, 22 and 23 are added after the existing regulation 20:

"**Regulation 21**
Casualty threshold, safe return to port and safe areas

1 Application

Passenger ships constructed on or after 1 July 2010 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 Purpose

The purpose of this regulation is to establish design criteria for a ship's safe return to port under its own propulsion after a casualty that does not exceed the casualty threshold stipulated in paragraph 3 and also provides functional requirements and performance standards for safe areas.

3 Casualty threshold

The casualty threshold, in the context of a fire, includes:

.1 loss of space of origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space of origin is protected by a fixed fire extinguishing system; or

.2 loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin.

4 Safe return to port*

When fire damage does not exceed the casualty threshold indicated in paragraph 3, the ship shall be capable of returning to port while providing a safe area as defined in regulation 3. To be deemed capable of returning to port, the following systems shall remain operational in the remaining part of the ship not affected by fire:

.1 propulsion;

.2 steering systems and steering-control systems;

.3 navigational systems;

.4 systems for fill, transfer and service of fuel oil;

.5 internal communication between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering;

.6 external communication;

.7 fire main system;

.8 fixed fire-extinguishing systems;

.9 fire and smoke detection system;

.10 bilge and ballast system;

.11 power-operated watertight and semi-watertight doors;

.12 systems intended to support "safe areas" as indicated in paragraph 5.1.2;

.13 flooding detection systems; and

.14 other systems determined by the Administration to be vital to damage control efforts.

5 Safe area(s)

5.1 *Functional requirements:*

.1 the safe area(s) shall generally be internal space(s); however, the use of an external space as a safe area may be allowed by the Administration taking into account any restriction due to the area of operation and relevant expected environmental conditions;

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* Refer to the Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty (MSC.1/Circ.1214).

.2 the safe area(s) shall provide all occupants with the following basic services* to ensure that the health of passengers and crew is maintained:

.1 sanitation;

.2 water;

.3 food;

.4 alternate space for medical care;

.5 shelter from the weather;

.6 means of preventing heat stress and hypothermia;

.7 light; and

.8 ventilation;

.3 ventilation design shall reduce the risk that smoke and hot gases could affect the use of the safe area(s); and

.4 means of access to life-saving appliances shall be provided from each area identified or used as a safe area, taking into account that a main vertical zone may not be available for internal transit.

5.2 ***Alternate space for medical care***

Alternate space for medical care shall conform to a standard acceptable to the Administration.**

Regulation 22
Design criteria for systems to remain operational after a fire casualty

1 Application

Passenger ships constructed on or after 1 July 2010 having length, as defined in regulation II-1/2.2, of 120 m or more or having three or more main vertical zones shall comply with the provisions of this regulation.

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* Refer to the Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty (MSC.1/Circ.1214).

** Refer to the Guidance on the establishment of medical and sanitation related programmes for passenger ships (MSC/Circ.1129).

2 Purpose

The purpose of this regulation is to provide design criteria for systems required to remain operational for supporting the orderly evacuation and abandonment of a ship, if the casualty threshold, as defined in regulation 21.3, is exceeded.

3 Systems*

3.1 In case any one main vertical zone is unserviceable due to fire, the following systems shall be so arranged and segregated as to remain operational:

.1 fire main;

.2 internal communications (in support of fire-fighting as required for passenger and crew notification and evacuation);

.3 means of external communications;

.4 bilge systems for removal of fire-fighting water;

.5 lighting along escape routes, at assembly stations and at embarkation stations of life-saving appliances; and

.6 guidance systems for evacuation shall be available.

3.2 The above systems shall be capable of operation for at least 3 h based on the assumption of no damage outside the unserviceable main vertical zone. These systems are not required to remain operational within the unserviceable main vertical zones.

3.3 Cabling and piping within a trunk constructed to an "A-60" standard shall be deemed to remain intact and serviceable while passing through the unserviceable main vertical zone for the purposes of paragraph 3.1. An equivalent degree of protection for cabling and piping may be approved by the Administration.

Regulation 23
Safety centre on passenger ships

1 Application

Passenger ships constructed on or after 1 July 2010 shall have on board a safety centre complying with the requirements of this regulation.

2 Purpose

The purpose of this regulation is to provide a space to assist with the management of emergency situations.

3 Location and arrangement

** Refer to the Performance standards for the systems and services to remain operational on passenger ships for safe return to port and orderly evacuation and abandonment after a casualty (MSC.1/Circ.1214).

The safety centre shall either be a part of the navigation bridge or be located in a separate space adjacent to and having direct access to the navigation bridge, so that the management of emergencies can be performed without distracting watch officers from their navigational duties.

4 Layout and ergonomic design

The layout and ergonomic design of the safety centre shall take into account the guidelines developed by the Organization*, as appropriate.

5 Communications

Means of communication between the safety centre, the central control station, the navigation bridge, the engine control room, the storage room(s) for fire extinguishing system(s) and fire equipment lockers shall be provided.

6 Control and monitoring of safety systems

Notwithstanding the requirements set out elsewhere in the Convention, the full functionality (operation, control, monitoring or any combination thereof, as required) of the safety systems listed below shall be available from the safety centre:

.1 all powered ventilation systems;

.2 fire doors;

.3 general emergency alarm system;

.4 public address system;

.5 electrically powered evacuation guidance systems;

.6 watertight and semi-watertight doors;

.7 indicators for shell doors, loading doors and other closing appliances;

.8 water leakage of inner/outer bow doors, stern doors and any other shell door;

.9 television surveillance system;

.10 fire detection and alarm system;

.11 fixed fire-fighting local application system(s);

.12 sprinkler and equivalent systems;

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* Refer to guidelines to be developed by the Organization.

.13 water-based systems for machinery spaces;

.14 alarm to summon the crew;

.15 atrium smoke extraction system;

.16 flooding detection systems; and

.17 fire pumps and emergency fire pumps."

CHAPTER III
LIFE-SAVING APPLIANCES AND ARRANGEMENTS

Regulation 4 – Evaluation, testing and approval of life-saving appliances and arrangements

17 Paragraph 3 is replaced by the following:

"3 Before giving approval to novel life-saving appliances or arrangements, the Administration shall ensure that such:

.1 appliances provide safety standards at least equivalent to the requirements of this chapter and the Code and have been evaluated and tested based on the guidelines developed by the Organization*; or

.2 arrangements have successfully undergone an engineering analysis, evaluation and approval in accordance with regulation 38."

* Refer to the guidelines to be developed by the Organization.

18 The following new part C is added after the existing regulation 37:

"PART C
ALTERNATIVE DESIGN AND ARRANGEMENTS

Regulation 38
Alternative design and arrangements

1 Purpose

The purpose of this regulation is to provide a methodology for alternative design and arrangements for life-saving appliances and arrangements.

2 General

2.1 Life-saving appliances and arrangements may deviate from the requirements set out in part B, provided that the alternative design and arrangements meet the intent of the requirements concerned and provide an equivalent level of safety to this chapter.

2.2 When alternative design or arrangements deviate from the prescriptive requirements of part B, an engineering analysis, evaluation and approval of the design and arrangements shall be carried out in accordance with this regulation.

3 Engineering analysis

The engineering analysis shall be prepared and submitted to the Administration, based on the guidelines developed by the Organization* and shall include, as a minimum, the following elements:

.1 determination of the ship type and the life-saving appliance and arrangements concerned;

.2 identification of the prescriptive requirement(s) with which the life-saving appliance and arrangements will not comply;

.3 identification of the reason the proposed design will not meet the prescriptive requirements supported by compliance with other recognized engineering or industry standards;

.4 determination of the performance criteria for the ship and the life-saving appliance and arrangements concerned addressed by the relevant prescriptive requirement(s):

4.1 performance criteria shall provide a level of safety not inferior to the relevant prescriptive requirements contained in part B; and

4.2 performance criteria shall be quantifiable and measurable;

.5 detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions;

.6 technical justification demonstrating that the alternative design and arrangements meet the safety performance criteria; and

.7 risk assessment based on identification of the potential faults and hazards associated with the proposal.

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* Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

4 Evaluation of the alternative design and arrangements

4.1 The engineering analysis required in paragraph 3 shall be evaluated and approved by the Administration, taking into account the guidelines developed by the Organization.*

4.2 A copy of the documentation, as approved by the Administration, indicating that the alternative design and arrangements comply with this regulation, shall be carried on board the ship.

5 Exchange of information

The Administration shall communicate to the Organization pertinent information concerning alternative design and arrangements approved by them for circulation to all Contracting Governments.

6 Re-evaluation due to change of conditions

If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis shall be carried out under the changed condition and shall be approved by the Administration."

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* Refer to the Guidelines on alternative design and arrangements for SOLAS chapters II-1 and III (MSC.1/Circ.1212).

ANNEX 1

RESOLUTION MSC.194(80)
(adopted on 20 May 2005)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974 (hereinafter referred to as "the Convention"), concerning the amendment procedure applicable to the Annex to the Convention, other than the provisions of chapter I thereof,

HAVING CONSIDERED, at its eightieth session, amendments to the Convention, proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annexes to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that:

(a) the said amendments set out in annex 1 shall be deemed to have been accepted on 1 July 2006; and

(b) the said amendments set out in annex 2 shall be deemed to have been accepted on 1 July 2008,

unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES SOLAS Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention:

(a) the amendments set out in annex 1 shall enter into force on 1 January 2007; and

(b) the amendments set out in annex 2 shall enter into force on 1 January 2009,

upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX 1

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1

CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

PART A
GENERAL

Regulation 2 – Definitions

1 The following new paragraph 14 is added after the existing paragraph 13:

"14 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1".

PART A-1
STRUCTURE OF SHIPS

2 The existing text of part A-1 is replaced by the following:

"PART A-1
STRUCTURE OF SHIPS

Regulation 3-1
Structural, mechanical and electrical requirements for ships

In addition to the requirements contained elsewhere in the present regulations, ships shall be designed, constructed and maintained in compliance with the structural, mechanical and electrical requirements of a classification society which is recognized by the Administration in accordance with the provisions of regulation XI-1/1, or with applicable national standards of the Administration which provide an equivalent level of safety.

Regulation 3-2
Corrosion prevention of seawater ballast tanks in oil tankers and bulk carriers

(This regulation applies to oil tankers and bulk carriers constructed on or after 1 July 1998)

All dedicated seawater ballast tanks shall have an efficient corrosion prevention system, such as hard protective coatings or equivalent. The coatings should preferably be of a light colour. The scheme for the selection, application and maintenance of the system shall be approved by the Administration, based on the guidelines adopted by the Organization.* Where appropriate, sacrificial anodes shall also be used.

* Refer to the Guidelines for the selection, application and maintenance of corrosion prevention systems of dedicated seawater ballast tanks, adopted by the Organization by resolution A.798(19).

Regulation 3-3
Safe access to tanker bows

1 For the purpose of this regulation and regulation 3-4, tankers include oil tankers as defined in regulation 2, chemical tankers as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2.

2 Every tanker shall be provided with the means to enable the crew to gain safe access to the bow even in severe weather conditions. Such means of access shall be approved by the Administration based on the guidelines developed by the Organization.*

Regulation 3-4
Emergency towing arrangements on tankers

1 Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight.

2 For tankers constructed on or after 1 July 2002:

.1 the arrangements shall, at all times, be capable of rapid deployment in the absence of main power on the ship to be towed and easy connection to the towing ship. At least one of the emergency towing arrangements shall be pre-rigged ready for rapid deployment; and

.2 emergency towing arrangements at both ends shall be of adequate strength taking into account the size and deadweight of the ship, and the expected forces during bad weather conditions. The design and construction and prototype testing of the emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.

3 For tankers constructed before 1 July 2002, the design and construction of emergency towing arrangements shall be approved by the Administration, based on the Guidelines developed by the Organization.**

Regulation 3-5
New installation of materials containing asbestos

1 This regulation shall apply to materials used for the structure, machinery, electrical installations and equipment covered by the present Convention.

2 For all ships, new installation of materials which contain asbestos shall be prohibited except for:

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* Refer to the Guidelines for safe access to tanker bows, adopted by the Maritime Safety Committee by resolution MSC.62(67).

** Refer to the Guidelines on emergency towing arrangements for tankers, adopted by the Maritime Safety Committee by resolution MSC.35(63), as may be amended.

.1 vanes used in rotary vane compressors and rotary vane vacuum pumps;

.2 watertight joints and linings used for the circulation of fluids when, at high temperature (in excess of 350°C) or pressure (in excess of 7 x 10^6 Pa), there is a risk of fire, corrosion or toxicity; and

.3 supple and flexible thermal insulation assemblies used for temperatures above 1000°C.

Regulation 3-6
Access to and within spaces in, and forward of, the cargo area of oil tankers and bulk carriers

1 Application

1.1 Except as provided for in paragraph 1.2, this regulation applies to oil tankers of 500 gross tonnage and over and bulk carriers, as defined in regulation IX/1, of 20,000 gross tonnage and over, constructed on or after 1 January 2006.

1.2 Oil tankers of 500 gross tonnage and over constructed on or after 1 October 1994 but before 1 January 2005 shall comply with the provisions of regulation II-1/12-2 adopted by resolution MSC.27(61).

2 Means of access to cargo and other spaces

2.1 Each space shall be provided with means of access to enable, throughout the life of a ship, overall and close-up inspections and thickness measurements of the ship's structures to be carried out by the Administration, the company, as defined in regulation IX/1, and the ship's personnel and others as necessary. Such means of access shall comply with the requirements of paragraph 5 and with the Technical provisions for means of access for inspections, adopted by the Maritime Safety Committee by resolution MSC.133(76), 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.

2.2 Where a permanent means of access may be susceptible to damage during normal cargo loading and unloading operations or where it is impracticable to fit permanent means of access, the Administration may allow, in lieu thereof, the provision of movable or portable means of access, as specified in the Technical provisions, provided that the means of attaching, rigging, suspending or supporting the portable means of access forms a permanent part of the ship's structure. All portable equipment shall be capable of being readily erected or deployed by ship's personnel.

2.3 The construction and materials of all means of access and their attachment to the ship's structure shall be to the satisfaction of the Administration. The means of access shall be subject to survey prior to, or in conjunction with, its use in carrying out surveys in accordance with regulation I/10.

3 Safe access to cargo holds, cargo tanks, ballast tanks and other spaces

3.1 Safe access* to cargo holds, cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area shall be direct from the open deck and such as to ensure their complete inspection. Safe access to double bottom spaces or to forward ballast tanks may be from a pump-room, deep cofferdam, pipe tunnel, cargo hold, double hull space or similar compartment not intended for the carriage of oil or hazardous cargoes.

3.2 Tanks, and subdivisions of tanks, having a length of 35 m or more, shall be fitted with at least two access hatchways and ladders, as far apart as practicable. Tanks less than 35 m in length shall be served by at least one access hatchway and ladder. When a tank is subdivided by one or more swash bulkheads or similar obstructions which do not allow ready means of access to the other parts of the tank, at least two hatchways and ladders shall be fitted.

3.3 Each cargo hold shall be provided with at least two means of access as far apart as practicable. In general, these accesses should be arranged diagonally, for example one access near the forward bulkhead on the port side, the other one near the aft bulkhead on the starboard side.

4 Ship structure access manual

4.1 A ship's means of access to carry out overall and close-up inspections and thickness measurements shall be described in a Ship structure access manual approved by the Administration, an updated copy of which shall be kept on board. The Ship structure access manual shall include the following for each space:

.1 plans showing the means of access to the space, with appropriate technical specifications and dimensions;

.2 plans showing the means of access within each space to enable an overall inspection to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate from where each area in the space can be inspected;

.3 plans showing the means of access within the space to enable close-up inspections to be carried out, with appropriate technical specifications and dimensions. The plans shall indicate the positions of critical structural areas, whether the means of access is permanent or portable and from where each area can be inspected;

.4 instructions for inspecting and maintaining the structural strength of all means of access and means of attachment, taking into account any corrosive atmosphere that may be within the space;

.5 instructions for safety guidance when rafting is used for close-up inspections and thickness measurements;

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* Refer to the Recommendations for entering enclosed spaces aboard ships, adopted by the Organization by resolution A.864(20).

.6 instructions for the rigging and use of any portable means of access in a safe manner;

.7 an inventory of all portable means of access; and

.8 records of periodical inspections and maintenance of the ship's means of access.

4.2 For the purpose of this regulation "critical structural areas" are locations which have been identified from calculations to require monitoring or from the service history of similar or sister ships to be sensitive to cracking, buckling, deformation or corrosion which would impair the structural integrity of the ship.

5 General technical specifications

5.1 For access through horizontal openings, hatches or manholes, the dimensions shall be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening shall not be less than 600 mm x 600 mm. When access to a cargo hold is arranged through the cargo hatch, the top of the ladder shall be placed as close as possible to the hatch coaming. Access hatch coamings having a height greater than 900 mm shall also have steps on the outside in conjunction with the ladder.

5.2 For access through vertical openings, or manholes, in swash bulkheads, floors, girders and web frames providing passage through the length and breadth of the space, the minimum opening shall be not less than 600 mm x 800 mm at a height of not more than 600 mm from the bottom shell plating unless gratings or other foot holds are provided.

5.3 For oil tankers of less than 5,000 tonnes deadweight, the Administration may approve, in special circumstances, smaller dimensions for the openings referred to in paragraphs 5.1 and 5.2, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

Regulation 3-7
Construction drawings maintained on board and ashore

1 A set of as-built construction drawings* and other plans showing any subsequent structural alterations shall be kept on board a ship constructed on or after 1 January 2007.

2 An additional set of such drawings shall be kept ashore by the Company, as defined in regulation IX/1.2.

* Refer to MSC/Circ.1135 on As-built construction drawings to be maintained on board the ship and ashore.

Regulation 3-8
Towing and mooring equipment

1 This regulation applies to ships constructed on or after 1 January 2007, but does not apply to emergency towing arrangements provided in accordance with regulation 3-4.

2 Ships shall be provided with arrangements, equipment and fittings of sufficient safe working load to enable the safe conduct of all towing and mooring operations associated with the normal operation of the ship.

3 Arrangements, equipment and fittings provided in accordance with paragraph 2 shall meet the appropriate requirements of the Administration or an organization recognized by the Administration under regulation I/6.*

4 Each fitting or item of equipment provided under this regulation shall be clearly marked with any restrictions associated with its safe operation, taking into account the strength of its attachment to the ship's structure."

PART B
SUBDIVISION AND STABILITY

3 The following new regulation 23-3 is added after existing regulation 23-2:

"**Regulation 23-3**
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than the date of the first intermediate or renewal survey of the ship to be carried out after 1 January 2007, whichever comes first.

2 For the purpose of this regulation, *freeboard deck* has the meaning defined in the International Convention on Load Lines in force.

3 Ships having a length (L) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors**.

4 The water level detectors required by paragraph 3 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

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* Refer to MSC/Circ.1175 on Guidance on shipboard towing and mooring equipment.

** Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

5 The water level detectors required by paragraph 3 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

PART C
MACHINERY INSTALLATIONS

Regulation 31 – Machinery controls

4 The existing paragraph 2.10 is deleted.

5 The following new paragraph 6 is added after the existing paragraph 5:

"6 Ships constructed on or after 1 July 2004 shall comply with the requirements of paragraphs 1 to 5, as amended, as follows:

.1 a new subparagraph .10 is added to paragraph 2 to read as follows:

".10 automation systems shall be designed in a manner which ensures that threshold warning of impending or imminent slowdown or shutdown of the propulsion system is given to the officer in charge of the navigational watch in time to assess navigational circumstances in an emergency. In particular, the systems shall control, monitor, report, alert and take safety action to slow down or stop propulsion while providing the officer in charge of the navigational watch an opportunity to manually intervene, except for those cases where manual intervention will result in total failure of the engine and/or propulsion equipment within a short time, for example in the case of overspeed.""

ANNEX 2

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER II-1

CONSTRUCTION – STRUCTURE, SUBDIVISION AND STABILITY, MACHINERY AND ELECTRICAL INSTALLATIONS

1 The existing text of parts A, B and B-1 of the chapter is replaced by the following:

"PART A
GENERAL

Regulation 1
Application

1.1 Unless expressly provided otherwise, this chapter shall apply to ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2009.

1.2 For the purpose of this chapter, the term *a similar stage of construction* means the stage at which:

.1 construction identifiable with a specific ship begins; and

.2 assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less.

1.3 For the purpose of this chapter:

.1 the expression *ships constructed* means ships the keels of which are laid or which are at a similar stage of construction;

.2 the expression *all ships* means ships constructed before, on or after 1 January 2009;

.3 a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences;

.4 the expression *alterations and modifications of a major character* means, in the context of cargo ship subdivision and stability, any modification to the construction which affects the level of subdivision of that ship. Where a cargo ship is subject to such modification, it shall be demonstrated that the A/R ratio calculated for the ship after such modifications is not less than the A/R ratio calculated for the ship before the modification. However, in those cases where the ship's A/R ratio before modification is equal to or greater than unity, it is only necessary that the ship after modification has an A value which is not less than R, calculated for the modified ship.

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

3 All ships which undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before the date on which any relevant amendments enter into force, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting. Repairs, alterations and modifications of a major character and outfitting related thereto shall meet the requirements for ships constructed on or after the date on which any relevant amendments enter into force, in so far as the Administration deems reasonable and practicable.

4 The Administration of a State may, if it considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of this chapter unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships entitled to fly the flag of that State which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

5 In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Administration of the State whose flag such ships are entitled to fly, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

.1 the rules annexed to the Special Trade Passenger Ships Agreement, 1971; and

.2 the rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Regulation 2
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *Subdivision length (L_s)* of the ship is the greatest projected moulded length of that part of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.

2 *Mid-length* is the mid-point of the subdivision length of the ship.

3 *Aft terminal* is the aft limit of the subdivision length.

4 *Forward terminal* is the forward limit of the subdivision length.

5 *Length (L)* is the length as defined in the International Convention on Load Lines in force.

6 *Freeboard deck* is the deck as defined in the International Convention on Load Lines in force.

7 *Forward perpendicular* is the forward perpendicular as defined in the International Convention on Load Lines in force.

8 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision draught.

9 *Draught (d)* is the vertical distance from the keel line at mid-length to the waterline in question.

10 *Deepest subdivision draught (d_s)* is the waterline which corresponds to the summer load line draught of the ship.

11 *Light service draught (d_l)* is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew on board.

12 *Partial subdivision draught (d_p)* is the light service draught plus 60% of the difference between the light service draught and the deepest subdivision draught.

13 *Trim* is the difference between the draught forward and the draught aft, where the draughts are measured at the forward and aft terminals respectively, disregarding any rake of keel.

14 *Permeability (μ)* of a space is the proportion of the immersed volume of that space which can be occupied by water.

15 *Machinery spaces* are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

16 *Weathertight* means that in any sea conditions water will not penetrate into the ship.

17 *Watertight* means having scantlings and arrangements capable of preventing the passage of water in any direction under the head of water likely to occur in intact and damaged conditions. In the damaged condition, the head of water is to be considered in the worst situation at equilibrium, including intermediate stages of flooding.

18 *Design pressure* means the hydrostatic pressure for which each structure or appliance assumed watertight in the intact and damage stability calculations is designed to withstand.

19 *Bulkhead deck* in a passenger ship means the uppermost deck 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. The bulkhead deck may be a stepped deck. In a cargo ship the freeboard deck may be taken as the bulkhead deck.

20 *Deadweight* is the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the draught corresponding to the assigned summer freeboard and the lightweight of the ship.

21 *Lightweight* is the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects.

22 *Oil tanker* is the oil tanker defined in regulation 1 of Annex 1 of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973.

23 *Ro-ro passenger ship* means a passenger ship with ro-ro spaces or special category spaces as defined in regulation II-2/3.

24 *Bulk carrier* means a bulk carrier as defined in regulation XII/1.1.

25 *Keel line* is a line parallel to the slope of the keel passing amidships through:

.1 the top of the keel at centreline or line of intersection of the inside of shell plating with the keel if a bar keel extends below that line, on a ship with a metal shell; or

.2 in wood and composite ships, the distance is measured from the lower edge of the keel rabbet. When the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inward intersects the centreline amidships.

26 *Amidship* is at the middle of the length (*L*).

Regulation 3
Definitions relating to parts C, D and E

For the purpose of parts C, D and E, unless expressly provided otherwise:

1 *Steering gear control system* is the equipment by which orders are transmitted from the navigating bridge to the steering gear power units. Steering gear control systems comprise transmitters, receivers, hydraulic control pumps and their associated motors, motor controllers, piping and cables.

2 *Main steering gear* is the machinery, rudder actuators, steering gear, power units, if any, and ancillary equipment and the means of applying torque to the rudder stock (e.g. tiller or quadrant) necessary for effecting movement of the rudder for the purpose of steering the ship under normal service conditions.

3 *Steering gear power unit* is:

.1 in the case of electric steering gear, an electric motor and its associated electrical equipment;

.2 in the case of electrohydraulic steering gear, an electric motor and its associated electrical equipment and connected pump; or

.3 in the case of other hydraulic steering gear, a driving engine and connected pump.

4 *Auxiliary steering gear* is the equipment other than any part of the main steering gear necessary to steer the ship in the event of failure of the main steering gear but not including the tiller, quadrant or components serving the same purpose.

5 *Normal operational and habitable condition* is a condition under which the ship as a whole, the machinery, services, means and aids ensuring propulsion, ability to steer, safe navigation, fire and flooding safety, internal and external communications and signals, means of escape, and emergency boat winches, as well as the designed comfortable conditions of habitability are in working order and functioning normally.

6 *Emergency condition* is a condition under which any services needed for normal operational and habitable conditions are not in working order due to failure of the main source of electrical power.

7 *Main source of electrical power* is a source intended to supply electrical power to the main switchboard for distribution to all services necessary for maintaining the ship in normal operational and habitable conditions.

8 *Dead ship condition* is the condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power.

9 *Main generating station* is the space in which the main source of electrical power is situated.

10 *Main switchboard* is a switchboard which is directly supplied by the main source of electrical power and is intended to distribute electrical energy to the ship's services.

11 *Emergency switchboard* is a switchboard which in the event of failure of the main electrical power supply system is directly supplied by the emergency source of electrical power or the transitional source of emergency power and is intended to distribute electrical energy to the emergency services.

12 *Emergency source of electrical power* is a source of electrical power, intended to supply the emergency switchboard in the event of a failure of the supply from the main source of electrical power.

13 *Power actuating system* is the hydraulic equipment provided for supplying power to turn the rudder stock, comprising a steering gear power unit or units, together with the associated pipes and fittings, and a rudder actuator. The power actuating systems may

share common mechanical components (i.e. tiller, quadrant and rudder stock) or components serving the same purpose.

14 *Maximum ahead service speed* is the greatest speed which the ship is designed to maintain in service at sea at the deepest sea-going draught.

15 *Maximum astern speed* is the speed which it is estimated the ship can attain at the designed maximum astern power at the deepest sea-going draught.

16 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces.

17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

.1 internal combustion machinery used for main propulsion;

.2 internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

.3 any oil-fired boiler or oil fuel unit.

18 *Control stations* are those spaces in which the ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.

19 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

.1 chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee by resolution MSC.4(48), hereinafter referred to as "the International Bulk Chemical Code", as may be amended by the Organization; or

.2 chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Assembly of the Organization by resolution A.212(VII), hereinafter referred to as "the Bulk Chemical Code", as has been or may be amended by the Organization,

whichever is applicable.

20 *Gas carrier* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

.1 chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Maritime Safety

Committee by resolution MSC.5(48), hereinafter referred to as "the International Gas Carrier Code", as may be amended by the Organization; or

.2 chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by the Organization by resolution A.328(IX), hereinafter referred to as "the Gas Carrier Code", as has been or may be amended by the Organization,

whichever is applicable.

PART B
SUBDIVISION AND STABILITY

Regulation 4
General

1 The damage stability requirements in Parts B-1 through B-4 shall apply to cargo ships of 80 m in length (L) and upwards and to all passenger ships regardless of length but shall exclude those cargo ships which are shown to comply with subdivision and damage stability regulations in other instruments* developed by the Organization.

2 The Administration may, for a particular ship or group of ships, accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by these regulations is achieved. Any Administration which allows such alternative methodologies shall communicate to the Organization particulars thereof.

3 Ships shall be as efficiently subdivided as is possible having regard to the nature of the service for which they are intended. The degree of subdivision shall vary with the subdivision length (L_s) of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest subdivision length (L_s), primarily engaged in the carriage of passengers.

4 Where it is proposed to fit decks, inner skins or longitudinal bulkheads of sufficient tightness to seriously restrict the flow of water, the Administration shall be satisfied that proper consideration is given to beneficial or adverse effects of such structures in the calculations.

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* Cargo ships shown to comply with the following regulations may be excluded from the application of part B-1:

.1 Annex I to MARPOL 73/78, except OBO ships with type B freeboards are not excluded;
.2 International Bulk Chemical Code;
.3 International Gas Carrier Code;
.4 Guidelines for the design and construction of offshore supply vessels (resolution A.469(XII));
.5 Code of Safety for Special Purpose Ships (resolution A.534(13), as amended);
.6 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); and
.7 Damage stability requirements of regulation 27 of the 1988 Load Lines Protocol.

PART B-1
STABILITY

Regulation 5
Intact stability information*

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 and the elements of its stability determined.

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 weight 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_s is found.

3 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

4 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined. The ship shall be re-inclined if anticipated deviations exceed one of the values specified in paragraph 5.

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_s is found or anticipated.

6 Every ship shall have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.

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* Refer to the Code on Intact Stability for All Types of Ships covered by IMO Instruments, adopted by the Organization by resolution A.749(18).

Regulation 5-1
Stability information to be supplied to the master*

1 The master shall be supplied with such information satisfactory to 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.

2 The information should include:

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

.2 instructions concerning the operation of cross-flooding arrangements; and

.3 all other data and aids which might be necessary to maintain the required intact stability and stability after damage.

3 The stability information shall show the influence of various trims in cases where the operational trim range exceeds +/- 0.5% of L_s.

4 For ships which have to fulfil the stability requirements of part B-1, information referred to in paragraph 2 are determined from considerations related to the subdivision index, in the following manner: Minimum required *GM* (or maximum permissible vertical position of centre of gravity *KG*) for the three draughts d_s, d_p and d_l are equal to the *GM* (or *KG* values) of corresponding loading cases used for the calculation of survival factor s_i. For intermediate draughts, values to be used shall be obtained by linear interpolation applied to the *GM* value only between the deepest subdivision draught and the partial subdivision draught and between the partial load line and the light service draught respectively. Intact stability criteria will also be taken into account by retaining for each draft the maximum among minimum required *GM* values or the minimum of maximum permissible *KG* values for both criteria. If the subdivision index is calculated for different trims, several required *GM* curves will be established in the same way.

5 When curves or tables of minimum operational metacentric height (*GM*) versus draught are not appropriate, the master should ensure that the operating condition does not deviate from a studied loading condition, or verify by calculation that the stability criteria are satisfied for this loading condition.

* Refer also to the Guidelines for the preparation of intact stability information (MSC/Circ.456); Guidance on the intact stability of existing tankers during transfer operations (MSC/Circ.706); and the Guidance to the master for avoiding dangerous situations in following and quartering seas (MSC/Circ.707).

Regulation 6
Required subdivision index *R*[*]

1 The subdivision of a ship is considered sufficient if the attained subdivision index *A*, determined in accordance with regulation 7, is not less than the required subdivision index *R* calculated in accordance with this regulation and if, in addition, the partial indices A_s, A_p and A_l are not less than 0.9*R* for passenger ships and 0.5*R* for cargo ships.

2 For all ships to which the damage stability requirements of this chapter apply, the degree of subdivision to be provided shall be determined by the required subdivision index *R*, as follows:

.1 In the case of cargo ships greater than 100 m in length (L_s):

$$R \quad 1 - \frac{128}{L_s + 152}$$

.2 In the case of cargo ships not less than 80 m in length (L_s) and not greater than 100 m in length (L_s):

$$R \quad 1 - [1/(1 + \frac{L_s}{100} \times \frac{R_o}{1 - R_o})]$$

Where R_o is the value *R* as calculated in accordance with the formula in subparagraph .1.

.3 In the case of passenger ships:

$$R \quad 1 - \frac{5{,}000}{L_s + 2.5N + 15{,}225}$$

where:

N $N_1 + 2N_2$
N_1 number of persons for whom lifeboats are provided
N_2 number of persons (including officers and crew) the ship is permitted to carry in excess of N_1.

.4 Where the conditions of service are such that compliance with paragraph 2.3 of this regulation on the basis of N $N_1 + 2N_2$ is impracticable and where the Administration considers that a suitably reduced degree of hazard exists, a lesser value of *N* may be taken but in no case less than N $N_1 + N_2$.

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* The Maritime Safety Committee, in adopting the regulations contained in parts B to B-4, invited Administrations to note that the regulations should be applied in conjunction with the explanatory notes developed by the Organization in order to ensure their uniform application.

Regulation 7
Attained subdivision index *A*

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

$$A \quad 0.4A_s + 0.4A_p + 0.2A_l$$

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$$A \quad \Sigma\, p_i\, s_i$$

where:

i represents each compartment or group of compartments under consideration,

p_i accounts for the probability that only the compartment or group of compartments under consideration may be flooded, disregarding any horizontal subdivision, as defined in regulation 7-1,

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, and includes the effect of any horizontal subdivision, as defined in regulation 7-2.

2 In the calculation of A, the level trim shall be used for the deepest subdivision draught and the partial subdivision draught. The actual service trim shall be used for the light service draught. If in any service condition, the trim variation in comparison with the calculated trim is greater than 0.5% of L_s, one or more additional calculations of A are to be submitted for the same draughts but different trims so that, for all service conditions, the difference in trim in comparison with the reference trim used for one calculation will be less than 0.5% of L_s.

3 When determining the positive righting lever (GZ) of the residual stability curve, the displacement used should be that of the intact condition. That is, the constant displacement method of calculation should be used.

4 The summation indicated by the above formula shall be taken over the ship's subdivision length (L_s) for all cases of flooding in which a single compartment or two or more adjacent compartments are involved. In the case of unsymmetrical arrangements, the calculated A value should be the mean value obtained from calculations involving both sides. Alternatively, it should be taken as that corresponding to the side which evidently gives the least favourable result.

5 Wherever wing compartments are fitted, contribution to the summation indicated by the formula shall be taken for all cases of flooding in which wing compartments are involved. Additionally, cases of simultaneous flooding of a wing compartment or group of compartments and the adjacent inboard compartment or group of compartments, but excluding damage of transverse extent greater than one half of the ship breadth B, may be

added. For the purpose of this regulation, transverse extent is measured inboard from ship's side, at right angle to the centreline at the level of the deepest subdivision draught.

6 In the flooding calculations carried out according to the regulations, only one breach of the hull and only one free surface need to be assumed. The assumed vertical extent of damage is to extend from the baseline upwards to any watertight horizontal subdivision above the waterline or higher. However, if a lesser extent of damage will give a more severe result, such extent is to be assumed.

7 If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements are to be made to ensure that progressive flooding cannot thereby extend to compartments other than those assumed flooded. However, the Administration may permit minor progressive flooding if it is demonstrated that its effects can be easily controlled and the safety of the ship is not impaired.

Regulation 7-1
Calculation of the factor p_i

1 The factor p_i for a compartment or group of compartments shall be calculated in accordance with paragraphs 1.1 and 1.2 using the following notations:

j the aftmost damage zone number involved in the damage starting with no.1 at the stern;

n the number of adjacent damage zones involved in the damage;

k is the number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centre line. The shell has *k* 0;

xI the distance from the aft terminal of L_s to the aft end of the zone in question;

x2 the distance from the aft terminal of L_s to the forward end of the zone in question;

b the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision loadline 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 loadline 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.

If the damage involves a single zone only:

$$p_i \quad p(xI_j,x2_j) \cdot [r(xI_j,x2_j,b_k) - r(xI_j,x2_j,b_{k-1})]$$

If the damage involves two adjacent zones:

$$\begin{aligned} p_i \quad & p(xI_j,x2_{j+1}) \cdot [r(xI_j,x2_{j+1},b_k) - r(xI_j,x2_{j+1},b_{k-1})] \\ & - p(xI_j,x2_j) \cdot [r(xI_j,x2_j,b_k) - r(xI_j,x2_j,b_{k-1})] \\ & - p(xI_{j+1},x2_{j+1}) \cdot [r(xI_{j+1},x2_{j+1},b_k) - r(xI_{j+1},x2_{j+1},b_{k-1})] \end{aligned}$$

If the damage involves three or more adjacent zones:

$$\begin{aligned} p_i \quad & p(xI_j,x2_{j+n-1}) \cdot [r(xI_j,x2_{j+n-1},b_k) - r(xI_j,x2_{j+n-1},b_{k-1})] \\ & - p(xI_j,x2_{j+n-2}) \cdot [r(xI_j,x2_{j+n-2},b_k) - r(xI_j,x2_{j+n-2},b_{k-1})] \\ & - p(xI_{j+1},x2_{j+n-1}) \cdot [r(xI_{j+1},x2_{j+n-1},b_k) - r(xI_{j+1},x2_{j+n-1},b_{k-1})] \\ & + p(xI_{j+1},x2_{j+n-2}) \cdot [r(xI_{j+1},x2_{j+n-2},b_k) - r(xI_{j+1},x2_{j+n-2},b_{k-1})] \end{aligned}$$

and where $r(xI, x2, b0) \quad 0$

1.1 The factor $p(xI, x2)$ is to be calculated according to the following formulae:

Overall normalized max damage length:	$J_{\max}$	10/33
Knuckle point in the distribution:	J_{kn}	5/33
Cumulative probability at J_{kn}:	p_k	11/12
Maximum absolute damage length:	$l_{\max}$	60 m
Length where normalized distribution ends:	L^*	260 m

Probability density at J 0:

$$b_0 = 2\left(\frac{p_k}{J_{kn}} - \frac{1-p_k}{J_{\max} - J_{kn}}\right)$$

When $L_s \le L^*$:

$$J_m = \min\left\{J_{\max}, \frac{l_{\max}}{L_s}\right\}$$

$$J_k = \frac{J_m}{2} + \frac{1 - \sqrt{1 + (1-2p_k)b_0 J_m + \frac{1}{4}b_0{}^2 J_m{}^2}}{b_0}$$

$$b_{12} = b_0$$

When $L_s > L^*$:

$$J_m{}^* = \min\left\{J_{\max}, \frac{l_{\max}}{L^*}\right\}$$

$$J_k^* = \frac{J_m^*}{2} + \frac{1 - \sqrt{1 + (1 - 2p_k) b_0 J_m^* + \frac{1}{4} b_0^2 J_m^{*2}}}{b_0}$$

$$J_m = \frac{J_m^* \cdot L^*}{L_s}$$

$$J_k = \frac{J_k^* \cdot L^*}{L_s}$$

$$b_{12} = 2\left(\frac{p_k}{J_k} - \frac{1 - p_k}{J_m - J_k} \right)$$

$$b_{11} = 4 \frac{(1 - p_k)}{J_m - J_k J_k} - 2 \frac{p_k}{J_k^2}$$

$$b_{21} = -2 \frac{1 - p_k}{(J_m - J_k)^2}$$

$$b_{22} = -b_{21} J_m$$

The non-dimensional damage length:

$$J = \frac{(x2 - xI)}{L_s}$$

The normalized length of a compartment or group of compartments:

J_n is to be taken as the lesser of J and J_m

1.1.1 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$J \leq J_k$:

$$p(xI, x2) = p_1 = \frac{1}{6} J^2 \left(b_{11} J + 3 b_{12} \right)$$

$J\ J_k$:

$$p(xI, x2) = p_2 = -\frac{1}{3} b_{11} J_k^3 + \frac{1}{2} (b_{11} J - b_{12}) J_k^2 + b_{12} J J_k - \frac{1}{3} b_{21} \left(J_n^3 - J_k^3 \right) + \frac{1}{2} (b_{21} J - b_{22}) \left(J_n^2 - J_k^2 \right) + b_{22} J (J_n - J_k)$$

1.1.2 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$J \le J_k$:

$$p(xI, x2) = \frac{1}{2}(p_1 + J)$$

$J\ J_k$:

$$p(xI, x2) = \frac{1}{2}(p_2 + J)$$

1.1.3 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$p(xI, x2) = 1$$

1.2 The factor *r(xI, x2, b)* shall be determined by the following formulae:

$$r(xI, x2, b) = 1 - (1 - C) \cdot \left\lceil 1 - \frac{G}{p(xI, x2)} \right\rceil$$

where:

$$C = 12 \cdot J_b \cdot (-45 \cdot J_b + 4), \text{ where}$$

$$J_b = \frac{b}{15 \cdot B}$$

1.2.1 Where the compartment or groups of compartments considered extends over the entire subdivision length (L_s):

$$G = G_1 = \frac{1}{2} b_{11} J_b^2 + b_{12} J_b$$

1.2.2 Where neither limits of the compartment or group of compartments under consideration coincides with the aft or forward terminals:

$$G = G_2 = -\frac{1}{3} b_{11} J_0^3 + \frac{1}{2}(b_{11} J - b_{12}) J_0^2 + b_{12} J J_0, \text{ where}$$

$$J_0 = \min(J, J_b)$$

1.2.3 Where the aft limit of the compartment or group of compartments under consideration coincides with the aft terminal or the forward limit of the compartment or group of compartments under consideration coincides with the forward terminal:

$$G = \frac{1}{2} \cdot (G_2 + G_1 \cdot J)$$

Regulation 7-2
Calculation of the factor s_i

1 The factor s_i shall be determined for each case of assumed flooding, involving a compartment or group of compartments, in accordance with the following notations and the provisions in this regulation.

θ_e is the equilibrium heel angle in any stage of flooding, in degrees;

θ_v is the angle, in any stage of flooding, where the righting lever becomes negative, or the angle at which an opening incapable of being closed weathertight becomes submerged;

GZ_{max} is the maximum positive righting lever, in metres, up to the angle θ_v;

Range is the range of positive righting levers, in degrees, measured from the angle θ_e. The positive range is to be taken up to the angle θ_v;

Flooding stage is any discrete step during the flooding process, including the stage before equalization (if any) until final equilibrium has been reached.

1.1 The factor s_i, for any damage case at any initial loading condition, d_i, shall be obtained from the formula:

$$s_i \quad \text{minimum} \{ s_{\text{intermediate,i}} \quad \text{or} \quad s_{\text{final,i}} \cdot s_{\text{mom,i}} \}$$

where:

$s_{\text{intermediate,i}}$ is the probability to survive all intermediate flooding stages until the final equilibrium stage, and is calculated in accordance with paragraph 2;

$s_{\text{final,i}}$ is the probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with paragraph 3;

$s_{\text{mom,i}}$ is the probability to survive heeling moments, and is calculated in accordance with paragraph 4.

2 The factor $s_{\text{intermediate,i}}$ is applicable only to passenger ships (for cargo ships $s_{\text{intermediate,i}}$ should be taken as unity) and shall be 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:

$$s_{\text{intermediate,i}} \quad \left\lceil \frac{GZ_{\max}}{0.05} \cdot \frac{Range}{7} \right\rceil^{4} \quad \frac{1}{}$$

where GZ_{max} is not to be taken as more than 0.05 m and *Range* as not more than 7°. $s_{\text{intermediate}}$ 0, if the intermediate heel angle exceeds 15°. Where cross-flooding fittings are required, the time for equalization shall not exceed 10 min.

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

$$s_{\text{final,i}} K \cdot \left[\frac{GZ_{\max}}{0.12} \cdot \frac{Range}{16} \right]^{\frac{1}{4}}$$

where:

$GZ_{\max}$ is not to be taken as more than 0.12 m;

Range is not to be taken as more than 16°;

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

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

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

where:

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

$\theta_{\max}$ 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:

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

where:

Displacement is the intact displacement at the subdivision draught;

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

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

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

M_{heel} maximum $\{M_{\text{passenger}}$ or M_{wind} 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:

$M_{\text{passenger}}$ $(0.075 \cdot N_p) \cdot (0.45 \cdot B)$ (tm)

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 beam of the ship.

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 force acting in a damage situation:

$$M_{wind} \quad (P \cdot A \cdot Z) / 9{,}806 \ \text{(tm)}$$

where:

P 120 N/m^2;

A projected lateral area above waterline;

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

T ship's draught, d_i.

4.1.3 $M_{Survivalcraft}$ is the maximum assumed heeling moment due to the launching of all fully loaded davit-launched survival craft on one side of the ship. It shall be calculated using the following assumptions:

.1 all lifeboats and rescue boats fitted on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out fully loaded and ready for lowering;

.2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

.3 a fully loaded davit-launched liferaft attached to each davit on the side to which the ship has heeled after having sustained damage shall be assumed to be swung out ready for lowering;

.4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment; and

.5 life-saving appliances on the side of the ship opposite to the side to which the ship has heeled shall be assumed to be in a stowed position.

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. 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.

5.1 Tanks and compartments taking part in such equalization shall be fitted with air pipes or equivalent means of sufficient cross-section to ensure that the flow of water into the equalization compartments is not delayed.

5.2 In all cases, s_i is to be taken as zero in those cases where the final waterline, taking into account sinkage, heel and trim, immerses:

.1 the lower edge of openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of factor s_i. Such openings shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers; and

.2 any part of the bulkhead deck in passenger ships considered a horizontal evacuation route for compliance with chapter II-2.

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 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 become inaccessible or inoperable;

.3 immersion of any part of piping or ventilation ducts carried through a watertight boundary that is located within any compartment included in damage cases contributing to the attained index A, if not fitted with watertight means of closure at each boundary.

5.4 However, where compartments assumed flooded due to progressive flooding are taken into account in the damage stability calculations multiple values of $s_{\text{intermediate,i}}$ may be calculated assuming equalization in additional flooding phases.

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

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* Reference is made to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passengers ships, adopted by the Organization by resolution A.266(VIII), as may be amended.

6 Where horizontal watertight boundaries are fitted above the waterline under consideration the s-value calculated for the lower compartment or group of compartments shall be obtained by multiplying the value as determined in paragraph 1.1 by the reduction factor v_m according to paragraph 6.1, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

6.1 The factor v_m shall be obtained from the formula:

$$v_m \quad v(H_{j,\,n,\,m}, d) \quad v(H_{j,\,n,\,m-1}, d)$$

where:

$H_{j,\,n,\,m}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the m^{th} horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j,\,n,\,m-1}$ is the least height above the baseline, in metres, within the longitudinal range of $x_{1(j)}...x_{2(j+n-1)}$ of the $(m-1)^{th}$ horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

j signifies the aft terminal of the damaged compartments under consideration;

m represents each horizontal boundary counted upwards from the waterline under consideration;

d is the draught in question as defined in regulation 2; and

x_1 and x_2 represent the terminals of the compartment or group of compartments considered in regulation 7-1.

6.1.1 The factors $v(H_{j,\,n,\,m}, d)$ and $v(H_{j,\,n,\,m-1}, d)$ shall be obtained from the formulas:

$$v(H,d) = 0.8\,\frac{(H-d)}{7.8}$$, if $(H_m - d)$ is less than, or equal to, 7.8 m;

$$v(H,d) = 0.8 + 0.2\left\lceil \frac{(H-d)-7.8}{4.7} \right\rceil$$ in all other cases,

where:

$v(H_{j,\,n,\,m}, d)$ is to be taken as 1, if H_m coincides with the uppermost watertight boundary of the ship within the range $(x1_{(j)}...x2_{(j+n-1)})$, and

$v(H_{j,\,n,\,0}, d)$ is to be taken as 0.

In no case is v_m to be taken as less than zero or more than 1.

6.2 In general, each contribution dA to the index A in the case of horizontal subdivisions is obtained from the formula:

$$dA = p_i \cdot \left[v_1 \cdot s_{\min 1} + (v_2 - v_1)\cdot s_{\min 2} + \cdots + (1 - v_{m-1})\cdot s_{\min m}\right]$$

where:

v_m the v-value calculated in accordance with paragraph 6.1;
s_{min} the least s-factor for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards.

Regulation 7-3
Permeability

1 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each general compartment or part of a compartment shall be as follows:

Spaces	Permeability
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Void spaces	0.95
Intended for liquids	0 or 0.95[1]

[1] Whichever results in the more severe requirement.

2 For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each cargo compartment or part of a compartment shall be as follows:

Spaces	Permeability at draught d_s	Permeability at draught d_p	Permeability at draught d_l
Dry cargo spaces	0.70	0.80	0.95
Container spaces	0.70	0.80	0.95
Ro-ro spaces	0.90	0.90	0.95
Cargo liquids	0.70	0.80	0.95

3 Other figures for permeability may be used if substantiated by calculations.

Regulation 8
Special requirements concerning passenger ship stability

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 the three loading conditions on which is based the calculation of the subdivision index and for a damage involving all the compartments within 0.08L measured from the forward perpendicular.

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 on which is based the calculation of the subdivision index.

3 The damage extent to be assumed when demonstrating compliance with paragraph 2, is to be dependent on both N as defined in regulation 6, and L_s as defined in regulation 2, such that:

.1 the vertical extent of damage is to extend from the ship's moulded baseline to a position up to 12.5 m above the position of the deepest subdivision draught as defined in regulation 2, unless a lesser vertical extent of damage were to give a lower value of s_i, in which case this reduced extent is to be used;

.2 where 400 or more persons are to be carried, a damage length of $0.03L_s$ 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 angle to the centreline at the level of the deepest subdivision draught;

.3 where less than 400 persons are carried, damage length is to be assumed at any position along the shell side between transverse watertight bulkheads provided that the distance between two adjacent transverse watertight bulkheads is not less than the assumed damage length. If the distance between adjacent transverse watertight bulkheads is less than the assumed damage length, only one of these bulkheads shall be considered effective for the purpose of demonstrating compliance with paragraph 2;

.4 where 36 persons are carried, a damage length of $0.015L_s$ 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

.5 where more than 36, but fewer than 400 persons are carried the values of damage length and penetration inboard, used in the determination of the assumed extent of damage, are to be obtained by linear interpolation between the values of damage length and penetration which apply for ships carrying 36 persons and 400 persons as specified in subparagraphs .4 and .2.

PART B-2
SUBDIVISION, WATERTIGHT AND WEATHERTIGHT INTEGRITY

Regulation 9
Double bottoms in passenger ships and cargo ships other than tankers

1 A double bottom shall be fitted extending from the collision bulkhead to the afterpeak bulkhead, as far as this is practicable and compatible with the design and proper working of the ship.

2 Where a double bottom is required to be fitted the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. Such protection will be deemed satisfactory if the inner bottom is not lower at any part than a plane parallel with the keel line and which is located not less than a vertical distance h measured from the keel line, as calculated by the formula:

h $B/20$

However, in no case is the value of *h* to be less than 760 mm, and need not be taken as more than 2,000 mm.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downward more than necessary. A well extending to the outer bottom is, however, permitted at the after end of the shaft tunnel. 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. In no case shall the vertical distance from the bottom of such a well to a plane coinciding with the keel line be less than 500 mm.

4 A double bottom need not be fitted in way of watertight tanks, including dry tanks of moderate size, provided the safety of the ship is not impaired in the event of bottom or side damage.

5 In the case of passenger ships to which the provisions of regulation 1.5 apply and which are engaged on regular service within the limits of a short international voyage as defined in regulation III/3.22, the Administration may permit a double bottom to be dispensed with if satisfied that the fitting of a double bottom in that part would not be compatible with the design and proper working of the ship.

6 Any part of a passenger ship or a cargo ship that is not fitted with a double bottom in accordance with paragraphs 1, 4 or 5 shall be capable of withstanding bottom damages, as specified in paragraph 8, in that part of the ship.

7 In the case of unusual bottom arrangements in a passenger ship or a cargo ship, it shall be demonstrated that the ship is capable of withstanding bottom damages as specified in paragraph 8.

8 Compliance with paragraphs 6 or 7 is to be achieved by demonstrating that s_i, when calculated in accordance with regulation 7-2, is not less than 1 for all service conditions when subject to a bottom damage assumed at any position along the ship's bottom and with an extent specified in .2 below for 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 0.3 L from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	1/3 $L^{2/3}$ or 14.5 m, whichever is less	1/3 $L^{2/3}$ 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 or 2 m, whichever is less	*B*/20 or 2 m, whichever is less

.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.

9 In case of large lower holds in passenger ships, the Administration may require an increased double bottom height of not more than *B*/10 or 3 m, whichever is less, measured from the keel line. Alternatively, bottom damages may be calculated for these areas, in accordance with paragraph 8, but assuming an increased vertical extent.

Regulation 10
Construction of watertight bulkheads

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.

2 Steps and recesses in watertight bulkheads shall be as strong as the bulkhead at the place where each occurs.

Regulation 11
Initial testing of watertight bulkheads, etc.

1 Testing watertight spaces not intended to hold liquids and cargo holds intended to hold ballast by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test shall be carried out where practicable. This test shall be carried out in the most advanced stage of the fitting out of the ship. Where a hose test is not practicable because of possible damage to machinery, electrical equipment insulation or outfitting items, it may be replaced by a careful visual examination of welded connections, supported where deemed necessary by means such as a dye penetrant test or an ultrasonic leak test or an equivalent test. In any case a thorough inspection of the watertight bulkheads shall be carried out.

2 The forepeak, double bottom (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of regulation 10.1.

3 Tanks which are intended to hold liquids, and which form part of the watertight subdivision of the ship, shall be tested for tightness and structural strength with water to a head corresponding to its design pressure. The water head is in no case to be less than the top of the air pipes or to a level of 2.4 m above the top of the tank, whichever is the greater.

4 The tests referred to in paragraphs 2 and 3 are for the purpose of ensuring that the subdivision structural arrangements are watertight and are not to be regarded as a test of the fitness of any compartment for the storage of oil fuel or for other special purposes for which a test of a superior character may be required depending on the height to which the liquid has access in the tank or its connections.

Regulation 12
Peak and machinery space bulkheads, shaft tunnels, etc.

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

2 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 0.015*L* forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular,

whichever gives the smallest measurement.

3 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 1 or 2.

4 No doors, manholes, access openings, ventilation ducts or any other openings shall be fitted in the collision bulkhead below the bulkhead deck.

5.1 Except as provided in paragraph 5.2, the collision bulkhead may be pierced below the bulkhead deck 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, the valve chest being secured inside the forepeak to 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. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable.

5.2 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 by two pipes, each of which is fitted as required by paragraph 5.1, 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.

6 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the bulkhead deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 1 or 2 with the exception permitted by paragraph 7 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 causing damage to it in the case of damage to, or detachment of, a bow door.

7 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the bulkhead deck 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 bulkhead deck may extend forward of the limit specified in paragraph 1 or 2. Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

8 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.

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

10 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

1 The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship, satisfactory means shall be provided for closing these openings.

2.1 Where pipes, scuppers, electric cables, etc., are carried through watertight bulkheads, arrangements shall be made to ensure the watertight integrity of the bulkheads.

2.2 Valves not forming part of a piping system shall not be permitted in watertight bulkheads.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

3 No doors, manholes, or access openings are permitted in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space, except as provided in paragraph 9.1 and in regulation 14.

4 Subject to paragraph 10, not more than one door, apart from the doors to shaft tunnels, may be fitted in each watertight bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion. Where two or more shafts are fitted, the tunnels shall be connected by an intercommunicating

passage. There shall be only one door between the machinery space and the tunnel spaces where two shafts are fitted and only two doors where there are more than two shafts. All these doors shall be of the sliding type and shall be so located as to have their sills as high as practicable. The hand gear for operating these doors from above the bulkhead deck shall be situated outside the spaces containing the machinery.

5.1 Watertight doors, except as provided in paragraph 9.1 or regulation 14, shall be power-operated sliding doors complying with the requirements of paragraph 7 capable of being closed simultaneously from the central operating console at the navigation bridge in not more than 60 s with the ship in the upright position.

5.2 The means of operation whether by power or by hand of any power-operated sliding watertight door shall be capable of closing the door with the ship listed to 15° either way. Consideration shall also be given to the forces which may act on either side of the door as may be experienced when water is flowing through the opening applying a static head equivalent to a water height of at least 1 m above the sill on the centreline of the door.

5.3 Watertight door controls, including hydraulic piping and electric cables, shall be kept as close as practicable to the bulkhead in which the doors are fitted, in order to minimize the likelihood of them being involved in any damage which the ship may sustain. The positioning of watertight doors and their controls shall be such that if the ship sustains damage within one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6 All power-operated sliding watertight doors shall be provided with means of indication which will show at all remote operating positions whether the doors are open or closed. Remote operating positions shall only be at the navigation bridge as required by paragraph 7.1.5 and at the location where hand operation above the bulkhead deck is required by paragraph 7.1.4.

7.1 Each power-operated sliding watertight door:

.1 shall have a vertical or horizontal motion;

.2 shall, subject to paragraph 10, be normally limited to a maximum clear opening width of 1.2 m. The Administration may permit larger doors only to the extent considered necessary for the effective operation of the ship provided that other safety measures, including the following, are taken into consideration:

.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages; and

.2 the door shall be located inboard the damage zone *B*/5;

.3 shall be fitted with the necessary equipment to open and close the door using electric power, hydraulic power, or any other form of power that is acceptable to the Administration;

.4 shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from either side, and in addition, close the door from an accessible position above the bulkhead deck with an all round crank motion or some other movement providing the same degree of safety acceptable to the Administration. Direction of rotation or other movement is to be clearly indicated at all operating positions. The time necessary for the complete closure of the door, when operating by hand gear, shall not exceed 90 s with the ship in the upright position;

.5 shall be provided with controls for opening and closing the door by power from both sides of the door and also for closing the door by power from the central operating console at the navigation bridge;

.6 shall be provided with an audible alarm, distinct from any other alarm in the area, which will sound whenever the door is closed remotely by power and which shall sound for at least 5 s but no more than 10 s before the door begins to move and shall continue sounding until the door is completely closed. In the case of remote hand operation it is sufficient for the audible alarm to sound only when the door is moving. Additionally, in passenger areas and areas of high ambient noise the Administration may require the audible alarm to be supplemented by an intermittent visual signal at the door; and

.7 shall have an approximately uniform rate of closure under power. The closure time, from the time the door begins to move to the time it reaches the completely closed position, shall in no case be less than 20 s or more than 40 s with the ship in the upright position.

7.2 The electrical power required for power-operated sliding watertight doors shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck. The associated control, indication and alarm circuits shall be supplied from the emergency switchboard either directly or by a dedicated distribution board situated above the bulkhead deck and be capable of being automatically supplied by the transitional source of emergency electrical power required by regulation 42.3.1.3 in the event of failure of either the main or emergency source of electrical power.

7.3 Power-operated sliding watertight doors shall have either:

.1 a centralized hydraulic system with two independent power sources each consisting of a motor and pump capable of simultaneously closing all doors. In addition, there shall be for the whole installation hydraulic accumulators of sufficient capacity to operate all the doors at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. The power operating system shall be designed to minimize the possibility of having a single failure in the hydraulic piping adversely affect the operation of more than one door. The hydraulic system shall be provided with a low-level alarm for hydraulic fluid reservoirs serving the

power-operated system and a low gas pressure alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators. These alarms are to be audible and visual and shall be situated on the central operating console at the navigation bridge; or

.2 an independent hydraulic system for each door with each power source consisting of a motor and pump capable of opening and closing the door. In addition, there shall be a hydraulic accumulator of sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°. This operating cycle shall be capable of being carried out when the accumulator is at the pump cut-in pressure. The fluid used shall be chosen considering the temperatures liable to be encountered by the installation during its service. A low gas pressure group alarm or other effective means of monitoring loss of stored energy in hydraulic accumulators shall be provided at the central operating console on the navigation bridge. Loss of stored energy indication at each local operating position shall also be provided; or

.3 an independent electrical system and motor for each door with each power source consisting of a motor capable of opening and closing the door. The power source shall be capable of being automatically supplied by the transitional source of emergency electrical power as required by regulation 42.4.2 - in the event of failure of either the main or emergency source of electrical power and with sufficient capacity to operate the door at least three times, i.e. closed-open-closed, against an adverse list of 15°.

For the systems specified in paragraphs 7.3.1, 7.3.2 and 7.3.3, provision should be made as follows: Power systems for power-operated watertight sliding doors shall be separate from any other power system. A single failure in the electric or hydraulic power-operated systems excluding the hydraulic actuator shall not prevent the hand operation of any door.

7.4 Control handles shall be provided at each side of the bulkhead at a minimum height of 1.6 m above the floor and shall be so arranged as to enable persons passing through the doorway to hold both handles in the open position without being able to set the power closing mechanism in operation accidentally. The direction of movement of the handles in opening and closing the door shall be in the direction of door movement and shall be clearly indicated.

7.5 As far as practicable, electrical equipment and components for watertight doors shall be situated above the bulkhead deck and outside hazardous areas and spaces.

7.6 The enclosures of electrical components necessarily situated below the bulkhead deck shall provide suitable protection against the ingress of water.*

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* Refer to the following IEC publication 529, 1976:
.1 electrical motors, associated circuits and control components; protected to IPX 7 standard;
.2 door position indicators and associated circuit components; protected to IPX 8 standard; and
.3 door movement warning signals; protected to IPX 6 standard.

Other arrangements for the enclosures of electrical components may be fitted provided the Administration is satisfied that an equivalent protection is achieved. The water pressure IPX 8 shall be based on the pressure that may occur at the location of the component during flooding for a period of 36 h.

7.7 Electric power, control, indication and alarm circuits shall be protected against fault in such a way that a failure in one door circuit will not cause a failure in any other door circuit. Short circuits or other faults in the alarm or indicator circuits of a door shall not result in a loss of power operation of that door. Arrangements shall be such that leakage of water into the electrical equipment located below the bulkhead deck will not cause the door to open.

7.8 A single electrical failure in the power operating or control system of a power-operated sliding watertight door shall not result in a closed door opening. Availability of the power supply should be continuously monitored at a point in the electrical circuit as near as practicable to each of the motors required by paragraph 7.3. Loss of any such power supply should activate an audible and visual alarm at the central operating console at the navigation bridge.

8.1 The central operating console at the navigation bridge shall have a "master mode" switch with two modes of control: a "local control" mode which shall allow any door to be locally opened and locally closed after use without automatic closure, and a "doors closed" mode which shall automatically close any door that is open. The "doors closed" mode shall automatically close any door that is open. The "doors closed" mode shall permit doors to be opened locally and shall automatically re-close the doors upon release of the local control mechanism. The "master mode" switch shall normally be in the "local control" mode. The "doors closed" mode shall only be used in an emergency or for testing purposes. Special consideration shall be given to the reliability of the "master mode" switch.

8.2 The central operating console at the navigation bridge shall be provided with a diagram showing the location of each door, with visual indicators to show whether each door is open or closed. A red light shall indicate a door is fully open and a green light shall indicate a door is fully closed. When the door is closed remotely the red light shall indicate the intermediate position by flashing. The indicating circuit shall be independent of the control circuit for each door.

8.3 It shall not be possible to remotely open any door from the central operating console.

9.1 If the Administration is satisfied that such doors are essential, watertight doors of satisfactory construction may be fitted in watertight bulkheads dividing cargo between deck spaces. Such doors may be hinged, rolling or sliding doors but shall not be remotely controlled. They shall be fitted at the highest level and as far from the shell plating as practicable, but in no case shall the outboard vertical edges be situated at a distance from the shell plating which is less than one fifth of the breadth of the ship, as defined in regulation 2, such distance being measured at right angles to the centreline at the level of the deepest subdivision draught.

9.2 Should any such doors be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening. When it is proposed to fit such doors, the number and arrangements shall receive the special consideration of the Administration.

10 Portable plates on bulkheads shall not be permitted except in machinery spaces. The Administration may permit not more than one power-operated sliding watertight door

in each watertight bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are intended to remain closed during navigation except in case of urgent necessity at the discretion of the master. These doors need not meet the requirements of paragraph 7.1.4 regarding complete closure by hand-operated gear in 90 s.

11.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, 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.

11.2 Where it is proposed to fit tunnels piercing watertight bulkheads, these shall receive the special consideration of the Administration.

11.3 Where trunkways in connection with refrigerated cargo and ventilation or forced draught trunks are carried through more than one watertight bulkhead, the means of closure at such openings shall be operated by power and be capable of being closed from a central position situated above the bulkhead deck.

Regulation 13-1
Openings in watertight bulkheads and internal decks in cargo ships

1 The number of openings in watertight subdivisions is to be kept to a minimum compatible with the design and proper working of the ship. Where penetrations of watertight bulkheads and internal decks are necessary for access, piping, ventilation, electrical cables, etc., arrangements are to be made to maintain the watertight integrity. The Administration may permit relaxation in the watertightness of openings above the freeboard deck, provided that it is demonstrated that any progressive flooding can be easily controlled and that the safety of the ship is not impaired.

2 Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of main power failure. Particular attention is to be paid to minimizing the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides.

3 Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is satisfied that such doors or ramps are essential. These doors or ramps may be hinged, rolling or sliding doors or ramps, but shall not be remotely controlled.* Should any of the doors or ramps be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

5 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of internal openings shall be provided with a notice which is to be affixed to each such closing appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 14
Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships designed or adapted for the carriage of goods vehicles and accompanying personnel.

2 If in such a ship the total number of passengers which include personnel accompanying vehicles does not exceed $12 + A_d/25$, where A_d total deck area (square metres) of spaces available for the stowage of goods vehicles and where the clear height at the stowage position and at the entrance to such spaces is not less than 4 m, the provisions of regulations 13.9.1 and 13.9.2 in respect of watertight doors apply except that the doors may be fitted at any level in watertight bulkheads dividing cargo spaces. Additionally, indicators are required on the navigation bridge to show automatically when each door is closed and all door fastenings are secured.

3 The ship may not be certified for a higher number of passengers than assumed in paragraph 2, if a watertight door has been fitted in accordance with this regulation.

Regulation 15
Openings in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships

1 The number of openings in the shell plating shall be reduced to the minimum compatible with the design and proper working of the ship.

2 The arrangement and efficiency of the means for closing any opening in the shell plating shall be consistent with its intended purpose and the position in which it is fitted and generally to the satisfaction of the Administration.

3.1 Subject to the requirements of the International Convention on Load Lines in force, no sidescuttle shall be fitted in such a position that its sill is below a line drawn parallel to the bulkhead deck at side and having its lowest point 2.5% of the breadth of the ship above the deepest subdivision draught, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, as permitted by paragraph 3.1, shall be of such

* Refer to Interpretations of regulations of part B-1 of SOLAS chapter II-1 (MSC/Circ.651).

construction as will effectively prevent any person opening them without the consent of the master of the ship.

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 other than that for steerage passengers, 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 or coal.

5.2 Sidescuttles may, however, be fitted in spaces appropriated alternatively to the carriage of cargo or passengers, but they shall be of such construction as will effectively prevent any person opening them or their deadlights without the consent of the master.

6 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the bulkhead deck of passenger ships and the freeboard deck of cargo ships without the special sanction of the Administration.

7 The number of scuppers, sanitary discharges and other similar openings in the shell plating shall be reduced to the minimum either by making each discharge serve for as many as possible of the sanitary and other pipes, or in any other satisfactory manner.

8.1 All inlets and discharges in the shell plating shall be fitted with efficient and accessible arrangements for preventing the accidental admission of water into the ship.

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 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 shall always be readily accessible and means shall be provided for indicating whether the valve is open or closed.

8.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

8.3 Machinery space, main and auxiliary sea inlets and discharges in connection with the operation of machinery shall be fitted with readily accessible valves between the pipes and the shell plating or between the pipes and fabricated boxes attached to the shell plating. In manned machinery spaces the valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

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 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.

8.5 All shell fittings and valves required by this regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this regulation refers shall be of steel or other equivalent material to the satisfaction of the Administration.

9 Gangway, cargo and fuelling ports fitted below the bulkhead deck of passenger ships and the freeboard deck of cargo ships shall be watertight and in no case be so fitted as to have their lowest point below the deepest subdivision draught.

10.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

10.2 If the inboard opening is situated below the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the cover shall be watertight and, in addition, an automatic non-return valve shall be fitted in the chute in an easily accessible position above the deepest subdivision draught.

Regulation 15-1
External openings in cargo ships

1 All external openings leading to compartments assumed intact in the damage analysis, which are below the final damage waterline, are required to be watertight.

2 External openings required to be watertight in accordance with paragraph 1 shall, except for cargo hatch covers, be fitted with indicators on the bridge.

3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be fitted with a device that prevents unauthorized opening if they are accessible during the voyage.

4 Other closing appliances which are kept permanently closed at sea to ensure the watertight integrity of external openings shall be provided with a notice affixed to each appliance to the effect that it is to be kept closed. Manholes fitted with closely bolted covers need not be so marked.

Regulation 16
Construction and initial tests of watertight doors, sidescuttles, etc.

1 In all ships:

.1 the design, materials and construction of all watertight doors, 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;

.2 such valves, doors and mechanisms shall be suitably marked to ensure that they may be properly used to provide maximum safety; and

.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 In passenger ships and cargo ships watertight doors shall be tested by water pressure to a head of water they might sustain in a final or intermediate stage of flooding. Where testing of individual doors is not carried out because of possible damage to insulation or outfitting items, testing of individual doors may be replaced by a prototype pressure test of each type and size of door with a test pressure corresponding at least to the head required for the intended location. The prototype test shall be carried out before the door is fitted. The installation method and procedure for fitting the door on board shall correspond to that of the prototype test. When fitted on board, each door shall be checked for proper seating between the bulkhead, the frame and the door.

Regulation 16-1
Construction and initial tests of watertight decks, trunks, etc.

1 Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Administration. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck in passenger ships and up to the freeboard deck in cargo ships.

2 Where a ventilation trunk passing through a structure penetrates 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 allowable during intermediate stages of flooding, in accordance with regulation 7-2.

3 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.

4 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 17
Internal watertight integrity of passenger ships above the bulkhead deck

1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the bulkhead deck. Such measures may include partial bulkheads or webs. When partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of watertight bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is in a heeled damaged condition. Where the partial watertight bulkhead does not line up with the bulkhead below, the bulkhead deck

between shall be made effectively watertight. Where openings, pipes, scuppers, electric cables etc. are carried through the partial watertight bulkheads or decks within the immersed part of the bulkhead deck, arrangements shall be made to ensure the watertight integrity of the structure above the bulkhead deck.*

2 All openings in the exposed weather deck shall have coamings of ample height and strength and shall be provided with efficient means for expeditiously closing them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

3 The open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to an angle of 15°, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the International Convention on Load Lines in force.

4 Sidescuttles, gangway, cargo and fuelling ports and other means for closing openings in the shell plating above the bulkhead deck shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and their positions relative to the deepest subdivision draught.**

5 Efficient inside deadlights, so arranged that they can be easily and effectively closed and secured watertight, shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

Regulation 17-1
Integrity of the hull and superstructure, damage prevention and control on ro-ro passenger ships

1.1 Subject to the provisions of paragraphs 1.2 and 1.3, all accesses that lead to spaces below the bulkhead deck shall have a lowest point which is not less than 2.5 m above the bulkhead deck.

1.2 Where vehicle ramps are installed to give access to spaces below the bulkhead deck, their openings shall be able to be closed weathertight to prevent ingress of water below, alarmed and indicated to the navigation bridge.

1.3 The Administration may permit the fitting of particular accesses to spaces below the bulkhead deck provided they are necessary for the essential working of the ship, e.g. the movement of machinery and stores, subject to such accesses being made watertight, alarmed and indicated on the navigation bridge.

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* Refer to the Guidance notes on the integrity of flooding boundaries above the bulkhead deck of passenger ships for proper application of regulations II-1/8 and 20, paragraph 1, of SOLAS 1974, as amended (MSC/Circ.541, as may be amended).

** Refer to the Recommendation on strength and security and locking arrangements of shell doors on ro-ro passenger ships, adopted by the Organization by resolution A.793(19).

2 Indicators shall be provided on the navigation bridge for 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. The indicator system shall be designed on the fail-safe principle and shall show by visual alarms if the door is not fully closed or if any of the securing arrangements are not in place and fully locked and by audible alarms if such door or closing appliances become open or the securing arrangements become unsecured. The indicator panel on the navigation bridge shall be equipped with a mode selection function "harbour/sea voyage" so arranged that an audible alarm is given on the navigation bridge if the ship leaves harbour with the bow doors, inner doors, stern ramp or any other side shell doors not closed or any closing device not in the correct position. The power supply for the indicator system shall be independent of the power supply for operating and securing the doors.

3 Television surveillance and a water leakage detection system shall be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through inner and outer bow doors, stern doors or any other shell doors which could lead to flooding of special category spaces or ro-ro spaces.

PART B-3
SUBDIVISION LOAD LINE ASSIGNMENT FOR PASSENGER SHIPS

Regulation 18
Assigning, marking and recording of subdivision load lines for passenger ships

1 In order that the required degree of subdivision shall be maintained, a load line corresponding to the approved subdivision draught shall be assigned and marked on the ship's sides. A ship intended for alternating modes of operation may, if the owners desire, have one or more additional load lines assigned and marked to correspond with the subdivision draughts which the Administration may approve for the alternative service configurations. Each service configuration so approved shall comply with part B-1 of this chapter independently of the results obtained for other modes of operation.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation P1 for the principal passenger service configuration, and P2, P3, etc., for the alternative configurations. The principal passenger configuration shall be taken as the mode of operation in which the required subdivision index *R* will have the highest value.

3 The freeboard corresponding to each of these load lines shall be measured at the same position and from the same deck line as the freeboards determined in accordance with the International Convention on Load Lines in force.

4 The freeboard corresponding to each approved subdivision load line and the service configuration, for which it is approved, shall be clearly indicated on the Passenger Ship Safety Certificate.

5 In no case shall any subdivision load line mark be placed above the deepest load line in salt water as determined by the strength of the ship or the International Convention on Load Lines in force.

6 Whatever may be the position of the subdivision load line marks, a ship shall in no case be loaded so as to submerge the load line mark appropriate to the season and locality as determined in accordance with the International Convention on Load Lines in force.

7 A ship shall in no case be so loaded that when it is in salt water the subdivision load line mark appropriate to the particular voyage and service configuration is submerged.

PART B-4
STABILITY MANAGEMENT

Regulation 19
Damage control information

1 There shall be permanently exhibited, or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, plans showing clearly for each deck and hold the boundaries of the watertight compartments, the openings therein with the means of closure and position of any controls thereof, and the arrangements for the correction of any list due to flooding. In addition, booklets containing the aforementioned information shall be made available to the officers of the ship.*

2 Watertight doors in passenger ships permitted to remain open during navigation shall be clearly indicated in the ship's stability information.

3 General precautions to be included shall consist of a listing of equipment, conditions, and operational procedures, considered by the Administration to be necessary to maintain watertight integrity under normal ship operations.

4 Specific precautions to be included shall consist of a listing of elements (i.e. closures, security of cargo, sounding of alarms, etc.) considered by the Administration to be vital to the survival of the ship, passengers and crew.

5 In case of ships to which damage stability requirements of part B-1 apply, damage stability information shall provide the master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments.**

Regulation 20
Loading of passenger 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 in compliance with stability criteria in relevant regulations. The determination of the ship's stability shall always be made by calculation. The Administration may accept the use of an electronic loading and stability computer or equivalent means for this purpose.

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* Refer to the Guidelines for damage control plans (MSC/Circ.919).

** Refer to the guidelines to be developed by the Organization.

2 Water ballast should not in general be carried in tanks intended for oil fuel. In ships in which it is not practicable to avoid putting water in oil fuel tanks, oily-water separating equipment to the satisfaction of the Administration shall be fitted, or other alternative means, such as discharge to shore facilities, acceptable to the Administration shall be provided for disposing of the oily-water ballast.

3 The provisions of this regulation are without prejudice to the provisions of the International Convention for the Prevention of Pollution from Ships in force.

Regulation 21
Periodical operation and inspection of watertight doors, etc. in passenger ships

1 Drills for the operating 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 drill shall be held before leaving port, and others thereafter at least once a week during the voyage.

2 All watertight doors, both hinged and power operated, in watertight bulkheads, in use at sea, shall be operated daily.

3 The watertight doors and all mechanisms and indicators connected therewith, all valves, the closing of which is necessary to make a compartment watertight, and all valves the operation of which is necessary for damage control cross connections shall be periodically inspected at sea at least once a week.

4 A record of all drills and inspections required by this regulation shall be entered in the log-book with an explicit record of any defects which may be disclosed.

Regulation 22
Prevention and control of water ingress, etc.

1 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 3 and 4. Watertight doors of a width of more than 1.2 m in machinery spaces as permitted by regulation 13.10 may only be opened in the circumstances detailed in that regulation. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

2 Watertight doors located below the bulkhead deck having a maximum clear opening width of more than 1.2 m shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration.

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.

4 Certain watertight doors may be permitted to remain open during navigation only if considered absolutely necessary; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only after careful consideration of the impact on ship operations and

survivability. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always be ready to be immediately closed.

5 Portable plates on bulkheads shall always be in place before the ship leaves port, 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 ship leaves port and shall remain closed during navigation except in case of urgent necessity at the discretion of the master.

6 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 of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

7 Gangway, cargo and fuelling ports fitted below the bulkhead deck shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

8 The following doors, located above the bulkhead deck, shall be closed and locked before the ship proceeds on any voyage 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 8.1;

.3 cargo loading doors in the collision bulkhead; and

.4 ramps forming an alternative closure to those defined in paragraphs 8.1 to 8.3 inclusive.

9 Provided that where a door cannot be opened or closed while the ship is at the berth such a door may be opened or left open while the ship approaches or draws away from the berth, but only so far as may be necessary to enable the door to be immediately operated. In any case, the inner bow door must be kept closed.

10 Notwithstanding the requirements of paragraphs 8.1 and 8.4, 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.

11 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 8 is implemented.

12 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book is made of the time of the last closing of the doors specified in paragraph 13 and the time of any opening of particular doors in accordance with paragraph 14.

13 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 ship leaves port. The time of closing and the time of opening (if permissible under these regulations) shall be recorded in such log-book as may be prescribed by the Administration.

14 Where in a between-decks, 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 and having its lowest point 1.4 m plus 2.5% of the breadth of the ship above the water when the ship departs from any port, all the sidescuttles in that between-decks shall be closed watertight and locked before the ship leaves port, 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 of opening such sidescuttles in port and of closing and locking them before the ship leaves port shall be entered in such log-book as may be prescribed by the Administration.

.2 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 15 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, and having its lowest point 1.4 m plus 25% of the breadth of the ship above the waterline corresponding to the limiting mean draught, and at which it will therefore be permissible to depart from port without previously closing and locking them and to open them at sea on the responsibility of the master during the voyage to the next port. In tropical zones as defined in the International Convention on Load Lines in force, this limiting draught may be increased by 0.3 m.

15 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

16 If cargo is carried in such spaces, the sidescuttles and their deadlights shall be closed watertight and locked before the cargo is shipped and such closing and locking shall be recorded in such log-book as may be prescribed by the Administration.

17 When a rubbish-chute, etc. is not in use, both the cover and the valve required by regulation 15.10.2 shall be kept closed and secured.

Regulation 23
Special requirements for ro-ro passenger ships

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 whilst the ship is underway.

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 ship leaves the berth on any voyage 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 ship leaves the berth on any voyage, that an entry in the log-book, as required by regulation 22.13, 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 ship leaves the berth 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 when the ship is under way.

Regulation 24
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 while at sea.

2 Notwithstanding the requirements of paragraph 3, the Administration may authorize that particular doors may be opened at the discretion of the master, if necessary for the operation of the ship and provided that the safety of the ship is not impaired.

3 Watertight doors or ramps fitted internally subdivide large cargo spaces shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors in port and of closing them before the ship leaves port shall be entered in the log-book.

4 The use of access doors and hatch covers intended to ensure the watertight integrity of internal openings shall be authorized by the officer of the watch.

Regulation 25
Water level detectors on single hold cargo ships other than bulk carriers

1 Single hold cargo ships other than bulk carriers constructed before 1 January 2007 shall comply with the requirements of this regulation not later than 31 December 2009.

2 Ships having a length (*L*) of less than 80 m, or 100 m if constructed before 1 July 1998, and a single cargo hold below the freeboard deck or cargo holds below the freeboard deck which are not separated by at least one bulkhead made watertight up to that deck, shall be fitted in such space or spaces with water level detectors*.

3 The water level detectors required by paragraph 2 shall:

.1 give an audible and visual alarm at the navigation bridge when the water level above the inner bottom in the cargo hold reaches a height of not less than 0.3 m, and another when such level reaches not more than 15% of the mean depth of the cargo hold; and

.2 be fitted at the aft end of the hold, or above its lowest part where the inner bottom is not parallel to the designed waterline. Where webs or partial watertight bulkheads are fitted above the inner bottom, Administrations may require the fitting of additional detectors.

4 The water level detectors required by paragraph 2 need not be fitted in ships complying with regulation XII/12, or in ships having watertight side compartments each side of the cargo hold length extending vertically at least from inner bottom to freeboard deck."

PART C
MACHINERY INSTALLATIONS

2 The following new regulation 35-1 is inserted after existing regulation 35:

"Regulation 35-1
Bilge pumping arrangements

1 This regulation applies to ships constructed on or after 1 January 2009.

2 Passenger ships and cargo ships

2.1 An efficient bilge pumping system shall be provided, capable of pumping from and draining any watertight compartment other than a space permanently appropriated for the carriage of fresh water, water ballast, oil fuel or liquid cargo and for which other efficient means of pumping are provided, under all practical conditions. Efficient means shall be provided for draining water from insulated holds.

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* Refer to the Performance standards for water level detectors on bulk carriers and single hold cargo ships other than bulk carriers, adopted by the Maritime Safety Committee by resolution MSC.188(79).

2.2 Sanitary, ballast and general service pumps may be accepted as independent power bilge pumps if fitted with the necessary connections to the bilge pumping system.

2.3 All bilge pipes used in or under coal bunkers or fuel storage tanks or in boiler or machinery spaces, including spaces in which oil-settling tanks or oil fuel pumping units are situated, shall be of steel or other suitable material.

2.4 The arrangement of the bilge and ballast pumping system shall be such as to prevent the possibility of water passing from the sea and from water ballast spaces into the cargo and machinery spaces, or from one compartment to another. Provision shall be made to prevent any deep tank having bilge and ballast connections being inadvertently flooded from the sea when containing cargo, or being discharged through a bilge pump when containing water ballast.

2.5 All distribution boxes and manually operated valves in connection with the bilge pumping arrangements shall be in positions which are accessible under ordinary circumstances.

2.6 Provision shall be made for the drainage of enclosed cargo spaces situated on the bulkhead deck of a passenger ship and on the freeboard deck of a cargo ship, provided that the Administration may permit the means of drainage to be dispensed with in any particular compartment of any ship or class of ship if it is satisfied that by reason of size or internal subdivision of those spaces the safety of the ship is not thereby impaired.

2.6.1 Where the freeboard to the bulkhead deck or the freeboard deck, respectively, is such that the deck edge is immersed when the ship heels more than 5°, the drainage shall be by means of a sufficient number of scuppers of suitable size discharging directly overboard, fitted in accordance with the requirements of regulation 15 in the case of a passenger ship and the requirements for scuppers, inlets and discharges of the International Convention on Load Lines in force in the case of a cargo ship.

2.6.2 Where the freeboard is such that the edge of the bulkhead deck or the edge of the freeboard deck, respectively, is immersed when the ship heels 5° or less, the drainage of the enclosed cargo spaces on the bulkhead deck or on the freeboard deck, respectively, shall be led to a suitable space, or spaces, of adequate capacity, having a high water level alarm and provided with suitable arrangements for discharge overboard. In addition it shall be ensured that:

.1 the number, size and disposition of the scuppers are such as to prevent unreasonable accumulation of free water;

.2 the pumping arrangements required by this regulation for passenger ships or cargo ships, as applicable, take account of the requirements for any fixed pressure water-spraying fire extinguishing system;

.3 water contaminated with petrol or other dangerous substances is not drained to machinery spaces or other spaces where sources of ignition may be present; and

.4 where the enclosed cargo space is protected by a carbon dioxide fire extinguishing system the deck scuppers are fitted with means to prevent the escape of the smothering gas.

3 Passenger ships

3.1 The bilge pumping system required by paragraph 2.1 shall be capable of operation under all practicable conditions after a casualty whether the ship is upright or listed. For this purpose wing suctions shall generally be fitted except in narrow compartments at the end of the ship where one suction may be sufficient. In compartments of unusual form, additional suctions may be required. Arrangements shall be made whereby water in the compartment may find its way to the suction pipes. Where, for particular compartments, the Administration is satisfied that the provision of drainage may be undesirable, it may allow such provision to be dispensed with if calculations made in accordance with the conditions laid down in regulations 7 and 8 show that the survival capability of the ship will not be impaired.

3.2 At least three power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the bilge pump numeral is 30 or more, one additional independent power pump shall be provided.

The bilge pump numeral shall be calculated as follows:

when P_1 is greater than P: bilge pump numeral $72 \cdot \left\lceil \frac{M + 2P_1}{V + P - P_1} \right\rceil$

in other cases: bilge pump numeral $72 \cdot \left\lceil \frac{M + 2P}{V} \right\rceil$

where:

L the length of the ship (metres), as defined in regulation 2;

M the volume of the machinery space (cubic metres), as defined in regulation 2, that is below the bulkhead deck; with the addition thereto of the volume of any permanent oil fuel bunkers which may be situated above the inner bottom and forward of, or abaft, the machinery space;

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, provision and mail rooms;

V the whole volume of the ship below the bulkhead deck (cubic metres);

P_1 KN,

where:

N the number of passengers for which the ship is to be certified; and

K $0.056L$

However, where the value of *KN* is greater than the sum of *P* and the whole volume of the actual passenger spaces above the bulkhead deck, the figure to be taken as P_1 is that sum or two-thirds *KN*, whichever is the greater.

3.3 Where practicable, the power bilge pumps shall be placed in separate watertight compartments and so arranged or situated that these compartments will not be flooded by the same damage. If the main propulsion machinery, auxiliary machinery and boilers are in two or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

3.4 On a ship of 91.5 m in length 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, as follows:

.1 one of the required bilge pumps shall be an emergency pump of a reliable submersible type having a source of power situated above the bulkhead deck; or

.2 the bilge pumps and their sources of power shall be so distributed throughout the length of the ship that at least one pump in an undamaged compartment will be available.

3.5 With the exception of additional pumps which may be provided for peak compartments only, each required bilge pump shall be so arranged as to draw water from any space required to be drained by paragraph 2.1.

3.6 Each power bilge pump shall be capable of pumping water through the required main bilge pipe at a speed of not less than 2 m/s. Independent power bilge pumps situated in machinery spaces shall have direct suctions from these spaces, except that not more than two such suctions shall be required in any one space. Where two or more such suctions are provided, there shall be at least one on each side of the ship. The Administration may require independent power bilge pumps situated in other spaces to have separate direct suctions. Direct suctions shall be suitably arranged and those in a machinery space shall be of a diameter not less than that required for the bilge main.

3.7.1 In addition to the direct bilge suction or suctions required by paragraph 3.6, a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a non-return valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

3.7.2 Where in the opinion of the Administration the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Administration.

3.7.3 The spindles of the sea inlet and direct suction valves shall extend well above the engine-room platform.

3.8 All bilge suction piping up to the connection to the pumps shall be independent of other piping.

3.9 The diameter *d* of the bilge main shall be calculated according to the following formula. However, the actual internal diameter of the bilge main may be rounded off to the nearest standard size acceptable to the Administration:

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

where:

d is the internal diameter of the bilge main (millimetres);

L and *B* are the length and the breadth of the ship (metres) as defined in regulation 2; and

D is the moulded depth of the ship to the bulkhead deck (metres) provided that, in a ship having an enclosed cargo space on the bulkhead deck which is internally drained in accordance with the requirements of paragraph 2.6.2 and which extends for the full length of the ship, *D* shall be measured to the next deck above the bulkhead deck. Where the enclosed cargo spaces cover a lesser length, *D* shall be taken as the moulded depth to the bulkhead deck plus lh/L where *l* and *h* are the aggregate length and height respectively of the enclosed cargo spaces (metres).
The diameter of the bilge branch pipes shall meet the requirements of the Administration.

3.10 Provision shall be made to prevent the compartment served by any bilge suction pipe being flooded in the event of the pipe being severed or otherwise damaged by collision or grounding in any other compartment. For this purpose, where the pipe is at any part situated nearer the side of the ship than one fifth of the breadth of the ship (as defined in regulation 2 and measured at right angles to the centreline at the level of the deepest subdivision load line), or is in a duct keel, a non-return valve shall be fitted to the pipe in the compartment containing the open end.

3.11 Distribution boxes, cocks and valves in connection with the bilge pumping system shall be so arranged that, in the event of flooding, one of the bilge pumps may be operative on any compartment; in addition, damage to a pump or its pipe connecting to the bilge main outboard of a line drawn at one fifth of the breadth of the ship shall not put the bilge system out of action. If there is only one system of pipes common to all the pumps, the necessary valves for controlling the bilge suctions must be capable of being operated from above the bulkhead deck. Where in addition to the main bilge pumping system an emergency bilge pumping system is provided, it shall be independent of the main system and so arranged that a pump is capable of operating on any compartment under flooding condition as specified in paragraph 3.1; in that case only the valves necessary for the operation of the emergency system need be capable of being operated from above the bulkhead deck.

3.12 All cocks and valves referred to in paragraph 3.11 which can be operated from above the bulkhead deck shall have their controls at their place of operation clearly marked and shall be provided with means to indicate whether they are open or closed.

4 Cargo ships

At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments."

CHAPTER II-2
CONSTRUCTION – FIRE PROTECTION, FIRE DETECTION AND FIRE EXTINCTION

Regulation 4 – Probability of ignition

3 In paragraph 5.2.4, the reference to "regulation II-1/25-9.2" is replaced by the reference to "regulation II-1/13-1.2".

Regulation 10 – Fire fighting

4 In paragraph 2.2.4.1.2, the reference to "regulation II-1/21" is replaced by the reference to "regulation II-1/35-1".

Regulation 20 – Protection of vehicle, special category and ro-ro spaces

5 In paragraph 6.1.4.1.3, the reference to "regulation II-1/21" is replaced by the reference to "regulation II-1/35-1", and in paragraph 6.1.4.2, the reference to "regulation II-1/22" is replaced by the reference to "regulation II-1/5-1".

CHAPTER VI
CARRIAGE OF CARGOES

Regulation 7 – Loading, unloading and stowage of bulk cargoes

6 In subparagraph 2.1, the reference to "regulation II-1/22" is replaced by the reference to "regulation II-1/5-1".

CHAPTER IX
MANAGEMENT FOR THE SAFE OPERATION OF SHIPS

Regulation 1 – Definitions

7 In paragraph 3, the reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

CHAPTER XI-1
SPECIAL MEASURES TO ENHANCE MARITIME SAFETY

Regulation 2 – Enhanced surveys

8 The reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

9 The following new regulation 3-1 is added after the existing regulation 3:

"**Regulation 3-1**
Company and registered owner identification number

1 This regulation applies to Companies and registered owners of ships to which chapter I applies.

2 For the purpose of this regulation, registered owner shall be as specified by the Administration and Company as defined in regulation IX/l.

3 Every Company and registered owner shall be provided with an identification number which conforms to the IMO Unique Company and Registered Owner Identification Number Scheme adopted by the Organization*.

4 The Company identification number shall be inserted on the certificates and certified copies thereof issued under regulation IX/4 and section A/19.2 or A/19.4 of the ISPS Code.

5 This regulation shall take effect when the certificates referred to in paragraph 4 are issued or renewed on or after 1 January 2009."

Regulation 5 – Continuous Synopsis Record

10 In paragraph 3, in the first sentence, after the word "information", the following words are inserted:

"(The Continuous Synopsis Record shall contain the information in paragraphs 3.7 and 3.10 when it is issued or updated on or after 1 January 2009)";

and the following new subparagraphs .7 and .10 are inserted as follows:

".7 the registered owner identification number;" and

".10 the Company identification number;".

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* Refer to resolution MSC.160(78) entitled "Adoption of the IMO Unique Company and Registered Owner Identification Number Scheme".

11 In paragraph 3, existing subparagraphs .7 and .8 are renumbered as subparagraphs .8 and .9, and existing subparagraphs .9 to .13 are renumbered as subparagraphs .11 to .15.

CHAPTER XI-2
SPECIAL MEASURES TO ENHANCE MARITIME SECURITY

Regulation 1 – Definitions

12 In paragraph 1.6, the reference to "regulation II-1/2.12" is replaced by the reference to "regulation II-1/2.22".

APPENDIX
CERTIFICATES

Form of Safety Certificate for Passenger Ships

13 In the table of paragraph 2.1.3, in the section commencing with the words "THIS IS TO CERTIFY:", the reference to "regulation II-1/13" is replaced by the reference to "regulation II-1/18".

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ANNEX 3

RESOLUTION MSC.87(71)
(adopted on 27 May 1999)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974, hereinafter referred to as "the Convention", concerning the procedures for amending the Annex to the Convention, other than the provisions of chapter I thereof,

RECOGNIZING the need for the mandatory application of an agreed international standard for the carriage of INF cargo by sea,

HAVING CONSIDERED, at its seventy-first session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention the text of which is set out in the Annex to the present resolution;

2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on 1 July 2000, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;

3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2001 upon their acceptance in accordance with paragraph 2 above;

4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;

5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

CHAPTER VII
CARRIAGE OF DANGEROUS GOODS

PART A

1 The following sentence is added at the end of existing paragraph 3 of regulation 1:

"In addition, the requirements of part D shall apply to the carriage of INF cargo as defined in regulation 14.2".

2 The following new part D is added after existing part C:

"PART D

SPECIAL REQUIREMENTS FOR THE CARRIAGE OF PACKAGED IRRADIATED NUCLEAR FUEL, PLUTONIUM AND HIGH-LEVEL RADIOACTIVE WASTES ON BOARD SHIPS

Regulation 14

Definitions

For the purpose of this part, unless expressly provided otherwise:

1 *INF Code* means the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships, adopted by the Maritime Safety Committee of the Organization by resolution MSC.88(71), 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.

2 *INF cargo* means packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes carried as cargo in accordance with Class 7 of the IMDG Code, schedule 10, 11, 12 or 13.

3 *Irradiated nuclear fuel* means material containing uranium, thorium and/or plutonium isotopes which has been used to maintain a self-sustaining nuclear chain reaction.

4 *Plutonium* means the resultant mixture of isotopes of that material extracted from irradiated nuclear fuel from reprocessing.

5 *High-level radioactive wastes* means liquid wastes resulting from the operation of the first stage extraction system or the concentrated wastes from subsequent extraction stages, in a facility for reprocessing irradiated nuclear fuel, or solids into which such liquid wastes have been converted.

6 *IMDG Code* means the International Maritime Dangerous Goods Code adopted by the Assembly of the Organization by resolution A.716(17), as amended and may be amended by the Maritime Safety Committee.

Regulation 15

Application to ships carrying INF cargo

1 Except as provided for in paragraph 2, this part shall apply to all ships regardless of the date of construction and size, including cargo ships of less than 500 gross tonnage, engaged in the carriage of INF cargo.

2 This part and the INF Code do not apply to warships, naval auxiliary or other vessels owned or operated by a Contracting Government and used, for the time being, only on government non-commercial service; however, each Administration shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships carrying INF cargo act in a manner consistent, so far as reasonable and practicable, with this part and the INF Code.

3 Nothing in this part or the INF Code shall prejudice the rights and duties of governments under international law and any action taken to enforce compliance shall be consistent with international law.

Regulation 16

Requirements for ships carrying INF cargo

1 A ship carrying INF cargo shall comply with the requirements of the INF Code in addition to any other applicable requirements of the present regulations and shall be surveyed and certified as provided for in that Code.

2 A ship holding a certificate issued pursuant to the provisions of paragraph 1 shall be subject to the control established in regulations I/19 and XI/4. For this purpose, such certificate shall be treated as a certificate issued under regulation I/12 or I/13."

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