IMO

International Convention for the Safety of Life at Sea

SOLAS

Version 1.0 November 2000

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* See also resolution A.851(20), General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants.

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Chapter VIII Nuclear ships

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APPENDIX

Certificates *

Form of Passenger Ship Safety Certificate
Form of Cargo Ship Safety Construction Certificate
Form of Cargo Ship Safety Equipment Certificate
Form of Cargo Ship Safety Radio Certificate
Form of Cargo Ship Safety Certificate
Form of Exemption Certificate
Form of Nuclear Passenger Ship Safety Certificate
Form of Nuclear Cargo Ship Safety Certificate

* The regulations relating to life-saving appliances and arrangements referred to in the forms of certificates and related records of equipment are those of SOLAS chapter III as amended by resolution MSC.47(66).

Brief explanation of the program for searching and displaying SOLAS information

Below are set out some of the features for finding information using Acrobat Reader 4.0 or higher. If you are working in a Windows 3.x environment you will use Acrobat Reader 3.0 which presents a different screen. For useful commands there see under **Searching and displaying with Acrobat Reader 3.0.**

The program used to store the SOLAS texts is Adobe Acrobat 4.0. You will find comprehensive information about Acrobat Reader by clicking on Help at the top right of your screen. All the pages of SOLAS plus the menus for finding these are stored in one PDF file (Acrobat portable document file) on this CDROM,

This online manual consists of the following items:

1. **Contents "How to Search SOLAS"**
2. **Buttons in Acrobat Reader 4.0**
3. **Searching and displaying with Acrobat Reader 3.0**
4. **Searching and displaying with Acrobat Reader 3.0 (continued)**
5. **Example of Split Screen with Thumbnails**
6. **Example of Split Screen with Bookmarks**

How to Search SOLAS (page 2 of 4)

The buttons on the third row at the top of the screen (in Acrobat Reader 4.0) have the following functions (from left to right):

Visit Adobe on the World Wide Web - a link to Adobes Web site

A link to the Web to create PDF files

Open - open a PDF file

Print

Show/Hide Navigation Pane - this will allow you to split the screen for viewing thumbnails or bookmarks
See examples: **Thumbnails** **Bookmarks**

Hand Tool - turns your pointer into a hand to move the page on your screen (default)

Zoom In Tool - turns your pointer into a magnifying glass to zoom in on part of the screen

Text Select Tool - allows you to mark part of the text for copying and pasting

First Page - takes you to the first page of the file you are viewing

Previous Page

Next Page

Last Page

Go to Previous View - if you have used a link you can go back to where you came from

Go to Next View - after moving back you can use this to move forward again

Actual Size - displays the page at its actual size

Fit in Window - shows the whole page

Fit Width - shows the page at its full width

Rotate View 90° CCW - to turn the page to the left

Rotate View 90° CW - to turn the page to the right

Find (Not Recommended) - does a linear search

Search - uses the available index to search

Search Results - lists the result of a search

Previous Highlight - displays the previous found page

Next Highlight - displays the next found page

Page 3 - Searching and displaying SOLAS information with Acrobat Reader 3.0
Page 1 - Contents "How to Search SOLAS"

Searching and displaying SOLAS information with Acrobat Reader 3.0

Below you will find a summary of the most important commands/actions for searching, displaying and printing the information.

1. Screens:
1.1 Full Screen (default) - this shows one page of information or a menu. The button to activate this is the first on the left hand side of the button bar.
1.2 Split screen 1 (left: Contents, right: a page from SOLAS) - the list of contents consists of links to relevant pages in the PDF file (to activate a link position your cursor on it and click). The button to activate this is the second from the left. At the bottom of your screen you will see the page number of the page you are looking at e.g. 123 of 351
1.3 Split screen 2 (left: thumbnails, right: a page from SOLAS) - this is useful for browsing through a number of pages

2. View buttons:
2.1 'Hand' (default) - this turns your cursor into a hand, except when your cursor is positioned over a part of a page containing a link (see below under links). If you hold down your left mouse button you can move the page you are viewing over your screen. Note that the slide bar at the right hand side of your screen regards the whole PDF file and therefore cannot be used to move a page on your screen.
2.2 'Magnifying Glass' - this turns your cursor into a magnifying glass. If you want to zoom in on a piece of text or illustration drag the cursor over part of your screen whilst holding down the left mouse button. On release of the mouse button the marked part will fill the whole screen. At the bottom of the screen you will see the zoom factor. To go back to the previous situation either click on this (at the bottom of the screen) and reset to "page width' or click on the double back' button at the top of your screen.
2.3 'ABC' - allows you to drag your mouse over a piece of text to copy it to your clipboard.

Page 4 - Searching and displaying with Acrobat Reader 3.0 (continued)
Page 1 - Contents "How to Search SOLAS"

Searching and displaying SOLAS information with Acrobat Reader 3.0 (continued)

3. Browsing buttons (from left to right):
3.1 Back to first page - this takes you back to the Introduction Screen
3.2 Single Arrow Left - back one page in the PDF file
3.3 Single Arrow Right - forward one page in the PDF file
3.4 To last page - this takes you to the last page of the PDF file
3.5 Double Arrow Left - one action back depending on what you have done
3.6 Double Arrow Right - one action forward depending on what you have done

4. Page view buttons (from left to right):
4.1 Shows a page at 100% zoom
4.2 Shows the whole page
4.3 Sets the zoom factor to display the full width of the text (default)
Note on the zoom factor: because the pages in this edition of SOLAS has several different page sizes, which means that each page needs its own zoom factor for legibility, and because parts of pages can be zoomed in on via the 'hand with arrow' cursor, some pages in SOLAS automatically open at 'page width' zoom factor, others have a zoom factor so that the user can immediatly see the contents.

5. Search buttons (from left to right):
5.1 Binoculars (Not Advised!) - activates a linear search
5.2 Binoculars and page - allows you to search the index. A successful search will take you to the first page containing your search term.
5.3 Circle and page - gives a list of pages resulting from your search
5.4 Page with arrow left - display of previous page from the list of found pages
5.5 Page with arrow right - display of next page from the list of found pages
5.6 'W' in circle (Not Relevant for this application) - WWW link

Page 3 - Searching and displaying with Acrobat Reader 3.0 (First Page)
Page 1 - Contents "How to Search SOLAS"

List of Certificates from SOLAS

These certificates are also available on this CDROM as separate documents as ASCII Text (extension .TXT) and as MS Word for Windows (extension .DOC)*:

Form of Safety Certificate for Cargo Ships	CargoSaf.*
Record of Equipment for the Cargo Ship Safety Certificate (Form C)	CargSafC.*
Form of Safety Equipment Certificate for Cargo Ships	CarSafeq.*
Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)	CargSafE.*
Form of Safety Radio Certificate for Cargo Ships	CarSafRa.*
Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R)	CarRaEq.*
Form of Safety Construction Certificate for Cargo Ships	CargCnstr.*
Form of Nuclear Cargo Ship Safety Certificate	NuCaSaf.*
Form of Nuclear Passenger Ship Safety Certificate	NuPaSaf.*
Form of Safety Certificate for Passenger Ships	PassSaf.*
Record of Equipment for the Passenger Ship Safety Certificate (Form P)	PassSafP.*
Form of Exemption Certificate	Exempt.*
All SOLAS Certificates in one document	SOLAS.*

*** The location of the above files is <CDROM Drive>:\ENGLISH\FORMS**
e.g. CARGOSAF.TXT on a CDROM drive "E:" will be at: E:\ENGLISH\FORMS\CARGOSAF.TXT

See also: **Information about the Certificates from SOLAS**

Information about the Certificates from SOLAS*

So that users can readily make use of forms of certificates this CDROM contains these in 2 formats:
1) As text (ASCII) files - with the extension .TXT
2) As MS Word for Windows files - with the extension .DOC

The following forms (and records) are available:

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

2 Form of Cargo Ship Safety Construction Certificate

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

4 Form of Cargo Ship Safety Radio Certificate
- Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R)

5 Form of Exemption Certificate

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

7 Form of Nuclear Cargo Ship Safety Certificate

8 Form of Passenger Ship Safety Certificate

For exact file names and location see: List of Certificates from SOLAS

* The regulations relating to life-saving appliances and arrangements referred to in the forms of certificates and related records of equipment are those of SOLAS chapter III as amended by resolution MSC.47(66).

About the International Maritime Organization IMO

IMO is a technical organization established in 1958. Today, it has 159 Member States plus two Associate Members. Formal arrangements for co-operation and/or consultative status have been established with a large number of international organizations. The Organization's chief task, especially in the early years, was to develop a comprehensive body of international conventions, codes and recommendations which could be implemented by all Member Governments. This international approach is essential, or the effectiveness of IMO measures depends upon how widely they are accepted and how they are implemented. The fact that the most important IMO conventions are now accepted by countries whose combined merchant fleets represent 98% of the world total indicates how successful this policy has been.

The governing body of IMO is the Assembly, which meets every two years. In between Assembly sessions a Council, consisting of 32 Member States elected by the Assembly, acts as governing body. The technical work of IMO is carried out by a series of committees. The Maritime Safety Committee is the most senior of these and has sub-committees dealing with the following subjects: safety of navigation, radiocommunications, life-saving, search and rescue, standards of training and watchkeeping, carriage of dangerous goods, ship design and equipment, fire protection, stability and load lines, fishing vessel safety, containers and cargoes, bulk chemicals and flag State implementation. The Maritime Environment Protection Committee deals with pollution prevention. IMO also has a Legal Committee, originally established to deal with legal problems resulting from the Torrey Canyon pollution disaster of 1967 but later made a permanent body. The Technical Co-operation Committee handles IMO's growing technical co-operation programme, which is designed to help Member Governments implement the technical measures adopted by the Organization, and the Facilitation Committee deals with measures to simplify the documentation and formalities required in international shipping. The Secretariat consists of some 300 international civil servants headed by a Secretary-General. The IMO Headquarters is in London, just across the River Thames from the Houses of Parliament.

The objective of IMO's publishing activities is to provide the world maritime community with the numerous texts (conventions, codes, recommendations, guidelines, etc.) prepared by the Organization as part of its work programme. The world-wide dissemination of this information plays an important role in the promotion of maritime safety and the prevention of marine pollution. Today, IMO has over 200 titles available in English. The majority are translated into French and Spanish and an increasing number into Arabic, Chinese and Russian. Since October 1993 IMO has also launched several electronic publications, 'The Computerized IMDG Code' (available on CD and diskette), 'The IMO-Vega Database' (CD only), the IMO Resolutions database (CD only),the GMDSS Manual (CD only), Ships’ Routeing (CD only), the IAMSAR Manual (CD only), IMO Labels and Symbols (CD only) and MARPOL on CDROM (CD only). A catalogue of publications (on paper and on diskette) is available on request.

Address of the IMO Publications Section

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Colophon and Copyright Notice to 'SOLAS' Version 1.0

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Foreword

Introduction

1 The International Convention for the Safety of Life at Sea (SOLAS), 1974, currently in force, was adopted on 1 November 1974 by the International Conference on Safety of Life at Sea, which was convened by the International Maritime Organization (IMO), and entered into force on 25 May 1980. It has since been amended twice by means of protocols:

.1 by the Protocol adopted on 17 February 1978 by the International Conference on Tanker Safety and Pollution Prevention (1978 SOLAS Protocol), which entered into force on 1 May 1981; and

.2 by the Protocol adopted on 11 November 1988 by the International Conference on the Harmonized System of Survey and Certification (1988 SOLAS Protocol), which entered into force on 3 February 2000 and replaced and abrogated the 1978 Protocol, as between Parties to the 1988 Protocol.

2 In addition, the 1974 SOLAS Convention has been amended by means of resolutions adopted either by IMO's Maritime Safety Committee (MSC) in its expanded form specified in SOLAS article VIII or by Conferences of SOLAS Contracting Governments, also specified in article VIII, as follows:

.1 by the 1981 amendments, which were adopted by resolution MSC.1(XLV) and entered into force on 1 September 1984;

.2 by the 1983 amendments, which were adopted by resolution MSC.6(48) and entered into force on 1 July 1986;

.3 by the April 1988 amendments, which were adopted by resolution MSC.11(55) and entered into force on 22 October 1989;

.4 by the October 1988 amendments, which were adopted by resolution MSC.12(56) and entered into force on 29 April 1990;

.5 by the November 1988 amendments, which were adopted by resolution 1 of the Conference of Contracting Governments to SOLAS, 1974, on the Global Maritime Distress and Safety System and entered into force on 1 February 1992;

.6 by the 1989 amendments, which were adopted by resolution MSC.13(57) and entered into force on 1 February 1992;

.7 by the 1990 amendments, which were adopted by resolution MSC.19(58) and entered into force on 1 February 1992;

.8 by the 1991 amendments, which were adopted by resolution MSC.22(59) and entered into force on 1 January 1994;

.9 by the April 1992 amendments, which were adopted by resolutions MSC.24(60) and MSC.26(60) and entered into force on 1 October 1994;

.10 by the December 1992 amendments, which were adopted by resolution MSC.27(61) and entered into force on 1 October 1994;

.11 by the May 1994 amendments, which were adopted by resolution MSC.31(63) and entered into force on 1 January 1996 (annex 1) and on 1 July 1998 (annex 2);

.12 by the May 1994 amendments, which were adopted by resolution 1 of the Conference of Contracting Governments to SOLAS, 1974, which entered into force on 1 January 1996 (annex 1) and on 1 July 1998 (annex 2);

.13 by the December 1994 amendments, which were adopted by resolution MSC.42(64) and entered into force on 1 July 1996;

.14 by the May 1995 amendments, which were adopted by resolution MSC.46(65) and entered into force on 1 January 1997;

.15 by the November 1995 amendments, which were adopted by resolution 1 of the Conference of Contracting Governments to SOLAS, 1974, and entered into force on 1 July 1997;

.16 by the June 1996 amendments, which were adopted by resolution MSC.47(66) and entered into force on 1 July 1998;

.17 by the December 1996 amendments, which were adopted by resolution MSC.57(67) and entered into force on 1 July 1998;

.18 by the June 1997 amendments, which were adopted by resolution MSC.65(68) and entered into force on 1 July 1999;

.19 by the November 1997 amendments which were adopted by resolution 1 of the Conference of Contracting Governments to SOLAS 1974 and entered into force on 1 July 1999;

.20 by the May 1998 amendments, which were adopted by resolution MSC.69(69) and are expected to enter into force on 1 July 2002;

.21 by the May 1999 amendments, which were adopted by resolution MSC.87(71) and are expected to enter into force on 1 January 2001; and

.22 by the May 2000 amendments, which were adopted by resolution MSC.91(72) and are expected to enter into force on 1 January 2002.

3 The 1988 SOLAS Protocol has been amended by the May 2000 amendments, which were adopted by resolution MSC.92(72) and are expected to enter into force on 1 January 2002.

Content of the consolidated text

4 This publication contains a consolidated text of the 1974 SOLAS Convention, the 1988 SOLAS Protocol, and all subsequent amendments thereto up to and including the May 1999 amendments except for the May 1998 amendments (see paragraph 2.20), which have not yet entered into force. The resulting text has been compiled by the IMO Secretariat and is intended to provide an easy reference to SOLAS requirements applicable as on 1 January 2001.

5 The publication has been arranged in two parts:

.1 part 1, which contains the 1974 SOLAS Convention and 1988 SOLAS Protocol articles, requirements and certificates; and

.2 part 2, which contains resolution A.883(21) on the Global and uniform implementation of the harmonized system of survey and certification (HSSC), a list of certificates and documents* to be carried on board ships and a list of resolutions adopted by the aforementioned SOLAS Conferences.

6 The operational requirements contained in this consolidated text are, in general, applicable to all ships, whilst the requirements for ship construction and equipment apply to ships constructed on or after the dates specified in the various regulations. To identify construction and equipment requirements applicable to ships constructed before 2001, previous texts of the 1974 SOLAS Convention, the 1988 SOLAS Protocol and the amendments to the Convention should be consulted. For instance, special requirements for existing passenger ships are contained only in part F of chapter II-2 of the original 1974 SOLAS Convention but neither in chapter II-2 of the 1981 amendments nor in this consolidated text.

7 Those provisions of chapter I and of the appendix to the annex to the 1974 SOLAS Convention which have been modified by the 1988 SOLAS Protocol are indicated by the symbol [P88]. No similar symbol is shown for provisions of the 1974 SOLAS Convention which were modified by the

* The list of certificates includes brief descriptions of the purpose of all certificates and documents specified therein for the purpose of assisting shore staff, officials and shipmasters in evaluating the documents and certificates, which are necessary for port State control and for the smooth operation of ships in ports.

1978 SOLAS Protocol because, whilst, in respect of chapter I of the Convention, the provisions thereof have been replaced and abrogated by the 1988 SOLAS Protocol, as between Parties to the Protocol, for provisions in other chapters of the Convention, they have been superseded by SOLAS amendments subsequently adopted.

8 In general, this publication reproduces the text of the 1974 SOLAS Convention and the 1988 SOLAS Protocol and includes the modifications and amendments thereto given in their authentic texts. In addition, it includes some minor editorial changes, which, while not altering the substance, aim at achieving a degree of consistency between the texts of the 1974 SOLAS Convention and the 1988 SOLAS Protocol and the various SOLAS amendments. In particular:

.1 while the decimal numbering system is used for paragraphs and subparagraphs of regulations in chapters II-1, II-2, III, IV, VI and VII, which were completely rewritten in the 1981, 1983, 1988 and 1991 amendments, the original numbering system is retained in chapters I, V and VIII;

.2 the references to regulations, paragraphs and chapters in the texts adopted in the 1981 and subsequent amendments use an abbreviated form (e.g. "regulation II-2/55.5"), whereas the original reference system is retained in unamended regulations (e.g. "regulation 5 of this chapter", "paragraph (a) of this regulation", etc.);

.3 the term *tons gross tonnage* has been replaced by the term *gross tonnage* in view of the Assembly's decision (resolution A.493(XII)) that the term *tons gross tonnage* used in IMO instruments should be considered as having the same meaning as *gross tonnage* as determined under the 1969 Tonnage Convention; and

.4 metric values of the SI system have been used in accordance with resolution A.351(IX).

Status of footnotes

9 The footnotes given in this consolidated text (which do not, as noted by the MSC, form part of the Convention but are inserted for ease of reference) refer to codes, guidelines and recommendations relating to a particular text and were updated by the Secretariat at the time of publication. In addition, certain explanatory footnotes have been inserted based on relevant texts of codes, guidelines, recommendations and other decisions of the MSC. In all cases, the reader must make use of the latest versions of the referenced texts, bearing in mind that such texts may have been revised or superseded by updated material since publication of this consolidated edition of the 1974 SOLAS Convention, as amended.

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Part 1

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

THE CONTRACTING GOVERNMENTS

BEING DESIROUS of promoting safety of life at sea by establishing in a common agreement uniform principles and rules directed thereto,

CONSIDERING that this end may best be achieved by the conclusion of a Convention to replace the International Convention for the Safety of Life at Sea, 1960, taking account of developments since that Convention was concluded,

HAVE AGREED as follows:

Article I
General obligations under the Convention

(a) The Contracting Governments undertake to give effect to the provisions of the present Convention and the annex thereto, which shall constitute an integral part of the present Convention. Every reference to the present Convention constitutes at the same time a reference to the annex.

(b) The Contracting Governments undertake to promulgate all laws, decrees, orders and regulations and to take all other steps which may be necessary to give the present Convention full and complete effect, so as to ensure that, from the point of view of safety of life, a ship is fit for the service for which it is intended.

Article II
Application

The present Convention shall apply to ships entitled to fly the flag of States the Governments of which are Contracting Governments.

Article III

Laws, regulations

The Contracting Governments undertake to communicate to and deposit with the Secretary-General of the Inter-Governmental Maritime Consultative Organization* (hereinafter referred to as "the Organization"):

(a) a list of non-governmental agencies which are authorized to act in their behalf in the administration of measures for safety of life at sea for circulation to the Contracting Governments for the information of their officers;

(b) the text of laws, decrees, orders and regulations which shall have been promulgated on the various matters within the scope of the present Convention;

(c) a sufficient number of specimens of their certificates issued under the provisions of the present Convention for circulation to the Contracting Governments for the information of their officers.

Article IV

Cases of force majeure

(a) A ship, which is not subject to the provisions of the present Convention at the time of its departure on any voyage, shall not become subject to the provisions of the present Convention on account of any deviation from its intended voyage due to stress of weather or any other case of *force majeure*.

(b) Persons who are on board a ship by reason of *force majeure* or in consequence of the obligation laid upon the master to carry shipwrecked or other persons shall not be taken into account for the purpose of ascertaining the application to a ship of any provisions of the present Convention.

Article V

Carriage of persons in emergencies

(a) For the purpose of evacuating persons in order to avoid a threat to the security of their lives a Contracting Government may permit the carriage of a larger number of persons in its ships than is otherwise permissible under the present Convention.

* The name of the Organization was changed to "International Maritime Organization" (IMO) by virtue of amendments to the Organization's Convention which entered into force on 22 May 1982.

(b) Such permission shall not deprive other Contracting Governments of any right of control under the present Convention over such ships which come within their ports.

(c) Notice of any such permission, together with a statement of the circumstances, shall be sent to the Secretary-General of the Organization by the Contracting Government granting such permission.

Article VI

Prior treaties and conventions

(a) As between the Contracting Governments, the present Convention replaces and abrogates the International Convention for the Safety of Life at Sea which was signed in London on 17 June 1960.

(b) All other treaties, conventions and arrangements relating to safety of life at sea, or matters appertaining thereto, at present in force between Governments parties to the present Convention shall continue to have full and complete effect during the terms thereof as regards:

(i) ships to which the present Convention does not apply;

(ii) ships to which the present Convention applies, in respect of matters for which it has not expressly provided.

(c) To the extent, however, that such treaties, conventions or arrangements conflict with the provisions of the present Convention, the provisions of the present Convention shall prevail.

(d) All matters which are not expressly provided for in the present Convention remain subject to the legislation of the Contracting Governments.

Article VII

Special rules drawn up by agreement

When in accordance with the present Convention special rules are drawn up by agreement between all or some of the Contracting Governments, such rules shall be communicated to the Secretary-General of the Organization for circulation to all Contracting Governments.

Article VIII

Amendments

(a) The present Convention may be amended by either of the procedures specified in the following paragraphs.

(b) Amendments after consideration within the Organization:

(i) Any amendment proposed by a Contracting Government shall be submitted to the Secretary-General of the Organization, who shall then circulate it to all Members of the Organization and all Contracting Governments at least six months prior to its consideration.

(ii) Any amendment proposed and circulated as above shall be referred to the Maritime Safety Committee of the Organization for consideration.

(iii) Contracting Governments of States, whether or not Members of the Organization, shall be entitled to participate in the proceedings of the Maritime Safety Committee for the consideration and adoption of amendments.

(iv) Amendments shall be adopted by a two-thirds majority of the Contracting Governments present and voting in the Maritime Safety Committee expanded as provided for in subparagraph (iii) of this paragraph (hereinafter referred to as "the expanded Maritime Safety Committee") on condition that at least one third of the Contracting Governments shall be present at the time of voting.

(v) Amendments adopted in accordance with subparagraph (iv) of this paragraph shall be communicated by the Secretary-General of the Organization to all Contracting Governments for acceptance.

(vi) (1) An amendment to an article of the Convention or to chapter I of the annex shall be deemed to have been accepted on the date on which it is accepted by two thirds of the Contracting Governments.

(2) An amendment to the annex other than chapter I shall be deemed to have been accepted

(aa) at the end of two years from the date on which it is communicated to Contracting Governments for acceptance; or

(bb) at the end of a different period, which shall not be less than one year, if so determined at the time of its adoption by a two-thirds majority of the Contracting Governments present and voting in the expanded Maritime Safety Committee.

However, if within the specified period either more than one third of Contracting Governments, or Contracting Governments the combined merchant fleets of which constitute not less than fifty per cent of the gross tonnage

of the world's merchant fleet, notify the Secretary-General of the Organization that they object to the amendment, it shall be deemed not to have been accepted.

(vii) (1) An amendment to an article of the Convention or to chapter I of the annex shall enter into force with respect to those Contracting Governments which have accepted it, six months after the date on which it is deemed to have been accepted, and with respect to each Contracting Government which accepts it after that date, six months after the date of that Contracting Government's acceptance.

(2) An amendment to the annex other than chapter I shall enter into force with respect to all Contracting Governments, except those which have objected to the amendment under subparagraph (vi)(2) of this paragraph and which have not withdrawn such objections, six months after the date on which it is deemed to have been accepted. However, before the date set for entry into force, any Contracting Government may give notice to the Secretary-General of the Organization that it exempts itself from giving effect to that amendment for a period not longer than one year from the date of its entry into force, or for such longer period as may be determined by a two-thirds majority of the Contracting Governments present and voting in the expanded Maritime Safety Committee at the time of the adoption of the amendment.

(c) Amendment by a Conference:

(i) Upon the request of a Contracting Government concurred in by at least one third of the Contracting Governments, the Organization shall convene a Conference of Contracting Governments to consider amendments to the present Convention.

(ii) Every amendment adopted by such a Conference by a two-thirds majority of the Contracting Governments present and voting shall be communicated by the Secretary-General of the Organization to all Contracting Governments for acceptance.

(iii) Unless the Conference decides otherwise, the amendment shall be deemed to have been accepted and shall enter into force in accordance with the procedures specified in subparagraphs (b)(vi) and (b)(vii) respectively of this article, provided that references in these paragraphs to the expanded Maritime Safety Committee shall be taken to mean references to the Conference.

(d) (i) A Contracting Government which has accepted an amendment to the annex which has entered into force shall not be obliged to extend the benefit of the present Convention in respect of the certificates issued to a ship entitled to fly the flag of a State the Government of which, pursuant to the provisions of subparagraph (b)(vi)(2) of this article, has objected to the amendment and has not withdrawn such an objection, but only to the extent that such certificates relate to matters covered by the amendment in question.

(ii) A Contracting Government which has accepted an amendment to the annex which has entered into force shall extend the benefit of the present Convention in respect of the certificates issued to a ship entitled to fly the flag of a State the Government of which, pursuant to the provisions of subparagraph (b)(vii)(2) of this article, has notified the Secretary-General of the Organization that it exempts itself from giving effect to the amendment.

(e) Unless expressly provided otherwise, any amendment to the present Convention made under this article, which relates to the structure of a ship, shall apply only to ships the keels of which are laid or which are at a similar stage of construction, on or after the date on which the amendment enters into force.

(f) Any declaration of acceptance of, or objection to, an amendment or any notice given under subparagraph (b)(vii)(2) of this article shall be submitted in writing to the Secretary-General of the Organization, who shall inform all Contracting Governments of any such submission and the date of its receipt.

(g) The Secretary-General of the Organization shall inform all Contracting Governments of any amendments which enter into force under this article, together with the date on which each such amendment enters into force.

Article IX

Signature, ratification, acceptance, approval and accession

(a) The present Convention shall remain open for signature at the Headquarters of the Organization from 1 November 1974 until 1 July 1975 and shall thereafter remain open for accession. States may become parties to the present Convention by:

(i) signature without reservation as to ratification, acceptance or approval; or

(ii) signature subject to ratification, acceptance or approval, followed by ratification, acceptance or approval; or

(iii) accession.

(b) Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General of the Organization.

(c) The Secretary-General of the Organization shall inform the Governments of all States which have signed the present Convention or acceded to it of any signature or of the deposit of any instrument of ratification, acceptance, approval or accession and the date of its deposit.

Article X

Entry into force

(a) The present Convention shall enter into force twelve months after the date on which not less than twenty-five States, the combined merchant fleets of which constitute not less than fifty per cent of the gross tonnage of the world's merchant shipping, have become parties to it in accordance with article IX.

(b) Any instrument of ratification, acceptance, approval or accession deposited after the date on which the present Convention enters into force shall take effect three months after the date of deposit.

(c) After the date on which an amendment to the present Convention is deemed to have been accepted under article VIII, any instrument of ratification, acceptance, approval or accession deposited shall apply to the Convention as amended.

Article XI

Denunciation

(a) The present Convention may be denounced by any Contracting Government at any time after the expiry of five years from the date on which the Convention enters into force for that Government.

(b) Denunciation shall be effected by the deposit of an instrument of denunciation with the Secretary-General of the Organization who shall notify all the other Contracting Governments of any instrument of denunciation received and of the date of its receipt as well as the date on which such denunciation takes effect.

(c) A denunciation shall take effect one year, or such longer period as may be specified in the instrument of denunciation, after its receipt by the Secretary-General of the Organization.

Article XII

Deposit and registration

(a) The present Convention shall be deposited with the Secretary-General of the Organization who shall transmit certified true copies thereof to the Governments of all States which have signed the present Convention or acceded to it.

(b) As soon as the present Convention enters into force, the text shall be transmitted by the Secretary-General of the Organization to the Secretary-General of the United Nations for registration and publication, in accordance with Article 102 of the Charter of the United Nations.

Article XIII

Languages

The present Convention is established in a single copy in the Chinese, English, French, Russian and Spanish languages, each text being equally authentic. Official translations in the Arabic, German and Italian languages shall be prepared and deposited with the signed original.

IN WITNESS WHEREOF the undersigned,* being duly authorized by their respective Governments for that purpose, have signed the present Convention.

DONE AT LONDON this first day of November one thousand nine hundred and seventy-four.

* Signatures omitted.

Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974

THE PARTIES TO THE PRESENT PROTOCOL,

BEING PARTIES to the International Convention for the Safety of Life at Sea, done at London on 1 November 1974,

RECOGNIZING the need for the introduction into the above-mentioned Convention of provisions for survey and certification harmonized with corresponding provisions in other international instruments,

CONSIDERING that this need may best be met by the conclusion of a Protocol relating to the International Convention for the Safety of Life at Sea, 1974,

HAVE AGREED as follows:

Article I
General obligations

1 The Parties to the present Protocol undertake to give effect to the provisions of the present Protocol and the annex hereto, which shall constitute an integral part of the present Protocol. Every reference to the present Protocol constitutes at the same time a reference to the annex hereto.

2 As between the Parties to the present Protocol, the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended, (hereinafter referred to as "the Convention") shall apply subject to the modifications and additions set out in the present Protocol.

3 With respect to ships entitled to fly the flag of a State which is not a Party to the Convention and the present Protocol, the Parties to the present Protocol shall apply the requirements of the Convention and the present Protocol as may be necessary to ensure that no more favourable treatment is given to such ships.

Article II
Prior treaties

1 As between the Parties to the present Protocol, the present Protocol replaces and abrogates the Protocol of 1978 relating to the Convention.

2 Notwithstanding any other provisions of the present Protocol, any certificate issued under, and in accordance with, the provisions of the Convention and any supplement to such certificate issued under, and in accordance with, the provisions of the Protocol of 1978 relating to the Convention which is current when the present Protocol enters into force in respect of the Party by which the certificate or supplement was issued, shall remain valid until it expires under the terms of the Convention or the Protocol of 1978 relating to the Convention, as the case may be.

3 A Party to the present Protocol shall not issue certificates under, and in accordance with, the provisions of the International Convention for the Safety of Life at Sea, 1974, as adopted on 1 November 1974.

Article III

Communication of information

The Parties to the present Protocol undertake to communicate to, and deposit with, the Secretary-General of the International Maritime Organization (hereinafter referred to as "the Organization"):

(a) the text of laws, decrees, orders and regulations and other instruments which have been promulgated on the various matters within the scope of the present Protocol;

(b) a list of nominated surveyors or recognized organizations which are authorized to act on their behalf in the administration of measures for safety of life at sea for circulation to the Parties for information of their officers, and a notification of the specific responsibilities and conditions of the authority delegated to those nominated surveyors or recognized organizations; and

(c) a sufficient number of specimens of their certificates issued under the provision of the present Protocol.

Article IV

Signature, ratification, acceptance, approval and accession

1 The present Protocol shall be open for signature at the Headquarters of the Organization from 1 March 1989 to 28 February 1990 and shall thereafter remain open for accession. Subject to the provisions of paragraph 3, States may express their consent to be bound by the present Protocol by:

(a) signature without reservation as to ratification, acceptance or approval; or

(b) signature subject to ratification, acceptance or approval, followed by ratification, acceptance or approval; or

(c) accession.

2 Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General of the Organization.

3 The present Protocol may be signed without reservation, ratified, accepted, approved or acceded to only by States which have signed without reservation, ratified, accepted, approved or acceded to the Convention.

Article V

Entry into force

1 The present Protocol shall enter into force twelve months after the date on which both the following conditions have been met:

(a) not less than fifteen States, the combined merchant fleets of which constitute not less than fifty per cent of the gross tonnage of the world's merchant shipping, have expressed their consent to be bound by it in accordance with article IV, and

(b) the conditions for the entry into force of the Protocol of 1988 relating to the International Convention on Load Lines, 1966, have been met,

provided that the present Protocol shall not enter into force before 1 February 1992.

2 For States which have deposited an instrument of ratification, acceptance, approval or accession in respect of the present Protocol after the conditions for entry into force thereof have been met but prior to the date of entry into force, the ratification, acceptance, approval or accession shall take effect on the date of entry into force of the present Protocol or three months after the date of deposit of the instrument, whichever is the later date.

3 Any instrument of ratification, acceptance, approval or accession deposited after the date on which the present Protocol enters into force shall take effect three months after the date of deposit.

4 After the date on which an amendment to the present Protocol is deemed to have been accepted under article VI, any instrument of ratification, acceptance, approval or accession deposited shall apply to the present Protocol as amended.

Article VI

Amendments

The procedures set out in article VIII of the Convention shall apply to amendments to the present Protocol, provided that:

(a) references in that article to the Convention and to Contracting Governments shall be taken to mean references to the present Protocol and to the Parties to the present Protocol respectively;

(b) amendments to the articles of the present Protocol and to the Annex thereto shall be adopted and brought into force in accordance with the procedure applicable to amendments to the articles of the Convention or to chapter I of the annex thereto; and

(c) amendments to the appendix to the annex to the present Protocol may be adopted and brought into force in accordance with the procedure applicable to amendments to the annex to the Convention other than chapter I.

Article VII

Denunciation

1 The present Protocol may be denounced by any Party at any time after the expiry of five years from the date on which the present Protocol enters into force for that Party.

2 Denunciation shall be effected by the deposit of an instrument of denunciation with the Secretary-General of the Organization.

3 A denunciation shall take effect one year, or such longer period as may be specified in the instrument of denunciation, after its receipt by the Secretary-General of the Organization.

4 A denunciation of the Convention by a Party shall be deemed to be a denunciation of the present Protocol by that Party. Such denunciation shall take effect on the same date as denunciation of the Convention takes effect according to paragraph (c) of article XI of the Convention.

Article VIII

Depositary

1 The present Protocol shall be deposited with the Secretary-General of the Organization (hereinafter referred to as "the depositary").

2 The depositary shall:

(a) inform the Governments of all States which have signed the present Protocol or acceded thereto of:

(i) each new signature or deposit of an instrument of ratification, acceptance, approval or accession, together with the date thereof;

(ii) the date of entry into force of the present Protocol;

(iii) the deposit of any instrument of denunciation of the present Protocol together with the date on which it was received and the date on which the denunciation takes effect;

(b) transmit certified true copies of the present Protocol to the Governments of all States which have signed the present Protocol or acceded thereto.

3 As soon as the present Protocol enters into force, a certified true copy thereof shall be transmitted by the depositary to the Secretariat of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

Article IX

Languages

The present Protocol is established in a single original in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic. An official translation into the Italian language shall be prepared and deposited with the signed original.

DONE AT LONDON this eleventh day of November one thousand nine hundred and eighty-eight.

IN WITNESS WHEREOF the undersigned*, being duly authorized by their respective Governments for that purpose, have signed the present Protocol.

* Signatures omitted.

Consolidated text of the annex to the 1974 SOLAS Convention

CHAPTER I
General provisions

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Part A
Application, definitions, etc.

Regulation 1
Application

(a) Unless expressly provided otherwise, the present regulations apply only to ships engaged on international voyages.

(b) The classes of ships to which each chapter applies are more precisely defined, and the extent of the application is shown, in each chapter.

Regulation 2
Definitions

For the purpose of the present regulations, unless expressly provided otherwise:

(a) *Regulations* means the regulations contained in the annex to the present Convention.

(b) *Administration* means the Government of the State whose flag the ship is entitled to fly.

(c) *Approved* means approved by the Administration.

(d) *International voyage* means a voyage from a country to which the present Convention applies to a port outside such country, or conversely.

(e) A *passenger* is every person other than:

- **(i)** the master and the members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship; and
- **(ii)** a child under one year of age.

(f) A *passenger ship* is a ship which carries more than twelve passengers.

(g) A *cargo ship* is any ship which is not a passenger ship.

(h) A *tanker* is a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable* nature.

(i) A *fishing vessel* is a vessel used for catching fish, whales, seals, walrus or other living resources of the sea.

(j) A *nuclear ship* is a ship provided with a nuclear power plant.

P88 **(k)** *New ship* means a ship the keel of which is laid or which is at a similar stage of construction on or after 25 May 1980.

(l) *Existing ship* means a ship which is not a new ship.

(m) A *mile* is 1,852 m or 6,080 ft.

P88 **(n)** *Anniversary date* means the day and the month of each year which will correspond to the date of expiry of the relevant certificate.

Regulation 3
Exceptions

(a) The present regulations, unless expressly provided otherwise, do not apply to:

(i) Ships of war and troopships.

(ii) Cargo ships of less than 500 gross tonnage.

(iii) Ships not propelled by mechanical means.

(iv) Wooden ships of primitive build.

(v) Pleasure yachts not engaged in trade.

(vi) Fishing vessels.

(b) Except as expressly provided in chapter V, nothing herein shall apply to ships solely navigating the Great Lakes of North America and the River St Lawrence as far east as a straight line drawn from Cap des Rosiers to West Point, Anticosti Island and, on the north side of Anticosti Island, the 63rd meridian.

* "Inflammable" has the same meaning as "flammable".

Regulation 4
*Exemptions**

(a) A ship which is not normally engaged on international voyages but which, in exceptional circumstances, is required to undertake a single international voyage may be exempted by the Administration from any of the requirements of the present regulations provided that it complies with safety requirements which are adequate in the opinion of the Administration for the voyage which is to be undertaken by the ship.

(b) The Administration may exempt any ship which embodies features of a novel kind from any of the provisions of chapters II-1, II-2, III and IV of these regulations the application of which might seriously impede research into the development of such features and their incorporation in ships engaged on international voyages. Any such ship shall, however, comply with safety requirements which, in the opinion of that Administration, are adequate for the service for which it is intended and are such as to ensure the overall safety of the ship and which are acceptable to the Governments of the States to be visited by the ship. The Administration which allows any such exemption shall communicate to the Organization particulars of same and the reasons therefor which the Organization shall circulate to the Contracting Governments for their information.

Regulation 5
Equivalents

(a) Where the present regulations require that a particular fitting, material, appliance or apparatus, or type thereof, shall be fitted or carried in a ship, or that any particular provision shall be made, the Administration may allow any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that ship, if it is satisfied by trial thereof or otherwise that such fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by the present regulations.

(b) Any Administration which so allows, in substitution, a fitting, material, appliance or apparatus, or type thereof, or provision, shall communicate to the Organization particulars thereof together with a report on any trials made and the Organization shall circulate such particulars to other Contracting Governments for the information of their officers.

* Refer to SLS.14/Circ.115, as amended, on the issue of exemption certificates under the 1974 SOLAS Convention and amendments thereto.

Part B

*Surveys and certificates**

P88 Regulation 6

Inspection and survey

(a) The inspection and survey of ships, so far as regards the enforcement of the provisions of the present regulations and the granting of exemptions therefrom, shall be carried out by officers of the Administration. The Administration may, however, entrust the inspections and surveys either to surveyors nominated for the purpose or to organizations recognized by it.

(b) An Administration nominating surveyors or recognizing organizations to conduct inspections and surveys as set forth in paragraph (a) shall as a minimum empower any nominated surveyor or recognized organization to:

(i) require repairs to a ship;

(ii) carry out inspections and surveys if requested by the appropriate authorities of a port State.

The Administration shall notify the Organization of the specific responsibilities and conditions of the authority delegated to nominated surveyors or recognized organizations.

(c) When a nominated surveyor or recognized organization determines that the condition of the ship or its equipment does not correspond substantially with the particulars of the certificate or is such that the ship is not fit to proceed to sea without danger to the ship, or persons on board, such surveyor or organization shall immediately ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken the relevant certificate should be withdrawn and the Administration shall be notified immediately; and, if the ship is in the port of another Party, the appropriate authorities of the port State shall also be notified immediately. When an officer of the Administration, a nominated surveyor or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this regulation. When

* Refer to "Global and uniform implementation of the harmonized system of survey and certification (HSSC)" and to the "Survey guidelines under the harmonized system of survey and certification" adopted by the Organization by resolutions A.883(21) and A.746(18) respectively.

applicable, the Government of the port State concerned shall ensure that the ship shall not sail until it can proceed to sea, or leave port for the purpose of proceeding to the appropriate repair yard, without danger to the ship or persons on board.

(d) In every case, the Administration shall fully guarantee the completeness and efficiency of the inspection and survey, and shall undertake to ensure the necessary arrangements to satisfy this obligation.

P88 Regulation 7

*Surveys of passenger ships**

(a) A passenger ship shall be subject to the surveys specified below:

(i) an initial survey before the ship is put in service;

(ii) a renewal survey once every 12 months, except where regulation 14(b), (e), (f) and (g) is applicable;

(iii) additional surveys, as occasion arises.

(b) The surveys referred to above shall be carried out as follows:

(i) the initial survey shall include a complete inspection of the ship's structure, machinery and equipment, including the outside of the ship's bottom and the inside and outside of the boilers. This survey shall be such as to ensure that the arrangements, materials and scantlings of the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment fully comply with the requirements of the present regulations, and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration for ships of the service for which it is intended. The survey shall also be such as to ensure that the workmanship of all parts of the ship and its equipment is in all respects satisfactory, and that the ship is provided with the lights, shapes, means of making sound signals and distress sigals as required by the provisions of the present regulations and the International Regulations for Preventing Collisions at Sea in force;

(ii) the renewal survey shall include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, including the outside of the ship's bottom. The survey shall be

* Refer to resolution A.794(19) on surveys and inspections of ro–ro passenger ships and MSC/Circ. 956, Guidelines for unscheduled inspections of ro–ro passenger ships by flag States.

such as to ensure that the ship, as regards the structure, boilers and other pressure vessels and their appurtenances, main and auxiliary machinery, electrical installation, radio installations including those used in life-saving appliances, fire protection, fire safety systems and appliances, life-saving appliances and arrangements, shipborne navigational equipment, nautical publications, means of embarkation for pilots and other equipment is in satisfactory condition and is fit for the service for which it is intended, and that it complies with the requirements of the present regulations and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration. The lights, shapes, means of making sound signals and distress signals carried by the ship shall also be subject to the above-mentioned survey for the purpose of ensuring that they comply with the requirements of the present regulations and of the International Regulations for Preventing Collisions at Sea in force;

(iii) an additional survey either general or partial, according to the circumstances, shall be made after a repair resulting from investigations prescribed in regulation 11, or whenever any important repairs or renewals are made. The survey shall be such as to ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are in all respects satisfactory, and that the ship complies in all respects with the provisions of the present regulations and of the Internaional Regulations for Preventing Collisions at Sea in force, and of the laws, decrees, orders and regulations promulgated as a result thereof by the Administration;

(c) **(i)** the laws, decrees, orders and regulations referred to in paragraph (b) of this regulation shall be in all respects such as to ensure that, from the point of view of safety of life, the ship is fit for the service for which it is intended;

(ii) they shall among other things prescribe the requirements to be observed as to the initial and subsequent hydraulic or other acceptable alternative tests to which the main and auxiliary boilers, connections, steam pipes, high pressure receivers and fuel tanks for internal combustion engines are to be submitted including the test procedures to be followed and the intervals between two consecutive tests.

P88 Regulation 8

Surveys of life-saving appliances and other equipment of cargo ships

(a) The life-saving appliances and other equipment of cargo ships of 500 gross tonnage and upwards as referred to in paragraph (b)(i) shall be subject to the surveys specified below:

(i) an initial survey before the ship is put in service;

(ii) a renewal survey at intervals specified by the Administration but not exceeding 5 years, except where regulation 14(b), (e), (f) and (g) is applicable;

(iii) a periodical survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the Cargo Ship Safety Equipment Certificate which shall take the place of one of the annual surveys specified in paragraph (a)(iv);

(iv) an annual survey within 3 months before or after each anniversary date of the Cargo Ship Safety Equipment Certificate;

(v) an additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys referred to in paragraph (a) shall be carried out as follows:

(i) the initial survey shall include a complete inspection of the fire safety systems and appliances, life-saving appliances and arrangements except radio installations, the shipborne navigational equipment, means of embarkation for pilots and other equipment to which chapters II-1, II-2, III and V apply to ensure that they comply with the requirements of the present regulations, are in satisfactory condition and are fit for the service for which the ship is intended. The fire control plans, nautical publications, lights, shapes, means of making sound signals and distress signals shall also be subject to the above-mentioned survey for the purpose of ensuring that they comply with the requirements of the present regulations and, where applicable, the International Regulations for Preventing Collisions at Sea in force;*

(ii) the renewal and periodical surveys shall include an inspection of the equipment referred to in paragraph (b)(i) to ensure that it complies with the relevant requirements of the present regulations and the International Regulations for Preventing Collisions at Sea in force, is in satisfactory condition and is fit for the service for which the ship is intended;

(iii) the annual survey shall include a general inspection of the equipment referred to in paragraph (b)(i) to ensure that it has been maintained in accordance with regulation 11(a) and that it remains satisfactory for the service for which the ship is intended.

* Refer to the Record of approved cargo ship safety equipment (SLS.14/Circ.1).

(c) The periodical and annual surveys referred to in paragraphs (a)(iii) and (a)(iv) shall be endorsed on the Cargo Ship Safety Equipment Certificate.

P88 Regulation 9

Surveys of radio installations of cargo ships

(a) The radio installations, including those used in life-saving appliances, of cargo ships to which chapters III and IV apply shall be subject to the surveys specified below:

(i) an initial survey before the ship is put in service;

(ii) a renewal survey at intervals specified by the Administration but not exceeding five years, except where regulation 14(b), (e), (f) and (g) is applicable;

(iii) a periodical survey within three months before or after each anniversary date of the Cargo Ship Safety Radio Certificate;

(iv) an additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys referred to in paragraph (a) shall be carried out as follows:

(i) the initial survey shall include a complete inspection of the radio installations of cargo ships, including those used in life-saving appliances, to ensure that they comply with the requirements of the present regulations;

(ii) the renewal and periodical surveys shall include an inspection of the radio installations of cargo ships, including those used in life-saving appliances, to ensure that they comply with the requirements of the present regulations.

(c) The periodical surveys referred to in paragraph (a)(iii) shall be endorsed on the Cargo Ship Safety Radio Certificate.

P88 Regulation 10

Surveys of structure, machinery and equipment of cargo ships

(a) The structure, machinery and equipment (other than items in respect of which a Cargo Ship Safety Equipment Certificate and a Cargo Ship Safety Radio Certificate are issued) of a cargo ship as referred to in paragraph (b)(i) shall be subject to the surveys and inspections specified below:

(i) an initial survey including an inspection of the outside of the ship's bottom before the ship is put in service;*

(ii) a renewal survey at intervals specified by the Administration but not exceeding 5 years, except where regulation 14(b), (e), (f) and (g) is applicable;

(iii) an intermediate survey within three months before or after the second anniversary date or within three months before or after the third anniversary date of the Cargo Ship Safety Construction Certificate, which shall take the place of one of the annual surveys specified in paragraph (a)(iv);

(iv) an annual survey within 3 months before or after each anniversary date of the Cargo Ship Safety Construction Certificate;

(v) a minimum of two inspections of the outside of the ship's bottom during any five year period, except where regulation 14(e) or (f) is applicable. Where regulation 14(e) or (f) is applicable, this five year period may be extended to coincide with the extended period of validity of the certificate. In all cases the interval between any two such inspections shall not exceed 36 months;

(vi) an additional survey as prescribed for passenger ships in regulation 7(b)(iii).

(b) The surveys and inspections referred to in paragraph (a) shall be carried out as follows:

(i) the initial survey shall include a complete inspection of the structure, machinery and equipment. This survey shall be such as to ensure that the arrangements, materials, scantlings and workmanship of the structure, boilers and other pressure vessels, their appurtenances, main and auxiliary machinery including steering gear and associated control systems, electrical installation and other equipment comply with the requirements of the present regulations, are in satisfactory condition and are fit for the service for which the ship is intended and that the required stability informaion is provided. In the case of tankers such a survey shall also include an inspection of the pump-rooms, cargo, bunker and ventilation piping systems and associated safety devices;

(ii) the renewal survey shall include an inspection of the structure, machinery and equipment as referred to in paragraph (b)(i) to ensure that they comply with the requirements of the present

* Refer to the circular concerning inspection of the outside of the ship's bottom (PSLS.2/Circ.5).

regulations, are in satisfactory condition and are fit for the service for which the ship is intended;

(iii) the intermediate survey shall include an inspection of the structure, boilers and other pressure vessels, machinery and equipment, the steering gear and the associated control systems and electrical installations to ensure that they remain satisfactory for the service for which the ship is intended. In the case of tankers, the survey shall also include an inspection of the pump-rooms, cargo, bunker and ventilation piping systems and associated safety devices and the testing of insulation resistance of electrical installations in dangerous zones;

(iv) the annual survey shall include a general inspection of the structure, machinery and equipment referred to in paragraph (b)(i), to ensure that they have been maintained in accordance with regulation 11(a) and that they remain satisfactory for the service for which the ship is intended;

(v) the inspection of the outside of the ship's bottom and the survey of related items inspected at the same time shall be such as to ensure that they remain satisfactory for the service for which the ship is intended..

(c) The intermediate and annual surveys and the inspections of the outside of the ship's bottom referred to in paragraphs (a)(iii), (a)(iv) and (a)(v) shall be endorsed on the Cargo Ship Safety Construction Certificate.

P88 Regulation 11

Maintenance of conditions after survey

(a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present regulations to ensure that the ship in all respects will remain fit to proceed to sea without danger to the ship or persons on board.

(b) After any survey of the ship under regulations 7, 8, 9 or 10 has been completed, no change shall be made in the structural arrangements, machinery, equipment and other items covered by the survey, without the sanction of the Administration.

(c) Whenever an accident occurs to a ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its life-saving appliances or other equipment, the master or owner of the ship shall report at the earliest opportunity to the Administration, the nominated sureyor or recognized organization responsible for issuing the relevant certificate, who shall cause investigations to be initiated to determine whether a survey, as required by regulations 7, 8, 9 or 10, is necessary. If the ship is in a port of another Contracting Government, the master or owner

shall also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization shall ascertain that such a report has been made.

P88 Regulation 12

*Issue or endorsement of certificates**

(a) **(i)** a certificate called a Passenger Ship Safety Certificate shall be issued after an initial or renewal survey to a passenger ship which complies with the relevant requirements of chapters II-1, II-2, III, IV and V and any other relevant requirements of the present regulations;

(ii) a certificate called a Cargo Ship Safety Construction Certificate shall be issued after an initial or renewal survey to a cargo ship which complies with the relevant requirements of chapters II-1 and II-2 (other than those relating to fire safety systems and appliances and fire control plans) and any other relevant requirements of the present regulations;

(iii) a certificate called a Cargo Ship Safety Equipment Certificate† shall be issued after an initial or renewal survey to a cargo ship which complies with the relevant requirements of chapters II-1, II-2, III and V and any other relevant requirements of the present regulations;

(iv) a certificate called a Cargo Ship Safety Radio Certificate shall be issued after an initial or renewal survey to a cargo ship which complies with the relevant requirements of chapter IV and any other relevant requirements of the present regulations;

(v) (1) a certificate called a Cargo Ship Safety Certificate may be issued after an initial or renewal survey to a cargo ship which complies with the relevant requirements of chapters II-1, II-2, III, IV and V and any other relevant requirements of the present regulations, as an alternative to the certificates referred to in paragraph (a)(ii), (a)(iii) and (a)(iv);

(2) whenever in this chapter reference is made to a Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate or Cargo Ship Safety Radio Certificate, it shall apply to a Cargo Ship Safety Certificate, if it is used as an alternative to these certificates.

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* Refer to resolution A.791(19) on application of the International Convention on Tonnage Measurement of Ships, 1969, to existing ships.

† Refer to the circular concerning issue of supplements and attachments (PSLS.2/Circ.1).

(vi) the Passenger Ship Safety Certificate, the Cargo Ship Safety Equipment Certificate, the Cargo Ship Safety Radio Certificate and the Cargo Ship Safety Certificate, referred to in subparagraphs (i), (iii), (iv) and (v), shall be supplemented by a Record of Equipment;

(vii) when an exemption is granted to a ship under and in accordance with the provisions of the present regulations, a certificate called an Exemption Certificate shall be issued in addition to the certificates prescribed in this paragraph;

(viii) the certificates referred to in this regulation shall be issued or endorsed either by the Administration or by any person or organization authorized by it. In every case, that Administration assumes full responsibility for the certificates.

(b) A Contracting Government shall not issue certificates under, and in accordance with, the provisions of the International Convention for the Safety of Life at Sea, 1960, 1948 or 1929, after the date on which acceptance of the present Convention by the Government takes effect.

P88 Regulation 13

Issue or endorsement of certificates by another Government

A Contracting Government may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the requirements of the present regulations are complied with, shall issue or authorize the issue of certificates to the ship and, where appropriate, endorse or authorize the endorsement of certificates on the ship in accordance with the present regulations. Any certificate so issued shall contain a statement to the effect that it has been issued at the request of the Government of the State the flag of which the ship is entitled to fly, and it shall have the same force and receive the same recognition as a certificate issued under regulation 12.

P88 Regulation 14

Duration and validity of certificates

(a) A Passenger Ship Safety Certificate shall be issued for a period not exceeding 12 months. A Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate shall be issued for a period specified by the Administration which shall not exceed five years. An Exemption Certificate shall not be valid for longer than the period of the certificate to which it refers.

(b) **(i)** notwithstanding the requirements of paragraph (a), when the renewal survey is completed within three months before the

expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to:

(1) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate;

(2) for a cargo ship, a date not exceeding five years from the date of expiry of the existing certificate;

(ii) when the renewal survey is completed after the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to:

(1) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate;

(2) for a cargo ship, a date not exceeding five years from the date of expiry of the existing certificate;

(iii) when the renewal survey is completed more than three months before the expiry date of the existing certificate, the new certificate shall be valid from the date of completion of the renewal survey to:

(1) for a passenger ship, a date not exceeding 12 months from the date of completion of the renewal survey;

(2) for a cargo ship, a date not exceeding five years from the date of completion of the renewal survey.

(c) If a certificate other than a Passenger Ship Safety Certificate is issued for a period of less than five years, the Administration may extend the validity of the certificate beyond the expiry date to the maximum period specified in paragraph (a), provided that the surveys referred to in regulations 8, 9 and 10 applicable when a certificate is issued for a period of 5 years are carried out as appropriate.

(d) If a renewal survey has been completed and a new certificate cannot be issued or placed on board the ship before the expiry date of the existing certificate, the person or organization authorized by the Administration may endorse the existing certificate and such a certificate shall be accepted as valid for a further period which shall not exceed 5 months from the expiry date.

(e) If a ship at the time when a certificate expires is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such

extension to leave that port without having a new certificate. When the renewal survey is completed, the new certificate shall be valid to:

(i) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate before the extension was granted;

(ii) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate before the extension was granted.

(f) A certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new certificate shall be valid to:

(i) for a passenger ship, a date not exceeding 12 months from the date of expiry of the existing certificate before the extension was granted;

(ii) for a cargo ship, a date not exceeding 5 years from the date of expiry of the existing certificate before the extension was granted.

(g) In special circumstances, as determined by the Administration, a new certificate need not be dated from the date of expiry of the existing certificate as required by paragraphs (b)(ii), (e) or (f). In these special circumstances, the new certificate shall be valid to:

(i) for a passenger ship, a date not exceeding 12 months from the date of completion of the renewal survey;

(ii) for a cargo ship, a date not exceeding five years from the date of completion of the renewal survey.

(h) If an annual, intermediate or periodical survey is completed before the period specified in the relevant regulations then:

(i) the anniversary date shown on the relevant certificate shall be amended by endorsement to a date which shall not be more than three months later than the date on which the survey was completed;

(ii) the subsequent annual, intermediate or periodical survey required by the relevant regulations shall be completed at the intervals prescribed by these regulations using the new anniversary date;

(iii) the expiry date may remain unchanged provided one or more annual, intermediate or periodical surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by the relevant regulations are not exceeded.

(i) A certificate issued under regulation 12 or 13 shall cease to be valid in any of the following cases:

(i) if the relevant surveys and inspections are not completed within the periods specified under regulations 7(a), 8(a), 9(a) and 10(a);

(ii) if the certificate is not endorsed in accordance with the present regulations;

(iii) upon transfer of the ship to the flag of another State. A new certificate shall only be issued when the Government issuing the new certificate is fully satisfied that the ship is in compliance with the requirements of regulation 11(a) and (b). In the case of a transfer between Contracting Governments, if requested within three months after the transfer has taken place, the Government of the State whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the certificates carried by the ship before a transfer and, if available, copies of the relevant survey reports.

P88 Regulation 15

Forms of certificates and records of equipment

The certificates and records of equipment shall be drawn up in the form corresponding to the models given in the appendix to the annex to the present Convention. If the language used is neither English nor French, the text shall include a translation into one of these languages.*

P88 Regulation 16

Availability of certificates

The certificates issued under regulations 12 and 13 shall be readily available on board for examination at all times.

Regulation 17

Acceptance of certificates

Certificates issued under the authority of a Contracting Government shall be accepted by the other Contracting Governments for all purposes covered by the present Convention. They shall be regarded by the other Contracting Governments as having the same force as certificates issued by them.

* Refer to resolution A.561(14) on translation of the text of certificates.

Regulation 18
Qualification of certificates

(a) If in the course of a particular voyage a ship has on board a number of persons less than the total number stated in the Passenger Ship Safety Certificate and is in consequence, in accordance with the provisions of the present regulations, free to carry a smaller number of lifeboats and other life-saving appliances than that stated in the certificate, an annex may be issued by the Government, person or organization referred to in regulation 12 or 13 of this chapter.

(b) This annex shall state that in the circumstances there is no infringement of the provisions of the present regulations. It shall be annexed to the certificate and shall be substituted for it in so far as the life-saving appliances are concerned. It shall be valid only for the particular voyage for which it is issued.

P88 Regulation 19
*Control**

(a)
Every ship when in a port of another Contracting Government is subject to control by officers duly authorized by such Government in so far as this control is directed towards verifying that the certificates issued under regulation 12 or regulation 13 are valid.

(b) Such certificates, if valid, shall be accepted unless there are clear grounds for believing that the condition of the ship or of its equipment does not correspond substantially with the particulars of any of the certificates or that the ship and its equipment are not in compliance with the provisions of regulation 11(a) and (b).

(c) In the circumstances given in paragraph (b) or where a certificate has expired or ceased to be valid, the officer carrying out the control shall take steps to ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the appropriate repair yard without danger to the ship or persons on board.

(d) In the event of this control giving rise to an intervention of any kind, the officer carrying out the control shall forthwith inform, in writing, the Consul or, in his absence, the nearest diplomatic representative of the State whose flag the ship is entitled to fly of all the circumstances in which intervention was deemed necessary. In addition, nominated surveyors or recognized organizations responsible for the issue of the certificates shall also

* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19), as amended by resolution A.882(21).

be notified. The facts concerning the intervention shall be reported to the Organization.

(e) The port State authority concerned shall notify all relevant information about the ship to the authorities of the next port of call, in addition to parties mentioned in paragraph (d), if it is unable to take action as specified in paragraphs (c) and (d) or if the ship has been allowed to proceed to the next port of call.

(f) When exercising control under this regulation all possible efforts shall be made to avoid a ship being unduly detained or delayed. If a ship is thereby unduly detained or delayed it shall be entitled to compensation for any loss or damage suffered.

Regulation 20
Privileges

The privileges of the present Convention may not be claimed in favour of any ship unless it holds appropriate valid certificates.

Part C
Casualties

Regulation 21
Casualties

(a) Each Administration undertakes to conduct an investigation of any casualty occurring to any of its ships subject to the provisions of the present Convention when it judges that such an investigation may assist in determining what changes in the present regulations might be desirable.*

(b) Each Contracting Government undertakes to supply the Organization with pertinent information concerning the findings of such investigations. No reports or recommendations of the Organization based upon such information shall disclose the identity or nationality of the ships concerned or in any manner fix or imply responsibility upon any ship or person.

* Refer to the following resolutions adopted by the Organization:

Resolution A.173(ES.IV): Participation in official inquiries into marine casualties.

Resolution A.203(VII): Recommendation on the conclusion of agreements and arrangements between States on the question of access and employment of foreign sea-borne salvage equipment in territorial waters.

Resolution A.322(IX): The conduct of investigations into casualties.

Resolution A.440(XI): Exchange of information for investigations into marine casualties.

Resolution A.442(XI): Personnel and material resource needs of Administrations for the investigation of casualties and contraventions of conventions.

Resolution A.637(16): Co-operation in maritime casualty investigations.

Resolution A.849(20): Code for the investigation of marine casualities and incidents, as amended by resolution A.884(21).

Refer also to:

MSC/Circ.539/Add.2: Reports on casualty statistics concerning fishing vessels and fishermen at sea.

MSC/Circ.827: Reports on marine casualties and incidents. Harmonized reporting procedures – Reports required under SOLAS regulation I/21 and MARPOL 73/78 articles 8 and 12.

CHAPTER II-1
Construction – Structure, subdivision and stability, machinery and electrical installations

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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 July 1986.

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 July 1986;

.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.

2 Unless expressly provided otherwise, for ships constructed before 1 July 1986 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 resolution MSC.1(XLV), are complied with.

3.1 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 1 July 1986 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 1 July 1986 in so far as the Administration deems reasonable and practicable.†

3.2 Notwithstanding the provisions of paragraph 3.1, passenger ships which undergo repairs, alterations and modifications to meet the requirements of regulation 8-1 shall not be deemed to have undergone repairs, alterations and modifications of a major character.

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:

1.1 *Subdivision load line* is a waterline used in determining the subdivision of the ship.

1.2 *Deepest subdivision load line* is the waterline which corresponds to the greatest draught permitted by the subdivision requirements which are applicable.

2 *Length of the ship* is the length measured between perpendiculars taken at the extremities of the deepest subdivision load line.

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* Refer to MSC/Circ.650 on interpretation of alterations and modifications of a major character.

† Refer to MSC/Circ.609 on interpretation of regulation II-1/1.3 of the 1974 SOLAS Convention.

3 *Breadth of the ship* is the extreme width from outside of frame to outside of frame at or below the deepest subdivision load line.

4 *Draught* is the vertical distance from the moulded base line amidships to the subdivision load line in question.

5 *Bulkhead deck* is the uppermost deck up to which the transverse watertight bulkheads are carried.

6 *Margin line* is a line drawn at least 76 mm below the upper surface of the bulkhead deck at side.

7 *Permeability of a space* is the percentage of that space which can be occupied by water. The volume of a space which extends above the margin line shall be measured only to the height of that line.

8 *Machinery space* is to be taken as extending from the moulded base line to the margin line and between the extreme main transverse watertight bulkheads, bounding the spaces containing the main and auxiliary propulsion machinery, boilers serving the needs of propulsion, and all permanent coal bunkers. In the case of unusual arrangements, the Administration may define the limits of the machinery spaces.

9 *Passenger spaces* are those spaces which are provided for the accommodation and use of passengers, excluding baggage, store, provision and mail rooms. For the purposes of regulations 5 and 6, spaces provided below the margin line for the accommodation and use of the crew shall be regarded as passenger spaces.

10 In all cases volumes and areas shall be calculated to moulded lines.

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

12 An *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.

13 *Ro–ro passenger ship* means a passenger ship with ro–ro cargo spaces or special category spaces as defined in regulation II-2/3.

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 navigation 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;

.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 condition.

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 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 seagoing 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 seagoing 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; or

.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.

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

22 *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.

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, or with applicable national standards of the Administration which provide an equivalent level of safety.

Regulation 3-2
Corrosion prevention of seawater ballast tanks

1 This regulation applies to oil tankers and bulk carriers constructed on or after 1 July 1998.

2 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.

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 2.12, chemical tankers as defined in regulation VII/8.2 and gas carriers as defined in regulation VII/11.2.

2 Every tanker constructed on or after 1 July 1998 shall be provided

* 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).

with the means to enable the crew to gain safe access to the bow even in severe weather conditions. For tankers constructed before 1 July 1998, such means of access shall be provided at the first scheduled dry-docking after 1 July 1998, but not later than 1 July 2001. 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

Emergency towing arrangements shall be fitted at both ends on board every tanker of not less than 20,000 tonnes deadweight, constructed on or after 1 January 1996. For tankers constructed before 1 January 1996, such an arrangement shall be fitted at the first scheduled dry-docking after 1 January 1996 but not later than 1 January 1999. The design and construction of the towing arrangements shall be approved by the Administration, based on the guidelines developed by the Organization.†

* 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 for emergency towing arrangements on tankers adopted by the Maritime Safety Committee by resolution MSC.35(63) and to MSC/Circ. 966, IACS Unified Interpretation of "Prototype test".

Part B
*Subdivision and stability**

(Part B applies to passenger ships and to cargo ships, as indicated in the regulations)

Regulation 4
Floodable length in passenger ships

1 The floodable length at any point of the length of a ship shall be determined by a method of calculation which takes into consideration the form, draught and other characteristics of the ship in question.

2 In a ship with a continuous bulkhead deck, the floodable length at a given point is the maximum portion of the length of the ship, having its centre at the point in question, which can be flooded under the definite assumptions set forth in regulation 5 without the ship being submerged beyond the margin line.

3.1 In the case of a ship not having a continuous bulkhead deck, the floodable length at any point may be determined to an assumed continuous margin line which at no point is less than 76 mm below the top of the deck (at side) to which the bulkheads concerned and the shell are carried watertight.

3.2 Where a portion of an assumed margin line is appreciably below the deck to which bulkheads are carried, the Administration may permit a limited relaxation in the watertightness of those portions of the bulkheads which are above the margin line and immediately under the higher deck.

Regulation 5
Permeability in passenger ships

1.1 The definite assumptions referred to in regulation 4 relate to the permeability of the spaces below the margin line.

1.2 In determining the floodable length, a uniform average permeability

* Instead of the requirements in this part, the Regulations on subdivision and stability of passenger ships as an equivalent to part B of chapter II of the International Convention for the Safety of Life at Sea, 1960, adopted by the Organization by resolution A.265(VIII), may be used, if applied in their entirety.

shall be used throughout the whole length of each of the following portions of the ship below the margin line:

.1 the machinery space as defined in regulation 2;

.2 the portion forward of the machinery space; and

.3 the portion abaft the machinery space.

2.1 The uniform average permeability throughout the machinery space shall be determined from the formula:

$$85 + 10\left(\frac{a - c}{v}\right)$$

where:

a = the volume of the passenger spaces, as defined in regulation 2, which are situated below the margin line within the limits of the machinery space;

c = the volume of between-deck spaces below the margin line within the limits of the machinery space which are appropriated to cargo, coal or stores;

v = the whole volume of the machinery space below the margin line.

2.2 Where it is shown to the satisfaction of the Administration that the average permeability as determined by detailed calculation is less than that given by the formula, the detailed calculated value may be used. For the purpose of such calculation, the permeability of passenger spaces, as defined in regulation 2, shall be taken as 95, that of all cargo, coal and store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.

3 Except as provided in paragraph 4, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be determined from the formula:

$$63 + 35\frac{a}{v}$$

where:

a = the volume of the passenger spaces, as defined in regulation 2, which are situated below the margin line, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery space.

4.1 In the case of special subdivision required in regulation 6.5, the uniform average permeability throughout the portion of the ship forward of or abaft the machinery space shall be:

$$95 - 35\frac{b}{v}$$

where:

b = the volume of the spaces below the margin line and above the tops of floors, inner bottom, or peak tanks, as the case may be, which are appropriated to and used as cargo spaces, coal or oil fuel bunkers, store-rooms, baggage and mail rooms, chain lockers and fresh water tanks, forward of or abaft the machinery space; and

v = the whole volume of the portion of the ship below the margin line forward of or abaft the machinery space.

4.2 In the case of ships engaged on services where the cargo holds are not generally occupied by any substantial quantities of cargo, no part of the cargo spaces is to be included in calculating *b*.

5 In the case of unusual arrangements the Administration may allow, or require, a detailed calculation of average permeability for the portions forward of or abaft the machinery space. For the purpose of such calculation, the permeability of passenger spaces as defined in regulation 2 shall be taken as 95, that of spaces containing machinery as 85, that of all cargo, coal and store spaces as 60, and that of double bottom, oil fuel and other tanks at such value as may be approved in each case.

6 Where a between-deck compartment between two watertight transverse bulkheads contains any passenger or crew space, the whole of that compartment, less any space completely enclosed within permanent steel bulkheads and appropriated to other purposes, shall be regarded as passenger space. Where, however, the passenger or crew space in question is completely enclosed within permanent steel bulkheads, only the space so enclosed need be considered as passenger space.

Regulation 6
Permissible length of compartments in passenger ships

1 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 length of the ship and with the service, in such manner that the highest degree of subdivision corresponds with the ships of greatest length, primarily engaged in the carriage of passengers.

2 Factor of subdivision

2.1 The maximum permissible length of a compartment having its centre at any point in the ship's length is obtained from the floodable length by multiplying the latter by an appropriate factor called the factor of subdivision.

2.2 The factor of subdivision shall depend on the length of the ship, and for a given length shall vary according to the nature of the service for which the ship is intended. It shall decrease in a regular and continuous manner,

.1 as the length of the ship increases, and

.2 from a factor A, applicable to ships primarily engaged in the carriage of cargo, to a factor B, applicable to ships primarily engaged in the carriage of passengers.

2.3 The variations of the factors A and B shall be expressed by the following formulae (1) and (2) where L is the length of the ship as defined in regulation 2:

$$A = \frac{58.2}{L - 60} + 0.18 \quad (L = 131 \text{ m and upwards}) \qquad (1)$$

$$B = \frac{30.3}{L - 42} + 0.18 \quad (L = 79 \text{ m and upwards}) \qquad (2)$$

3 Criterion of service

3.1 For a ship of given length the appropriate factor of subdivision shall be determined by the criterion of service numeral (hereinafter called the criterion numeral) as given by the following formulae (3) and (4) where:

C_s = the criterion numeral;

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; 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 spaces below the margin line (cubic metres), as defined in regulation 2;

V = the whole volume of the ship below the margin line (cubic metres);

P_1 = KN

where:

N = the number of passengers for which the ship is to be certified, and

K = $0.056L$

3.2 Where the value of KN is greater than the sum of P and the whole volume of the actual passenger spaces above the margin line, the figure to be taken as P_1 is that sum or two-thirds KN, whichever is the greater.

When P_1 is greater than P:

$$C_s = 72\,\frac{M + 2P_1}{V + P_1 - P} \tag{3}$$

and in other cases:

$$C_s = 72\,\frac{M + 2P}{V} \tag{4}$$

3.3 For ships not having a continuous bulkhead deck the volumes are to be taken up to the actual margin lines used in determining the floodable lengths.

4 Rules for subdivision of ships other than those covered by paragraph 5

4.1 The subdivision abaft the forepeak of ships of 131 m in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (1); of those having a criterion numeral of 123 or more by the factor B given by formula (2); and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and B, using the formula:

$$F = A - \frac{(A - B)(C_s - 23)}{100} \tag{5}$$

Nevertheless, where the criterion numeral is equal to 45 or more and simultaneously the computed factor of subdivision as given by formula (5) is 0.65 or less, but more than 0.50, the subdivision abaft the forepeak shall be governed by the factor 0.50.

4.2 Where the factor F is less than 0.40 and it is shown to the satisfaction of the Administration to be impracticable to comply with the factor F in a machinery compartment of the ship, the subdivision of such compartment may be governed by an increased factor, which, however, shall not exceed 0.40.

4.3 The subdivision abaft the forepeak of ships of less than 131 m but not less than 79 m in length having a criterion numeral equal to S, where:

$$S = \frac{3,574 - 25L}{13}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor B given by the formula (2); of those having a

criterion numeral between S and 123 by the factor F obtained by linear interpolation between unity and the factor B using the formula:

$$F = 1 - \frac{(1 - B)(C_s - S)}{123 - S} \qquad (6)$$

4.4 The subdivision abaft the forepeak of ships of less than 131 m but not less than 79 m in length and having a criterion numeral less than S, and of ships of less than 79 m in length shall be governed by the factor unity, unless, in either case, it is shown to the satisfaction of the Administration to be impracticable to comply with this factor in any part of the ship, in which case the Administration may allow such relaxation as may appear to be justified, having regard to all the circumstances.

4.5 The provisions of paragraph 4.4 shall apply also to ships of whatever length, which are to be certified to carry a number of passengers exceeding 12 but not exceeding:

$\frac{L^2}{650}$, or 50, whichever is the less.

5 Special subdivision standards for ships complying with regulation III/21.1.2

5.1.1 In the case of ships primarily engaged in the carriage of passengers, the subdivision abaft the forepeak shall be governed by a factor of 0.5 or by the factor determined according to paragraphs 3 and 4, if less than 0.5.

5.1.2 In the case of such ships of less than 91.5 m in length, if the Administration is satisfied that compliance with such factor would be impracticable in a compartment, it may allow the length of that compartment to be governed by a higher factor provided the factor used is the lowest that is practicable and reasonable in the circumstances.

5.2 Where, in the case of any ship whether of less than 91.5 m or not, the necessity of carrying appreciable quantities of cargo makes it impracticable to require the subdivision abaft the forepeak to be governed by a factor not exceeding 0.50, the standard of subdivision to be applied shall be determined in accordance with the following subparagraphs .1 to .5, subject to the condition that where the Administration is satisfied that insistence on strict compliance in any respect would be unreasonable, it may allow such alternative arrangement of the watertight bulkheads as appears to be justified on merits and will not diminish the general effectiveness of the subdivision.

.1 The provisions of paragraph 3 relating to the criterion numeral shall apply with the exception that in calculating the value of P_1 for berthed passengers K is to have the value defined in

paragraph 3, or 3.5 m^3, whichever is the greater, and for unberthed passengers K is to have the value 3.5 m^3.

.2 The factor B in paragraph 2 shall be replaced by the factor BB determined by the following formula:

$$BB = \frac{17.6}{L - 33} + 0.20 \qquad (L = 55 \text{ m and upwards})$$

.3 The subdivision abaft the forepeak of ships of 131 m in length and upwards having a criterion numeral of 23 or less shall be governed by the factor A given by formula (1) in paragraph 2.3; of those having a criterion numeral of 123 or more by the factor BB given by the formula in paragraph 5.2.2; and of those having a criterion numeral between 23 and 123 by the factor F obtained by linear interpolation between the factors A and BB, using the formula:

$$F = A - \frac{(A - BB)(C_s - 23)}{100}$$

except that if the factor F so obtained is less than 0.5 the factor to be used shall be either 0.5 or the factor calculated according to the provisions of paragraph 4.1, whichever is the smaller.

.4 The subdivision abaft the forepeak of ships of less than 131 m but not less than 55 m in length having a criterion numeral equal to S_1 where:

$$S_1 = \frac{3,712 - 25L}{19}$$

shall be governed by the factor unity; of those having a criterion numeral of 123 or more by the factor BB given by the formula in paragraph 5.2.2; of those having a criterion numeral between S_1 and 123 by the factor F obtained by linear interpolation between unity and the factor BB using the formula:

$$F = 1 - \frac{(1 - BB)(C_s - S_1)}{123 - S_1}$$

except that in either of the two latter cases if the factor so obtained is less than 0.5 the subdivision may be governed by a factor not exceeding 0.5.

.5 The subdivision abaft the forepeak of ships of less than 131 m but not less than 55 m in length and having a criterion numeral less than S_1 and of ships of less than 55 m in length shall be governed by the factor unity, unless it is shown to the satisfaction of the Administration to be impracticable to comply with this factor in particular compartments, in which event the Administration may allow such relaxations in respect of those

compartments as appear to be justified, having regard to all the circumstances, provided that the aftermost compartment and as many as possible of the forward compartments (between the forepeak and the after end of the machinery space) shall be kept within the floodable length.

5.3 The special provisions regarding permeability given in regulation 5.4 shall be employed when calculating the floodable length curves.

5.4 Where the Administration is satisfied that, having regard to the nature and conditions of the intended voyages compliance with the other provisions of this chapter and of chapter II-2 is sufficient, the requirements of this paragraph need not be complied with.

Regulation 7
Special requirements concerning passenger ship subdivision

1 Where in a portion or portions of a ship the watertight bulkheads are carried to a higher deck than in the remainder of the ship and it is desired to take advantage of this higher extension of the bulkheads in calculating the floodable length, separate margin lines may be used for each such portion of the ship provided that:

.1 the sides of the ship are extended throughout the ship's length to the deck corresponding to the upper margin line and all openings in the shell plating below this deck throughout the length of the ship are treated as being below a margin line, for the purposes of regulation 17; and

.2 the two compartments adjacent to the "step" in the bulkhead deck are each within the permissible length corresponding to their respective margin lines, and, in addition, their combined length does not exceed twice the permissible length based on the lower margin line.

2.1 A compartment may exceed the permissible length determined by the rules of regulation 6 provided the combined length of each pair of adjacent compartments to which the compartment in question is common does not exceed either the floodable length or twice the permissible length, whichever is the less.

2.2 If one of the two adjacent compartments is situated inside the machinery space, and the second is situated outside the machinery space, and the average permeability of the portion of the ship in which the second is situated differs from that of the machinery space, the combined length of the two compartments shall be adjusted to the mean average permeability of the two portions of the ship in which the compartments are situated.

2.3 Where the two adjacent compartments have different factors of subdivision, the combined length of the two compartments shall be determined proportionately.

3 In ships of 100 m in length and upwards, one of the main transverse bulkheads abaft the forepeak shall be fitted at a distance from the forward perpendicular which is not greater than the permissible length.

4 A main transverse bulkhead may be recessed provided that all parts of the recess lie inboard of vertical surfaces on both sides of the ship, situated at a distance from the shell plating equal to one fifth 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. Any part of a recess which lies outside these limits shall be dealt with as a step in accordance with paragraph 5.

5 A main transverse bulkhead may be stepped provided that it meets one of the following conditions:

.1 the combined length of the two compartments, separated by the bulkhead in question, does not exceed either 90% of the floodable length or twice the permissible length, except that, in ships having a factor of subdivision greater than 0.9, the combined length of the two compartments in question shall not exceed the permissible length;

.2 additional subdivision is provided in way of the step to maintain the same measure of safety as that secured by a plane bulkhead;

.3 the compartment over which the step extends does not exceed the permissible length corresponding to a margin line taken 76 mm below the step.

6 Where a main transverse bulkhead is recessed or stepped, an equivalent plane bulkhead shall be used in determining the subdivision.

7 If the distance between two adjacent main transverse bulkheads, or their equivalent plane bulkheads, or the distance between the transverse planes passing through the nearest stepped portions of the bulkheads, is less than 3 m plus 3% of the length of the ship, or 11 m, whichever is the less, only one of these bulkheads shall be regarded as forming part of the subdivision of the ship in accordance with the provisions of regulation 6.

8 Where a main transverse watertight compartment contains local subdivision and it can be shown to the satisfaction of the Administration that, after any assumed side damage extending over a length of 3 m plus 3% of the length of the ship, or 11 m, whichever is the less, the whole volume of the main compartment will not be flooded, a proportionate allowance may be made in the permissible length otherwise required for such compartment. In such a case the volume of effective buoyancy assumed on

the undamaged side shall not be greater than that assumed on the damaged side.

9 Where the required factor of subdivision is 0.5 or less, the combined length of any two adjacent compartments shall not exceed the floodable length.

Regulation 8

*Stability of passenger ships in damaged condition**

(Subject to the provisions of regulation 8–1, paragraphs 2.3.1 to 2.3.4, 2.4, 5 and 6.2 apply to passenger ships constructed on or after 29 April 1990. Paragraphs 7.2, 7.3 and 7.4 apply to all passenger ships)

1.1 Sufficient intact stability shall be provided in all service conditions so as to enable the ship to withstand the final stage of flooding of any one main compartment which is required to be within the floodable length.

1.2 Where two adjacent main compartments are separated by a bulkhead which is stepped under the conditions of regulation 7.5.1 the intact stability shall be adequate to withstand the flooding of those two adjacent main compartments.

1.3 Where the required factor of subdivision is 0.5 or less but more than 0.33 intact stability shall be adequate to withstand the flooding of any two adjacent main compartments.

1.4 Where the required factor of subdivision is 0.33 or less the intact stability shall be adequate to withstand the flooding of any three adjacent main compartments.

2.1 The requirements of paragraph 1 shall be determined by calculations which are in accordance with paragraphs 3, 4 and 6 and which take into consideration the proportions and design characteristics of the ship and the arrangement and configuration of the damaged compartments. In making these calculations the ship is to be assumed in the worst anticipated service condition as regards stability.

2.2 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 such restrictions in the calculations.

* Refer to MSC/Circ.541 (as may be revised): 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.

2.3 The stability required in the final condition after damage, and after equalization where provided, shall be determined as follows:

2.3.1 The positive residual righting lever curve shall have a minimum range of 15° beyond the angle of equilibrium. This range may be reduced to a minimum of 10°, in the case where the area under the righting lever curve is that specified in paragraph 2.3.2, increased by the ratio:

$$\frac{15}{\text{range}}$$

where the range is expressed in degrees.

2.3.2 The area under the righting lever curve shall be at least 0.015 metre-radians, measured from the angle of equilibrium to the lesser of:

.1 the angle at which progressive flooding occurs;

.2 22° (measured from the upright) in the case of one-compartment flooding, or 27° (measured from the upright) in the case of the simultaneous flooding of two or more adjacent compartments.

2.3.3 A residual righting lever is to be obtained within the range of positive stability, taking into account the greatest of the following heeling moments:

.1 the crowding of all passengers towards one side;

.2 the launching of all fully loaded davit-launched survival craft on one side;

.3 due to wind pressure;

as calculated by the formula:

$$GZ \text{ (in metres)} = \frac{\text{heeling moment}}{\text{displacement}} + 0.04$$

However, in no case is this righting lever to be less than 0.1 m.

2.3.4 For the purpose of calculating the heeling moments in paragraph 2.3.3, the following assumptions shall be made:

.1 Moments due to crowding of passengers:

.1.1 four persons per square metre;

.1.2 a mass of 75 kg for each passenger;

.1.3 passengers shall be distributed 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.

.2 Moments due to launching of all fully loaded davit-launched survival craft on one side:

.2.1 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;

.2.2 for lifeboats which are arranged to be launched fully loaded from the stowed position, the maximum heeling moment during launching shall be taken;

.2.3 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;

.2.4 persons not in the life-saving appliances which are swung out shall not provide either additional heeling or righting moment;

.2.5 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.

.3 Moments due to wind pressure:

.3.1 a wind pressure of 120 N/m^2 to be applied;

.3.2 the area applicable shall be the projected lateral area of the ship above the waterline corresponding to the intact condition;

.3.3 the moment arm shall be the vertical distance from a point at one half of the mean draught corresponding to the intact condition to the centre of gravity of the lateral area.

2.4 In intermediate stages of flooding, the maximum righting lever shall be at least 0.05 m and the range of positive righting levers shall be at least 7°. In all cases, only one breach in the hull and only one free surface need be assumed.

3 For the purpose of making damage stability calculations the volume and surface permeabilities shall be in general as follows:

Spaces	Permeability
Appropriated to cargo, coal or stores	60
Occupied by accommodation	95
Occupied by machinery	85
Intended for liquids	0 or 95*

Higher surface permeabilities are to be assumed in respect of spaces which, in the vicinity of the damage waterplane, contain no substantial quantity of accommodation or machinery and spaces which are not generally occupied by any substantial quantity of cargo or stores.

* Whichever results in the more severe requirements.

4 Assumed extent of damage shall be as follows:

.1 longitudinal extent: 3 m plus 3% of the length of the ship, or 11 m, whichever is the less. Where the required factor of subdivision is 0.33 or less the assumed longitudinal extent of damage shall be increased as necessary so as to include any two consecutive main transverse watertight bulkheads;

.2 transverse extent (measured inboard from the ship's side, at right angles to the centreline at the level of the deepest subdivision load line): a distance of one fifth of the breadth of the ship, as defined in regulation 2; and

.3 vertical extent: from the base line upwards without limit;

.4 if any damage of lesser extent than that indicated in paragraphs 4.1, 4.2 and 4.3 would result in a more severe condition regarding heel or loss of metacentric height, such damage shall be assumed in the calculations.

5 Unsymmetrical flooding is to be kept to a minimum consistent with 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 cross-flooding fittings are provided they shall be operable from above the bulkhead deck. These fittings together with their controls shall be acceptable to the Administration. The maximum angle of heel after flooding but before equalization shall not exceed 15°. Where cross-flooding fittings are required the time for equalization shall not exceed 15 min. Suitable information concerning the use of cross-flooding fittings shall be supplied to the master of the ship.*

6 The final conditions of the ship after damage and, in the case of unsymmetrical flooding, after equalization measures have been taken shall be as follows:

.1 in the case of symmetrical flooding there shall be a positive residual metacentric height of at least 50 mm as calculated by the constant displacement method;

.2 in the case of unsymmetrical flooding, the angle of heel for one-compartment flooding shall not exceed 7°. For the simultaneous flooding of two or more adjacent compartments, a heel of 12° may be permitted by the Administration;

.3 in no case shall the margin line be submerged in the final stage of flooding. If it is considered that the margin line may become submerged during an intermediate stage of flooding, the

* Refer to the Recommendation on a standard method for establishing compliance with the requirements for cross-flooding arrangements in passenger ships adopted by the Organization by resolution A.266(VIII).

Administration may require such investigations and arrangements as it considers necessary for the safety of the ship.

7.1 The master of the ship shall be supplied with the data necessary to maintain sufficient intact stability under service conditions to enable the ship to withstand the critical damage. In the case of ships requiring cross-flooding the master of the ship shall be informed of the conditions of stability on which the calculations of heel are based and be warned that excessive heeling might result should the ship sustain damage when in a less favourable condition.

7.2 The data referred to in paragraph 7.1 to enable the master to maintain sufficient intact stability shall include information which indicates the maximum permissible height of the ship's centre of gravity above keel (KG), or alternatively the minimum permissible metacentric height (GM), for a range of draughts or displacements sufficient to include all service conditions. The information shall show the influence of various trims taking into account the operational limits.

7.3 Each 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.

7.4 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 the 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.

8.1 No relaxation from the requirements for damage stability may be considered by the Administration unless it is shown that the intact metacentric height in any service condition necessary to meet these requirements is excessive for the service intended.

8.2 Relaxations from the requirements for damage stability shall be permitted only in exceptional cases and subject to the condition that the Administration is to be satisfied that the proportions, arrangements and other characteristics of the ship are the most favourable to stability after damage which can practically and reasonably be adopted in the particular circumstances.

Regulation 8-1

*Stability of ro–ro passenger ships in damaged condition**

Ro-ro passenger ships constructed before 1 July 1997 shall comply with regulation 8, as amended by resolution MSC.12(56), not later than the date of the first periodical survey after the date of compliance prescribed below, according to the value of A/A_{max} as defined in the annex of the Calculation Procedure to assess the survivability characteristics of existing ro–ro passenger ships when using a simplified method based upon resolution A.265(VIII), developed by the Maritime Safety Committee at its fifty-ninth session in June 1991 (MSC/Circ.574).†

Value of A/A_{max}	**Date of compliance**
less than 85%	1 October 1998
85% or more but less than 90%	1 October 2000
90% or more but less than 95%	1 October 2002
95% or more but less than 97.5%	1 October 2004
97.5% or more	1 October 2005

Regulation 8-2

Special requirements for ro–ro passenger ships carrying 400 persons or more

Notwithstanding the provisions of regulations 8 and 8-1:

.1 Ro–ro passenger ships certified to carry 400 persons or more constructed on or after 1 July 1997 shall comply with the provisions of paragraph 2.3 of regulation 8, assuming the damage applied anywhere within the ship's length *L*; and

.2 Ro–ro passenger ships certified to carry 400 persons or more constructed before 1 July 1997 shall comply with the requirements of subparagraph .1 not later than the date of the first periodical survey after the date of compliance prescribed in subparagraph .2.1, .2.2 or .2.3 which occurs the latest:

.2.1	**Value of A/A_{max}**	**Date of compliance**
	less than 85%	1 October 1998
	85% or more but less than 90%	1 October 2000
	90% or more but less than 95%	1 October 2002
	95% or more but less than 97.5%	1 October 2004
	97.5% or more	1 October 2010

* For the application of specific stability requirements to ro–ro passenger ships, refer to resolution 14 of the 1995 SOLAS Conference.

† Refer to MSC/Circ.649, Interpretations of provisions of resolution MSC.26(60) and MSC/Circ.574.

.2.2 Number of persons permitted to be carried

1,500 or more	1 October 2002
1,000 or more but less than 1,500	1 October 2006
600 or more but less than 1,000	1 October 2008
400 or more but less than 600	1 October 2010

.2.3 Age of the ship equal to or greater than 20 years,

where the age of the ship means the time counted from the date on which the keel was laid or the date on which it was at a similar stage of construction or from the date on which the ship was converted to a ro–ro passenger ship.

Regulation 8-3

Special requirements for passenger ships, other than ro–ro passenger ships, carrying 400 persons or more

Notwithstanding the provisions of regulation 8, passenger ships, other than ro–ro passenger ships, certified to carry 400 persons or more constructed on or after 1 July 2002 shall comply with the provisions of paragraphs 2.3 and 2.4 of regulation 8, assuming the damage applied anywhere within the ship's length *L*.

Regulation 9

Ballasting of passenger ships

1 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.

2 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 10

*Peak and machinery space bulkheads, shaft tunnels, etc., in passenger ships**

1 A forepeak or collision bulkhead shall be fitted which shall be watertight up to the bulkhead deck. This bulkhead shall be located at a

* Refer to MSC/Circ.855, Interpretation of the position of the forward perpendicular for the purpose of SOLAS regulation II-1/10.

distance from the forward perpendicular of not less than 5% of the length of the ship and not more than 3 m plus 5% of the length of the ship.

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; or

.2 at a distance 1.5% of the length of the ship forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular; whichever gives the smallest measurement.

3 Where a long forward superstructure is fitted, the forepeak or collision bulkhead on all passenger ships shall be extended weathertight to the next full deck above the bulkhead deck. 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.

4 The extension required in paragraph 3 need not be fitted directly above the bulkhead below, provided that all parts of the extension are not located forward of the forward limit specified in paragraph 1 or paragraph 2. However, in ships constructed before 1 July 1997:

.1 where a sloping ramp forms part of the extension, the part of the extension, which is more than 2.3 m above the bulkhead deck, may extend no more than 1 m forward of the forward limits specified in paragraph 1 or paragraph 2; and

.2 where the existing ramp does not comply with the requirements for acceptance as an extension to the collision bulkhead and the position of the ramp prevents the siting of such extension within the limits specified in paragraph 1 or paragraph 2, the extension may be sited within a limited distance aft of the aft limit specified in paragraph 1 or paragraph 2. The limited distance aft should be no more than is necessary to ensure non interference with the ramp. The extension to the collision bulkhead shall open forward and comply with the requirements of paragraph 3 and shall be so arranged as to preclude the possibility of the ramp causing damage to it in the case of damage to, or detachment of, the ramp.

5 Ramps not meeting the above requirements shall be disregarded as an extension of the collision bulkhead.

6 In ships constructed before 1 July 1997, the requirements of paragraphs 3 and 4 shall apply not later than the date of the first periodical survey after 1 July 1997.

7 An afterpeak bulkhead, and bulkheads dividing the machinery space, as defined in regulation 2, from the cargo and passenger spaces forward and aft, 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.

8 In all cases stern tubes shall be enclosed in watertight spaces of moderate volume. 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 margin line will not be submerged.

Regulation 11

Peak and machinery space bulkheads and stern tubes in cargo ships

(Paragraphs 8 and 9 of this regulation apply to ships constructed on or after 1 February 1992)

1 For the purpose of this regulation *freeboard deck, length of ship* and *forward perpendicular* have the meanings as defined in the International Convention on Load Lines in force.

2 A collision bulkhead shall be fitted which shall be watertight up to the freeboard deck. This bulkhead shall be located at a distance from the forward perpendicular of not less than 5% of the length of the ship or 10 m, whichever is the less, and, except as may be permitted by the Administration, not more than 8% of the length of the ship.

3 Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g. a bulbous bow, the distances stipulated in paragraph 2 shall be measured from a point either:

.1 at the mid-length of such extension; or

.2 at a distance 1.5% of the length of the ship forward of the forward perpendicular; or

.3 at a distance 3 m forward of the forward perpendicular;

whichever gives the smallest measurement.

4 The bulkhead may have steps or recesses provided they are within the limits prescribed in paragraph 2 or 3. Pipes piercing the collision bulkhead shall be fitted with suitable valves operable from above the freeboard deck and the valve chest shall be secured at the bulkhead inside the forepeak. The valves may be fitted on the after side of the collision bulkhead provided that the valves are readily accessible under all service conditions and the space in which they are 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. No door, manhole, ventilation duct or any other opening shall be fitted in this bulkhead.

5 Where a long forward superstructure is fitted the collision bulkhead shall be extended weathertight to the deck next above the freeboard deck. The extension need not be fitted directly above the bulkhead below provided it is located within the limits prescribed in paragraph 2 or 3 with the exemption permitted by paragraph 6 and the part of the deck which forms the step is made effectively weathertight.

6 Where bow doors are fitted and a sloping loading ramp forms part of the extension of the collision bulkhead above the freeboard deck the part of the ramp which is more than 2.3 m above the freeboad deck may extend forward of the limit specified in paragraph 2 or 3. The ramp shall be weathertight over its complete length.

7 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.

8 Bulkheads shall be fitted separating the machinery space from cargo and passenger spaces forward and aft and made watertight up to the freeboard deck.

9 Stern tubes shall be enclosed in a watertight space (or spaces) of moderate volume. 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 12
Double bottoms in passenger ships

1 A double bottom shall be fitted extending from the forepeak bulkhead to the afterpeak bulkhead as far as this is practicable and compatible with the design and proper working of the ship.

.1 In ships of 50 m and upwards but less than 61 m in length a double bottom shall be fitted at least from the machinery space to the forepeak bulkhead, or as near thereto as practicable.

.2 In ships of 61 m and upwards but less than 76 m in length a double bottom shall be fitted at least outside the machinery space, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable.

.3 In ships of 76 m in length and upwards, a double bottom shall be fitted amidships, and shall extend to the fore and after peak bulkheads, or as near thereto as practicable.

2 Where a double bottom is required to be fitted its depth shall be to the satisfaction of the Administration and 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 line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any part than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25° to the base line and cutting it at a point one half the ship's moulded breadth from the middle line.

3 Small wells constructed in the double bottom in connection with drainage arrangements of holds, etc., shall not extend downwards more than necessary. The depth of the well shall in no case be more than the depth less 460 mm of the double bottom at the centreline, nor shall the well extend below the horizontal plane referred to in paragraph 2. 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.

4 A double bottom need not be fitted in way of watertight compartments of moderate size used exclusively for the carriage of liquids, provided the safety of the ship, in the event of bottom or side damage, is not, in the opinion of the Administration, thereby impaired.

5 In the case of 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 in any part of the ship which is subdivided by a factor not exceeding 0.50, 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.

Regulation 12-1

Double bottoms in cargo ships other than tankers

(This regulation applies to ships constructed on or after 1 February 1992)

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, its depth shall be to the satisfaction of the Administration and the inner bottom shall be continued out to the ship's side in such a manner as to protect the bottom to the turn of the bilge.

3 Small wells constructed in the double bottom, in connection with the drainage arrangements of holds, shall not extend in depth more than necessary. A well extending to the outer bottom, may, however, be permitted at the after end of the shaft tunnel of the ship. Other wells may be permitted by the Administration if it is satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this regulation.

4 A double bottom need not be fitted in way of watertight compartments used exclusively for the carriage of liquids, provided the safety of the ship in the event of bottom damage is not, in the opinion of the Administration, thereby impaired.

Regulation 12-2

Access to spaces in the cargo area of oil tankers

1 This regulation applies to oil tankers constructed on or after 1 October 1994.

2 Access to 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. Access to double bottom spaces may be through a cargo pump-room, pump-room, deep cofferdam, pipe tunnel or similar compartments, subject to consideration of ventilation aspects.

3 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 to provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening should be not less than 600 mm × 600 mm.

4 For access through vertical openings, or manholes providing passage through the length and breadth of the space, the minimum clear opening should be not less than 600 mm × 800 mm at a height of not more than 600 mm from the bottom shell plating unless gratings or other footholds are provided.

5 For oil tankers of less than 5,000 tonnes deadweight smaller dimensions may be approved by the Administration in special circumstances, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

Regulation 13
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 having spaces which are specially adapted for the accommodation of passengers and the carriage of cargo alternatively 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 conditions.

2 The subdivision load lines assigned and marked shall be recorded in the Passenger Ship Safety Certificate, and shall be distinguished by the notation C.1 for the principal passenger condition, and C.2, C.3, etc., for the alternative conditions.

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 conditions of service 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 condition of service is submerged.

Regulation 14
Construction and initial testing of watertight bulkheads, etc., in passenger ships and cargo ships

1 Each watertight subdivision bulkhead, whether transverse or longitudinal, shall be constructed in such a manner that it shall be capable of supporting, with a proper margin of resistance, the pressure due to the maximum head of water which it might have to sustain in the event of

damage to the ship but at least the pressure due to a head of water up to the margin line. The construction of these bulkheads shall be to the satisfaction of the Administration.

2.1 Steps and recesses in bulkheads shall be watertight and as strong as the bulkhead at the place where each occurs.

2.2 Where frames or beams pass through a watertight deck or bulkhead, such deck or bulkhead shall be made structurally watertight without the use of wood or cement.

3 Testing main compartments by filling them with water is not compulsory. When testing by filling with water is not carried out, a hose test is compulsory; this test shall be carried out in the most advanced stage of the fitting out of the ship. In any case a thorough inspection of the watertight bulkheads shall be carried out.

4 The forepeak, double bottoms (including duct keels) and inner skins shall be tested with water to a head corresponding to the requirements of paragraph 1.

5 Tanks which are intended to hold liquids, and which form part of the subdivision of the ship, shall be tested for tightness with water to a head up to the deepest subdivision load line or to a head corresponding to two thirds of the depth from the top of keel to the margin line in way of the tanks, whichever is the greater; provided that in no case shall the test head be less than 0.9 m above the top of the tank.

6 The tests referred to in paragraphs 4 and 5 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 15

Openings in watertight bulkheads in passenger ships

(This regulation applies to ships constructed on or after 1 February 1992)

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 subdivision 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 subdivision bulkheads.

2.3 Lead or other heat sensitive materials shall not be used in systems which penetrate watertight subdivision bulkheads, where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads.

3.1 No doors, manholes, or access openings are permitted:

.1 in the collision bulkhead below the margin line;

.2 in watertight transverse bulkheads dividing a cargo space from an adjoining cargo space or from a permanent or reserve bunker, except as provided in paragraph 10.1 and in regulation 16.

3.2 Except as provided in paragraph 3.3, the collision bulkhead may be pierced below the margin line by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screwdown 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.

3.3 If the forepeak is divided to hold two different kinds of liquids the Administration may allow the collision bulkhead to be pierced below the margin line by two pipes, each of which is fitted as required by paragraph 3.2, 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.

4.1 Watertight doors fitted in bulkheads between permanent and reserve bunkers shall always be accessible, except as provided in paragraph 9.4 for between-deck bunker doors.

4.2 Satisfactory arrangements shall be made by means of screens or otherwise to prevent the coal from interfering with the closing of watertight bunker doors.

5 Subject to paragraph 11, not more than one door, apart from the doors to bunkers and shaft tunnels, may be fitted in each main transverse bulkhead within spaces containing the main and auxiliary propulsion machinery including boilers serving the needs of propulsion and all permanent bunkers. 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.

6.1 Watertight doors, except as provided in paragraph 10.1 or regulation 16, 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.

6.2 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.

6.3 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 load line, the operation of the watertight doors clear of the damaged portion of the ship is not impaired.

6.4 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.

6.5 In ships constructed before 1 February 1992, doors which do not comply with paragraphs 6.1 to 6.4 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 into the log-book.

7.1 Each power-operated sliding watertight door:

.1 shall have a vertical or horizontal motion;

.2 shall, subject to paragraph 11, 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:

.2.1 special consideration shall be given to the strength of the door and its closing appliances in order to prevent leakages;

.2.2 the door shall be located outside the damage zone $\frac{B}{5}$;

.2.3 the door shall be kept closed when the ship is at sea, except for limited periods when absolutely necessary as determined by the Administration;

.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 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 IPX7 standard;

.2 door position indicators and associated circuit components; protected to IPX8 standard; and

.3 door movement warning signals; protected to IPX6 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 testing of the enclosures protected to IPX8 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 permit doors to be opened locally and shall automatically reclose 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 All watertight doors shall be kept closed during navigation except that they may be opened during navigation as specified in paragraphs 9.2, 9.3 and 9.4. Watertight doors of width of more than 1.2 m permitted by paragraph 11 may only be opened in the circumstances detailed in that paragraph. Any door which is opened in accordance with this paragraph shall be ready to be immediately closed.

9.2 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.

9.3 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.

9.4 Sliding watertight doors fitted between bunkers in the between-decks below the bulkhead deck may sometimes be open at sea for the purpose of trimming coal. The opening and closing of these doors shall be recorded in such log-book as may be prescribed by the Administration.

10.1 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 load line.

10.2 Such doors 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. Should any of the 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.

11 Portable plates on bulkheads shall not be permitted except in machinery spaces. Such plates 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 times of removal and replacement of any such portable plates shall be recorded in the log-book, and the necessary precautions shall be taken in replacing them to ensure that the joints are watertight. The Administration may permit not more than one power-operated sliding watertight door in each main transverse bulkhead larger than those specified in paragraph 7.1.2 to be substituted for these portable plates, provided these doors are closed before the ship leaves port and 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. The time of opening and closing these doors, whether the ship is at sea or in port, shall be recorded in the log-book.

12.1 Where trunkways or tunnels for access from crew accommodation to the stokehold, for piping, or for any other purpose are carried through main transverse watertight bulkheads, they shall be watertight and in accordance with the requirements of regulation 19. 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 margin line. 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.

12.2 Where it is proposed to fit tunnels piercing main transverse watertight bulkheads, these shall receive the special consideration of the Administration.

12.3 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 16
Passenger ships carrying goods vehicles and accompanying personnel

1 This regulation applies to passenger ships regardless of the date of construction designed or adapted for the carriage of goods vehicles and accompanying personnel where the total number of persons on board, other than those specified in regulation I/2(e)(i) and (ii), exceeds 12.

2 If in such a ship the total number of passengers which includes personnel accompanying vehicles does not exceed $N = 12 + A/25$, where A = 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 regulation 15.10 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 When applying the provisions of this chapter to such a ship, N shall be taken as the maximum number of passengers for which the ship may be certified in accordance with this regulation.

4 In applying regulation 8 for the worst operating conditions, the permeability for cargo spaces intended for the stowage of goods vehicles and containers shall be derived by calculation in which the goods vehicles and containers shall be assumed to be non-watertight and their permeability taken as 65. For ships engaged in dedicated services the actual value of permeability for goods vehicles or containers may be applied. In no case shall the permeability of the cargo spaces in which the goods vehicles and containers are carried be taken as less than 60.

Regulation 17
Openings in the shell plating of passenger ships below the margin line

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 load line, or 500 mm, whichever is the greater.

3.2 All sidescuttles the sills of which are below the margin line, 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.

3.3.1 Where in a between-decks, the sills of any of the sidescuttles referred to in paragraph 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.

3.3.2 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.

3.3.3 For any ship that has one or more sidescuttles so placed that the requirements of paragraph 3.3.1 would apply when it was floating at its deepest subdivision load line, 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.

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 load line, 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 Sidescuttles and their deadlights which will not be accessible during navigation shall be closed and secured before the ship leaves port.

6.1 No sidescuttles shall be fitted in any spaces which are appropriated exclusively to the carriage of cargo or coal.

6.2 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.

6.3 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.

7 Automatic ventilating sidescuttles shall not be fitted in the shell plating below the margin line without the special sanction of the Administration.

8 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.

9.1 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.

9.2.1 Subject to the requirements of the International Convention on Load Lines in force, and except as provided in paragraph 9.3, each separate discharge led through the shell plating from spaces below the margin line 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 load line 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.

9.2.2 The requirements of the International Convention on Load Lines in force shall apply to discharges led through the shell plating from spaces above the margin line.

9.3 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. The valves may be controlled locally and shall be provided with indicators showing whether they are open or closed.

9.4 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.

10.1 Gangway, cargo and coaling ports fitted below the margin line shall be of sufficient strength. They shall be effectively closed and secured watertight before the ship leaves port, and shall be kept closed during navigation.

10.2 Such ports shall in no case be so fitted as to have their lowest point below the deepest subdivision load line.

11.1 The inboard opening of each ash-chute, rubbish-chute, etc., shall be fitted with an efficient cover.

11.2 If the inboard opening is situated below the margin line, 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 load line. When the chute is not in use both the cover and the valve shall be kept closed and secured.

Regulation 17-1

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

Notwithstanding the requirements of regulation 17, ships constructed on or after 1 July 1998 shall comply with the requirements of regulation 17 where a reference to "margin line" shall be deemed to mean a reference to the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

Regulation 18

Construction and initial tests of watertight doors, sidescuttles, etc., in passenger ships and cargo ships

1 In passenger ships:

.1 the design, materials and construction of all watertight doors, sidescuttles, gangway, cargo and coaling ports, valves, pipes, ash-chutes and rubbish-chutes referred to in these regulations shall be to the satisfaction of the Administration;

.2 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 each watertight door shall be tested by water pressure to a head up to the bulkhead deck or freeboard deck respectively. The test shall be made before the ship is put into service, either before or after the door is fitted.

Regulation 19

Construction and initial tests of watertight decks, trunks, etc., in passenger ships and cargo ships

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 In ro–ro passenger ships 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 8.5.*

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

4 In ro–ro passenger ships constructed before 1 July 1997, the requirements of paragraphs 2 and 3 shall apply not later than the date of the first periodical survey after 1 July 1997.*†

5 After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Regulation 20

Watertight integrity of passenger ships above the margin line

1 The Administration may require that all reasonable and practicable measures shall be taken to limit the entry and spread of water above the

* The Maritime Safety Committee, at its sixty-eighth session, agreed that paragraphs 2, 3 and 4 should commence with the words "In ro–ro passenger ships".

† The Maritime Safety Committee, at its sixty-seventh session, agreed that the expression "paragraph 2" should be replaced by the expression "paragraphs 2 and 3".

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 main subdivision 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.*

2 The bulkhead deck or a deck above it shall be weathertight. 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 In passenger ships constructed on or after 1 July 1997, 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 coaling ports and other means for closing openings in the shell plating above the margin line 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 load line.†

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 20-1
Closure of cargo loading doors

1 This regulation applies to all passenger ships.‡

2 The following doors, located above the margin line, shall be closed

* Refer to MSC/Circ.541 (as may be amended): 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.

† 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).

‡ Refer to MSC/Circ.541 (as may be amended): 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.

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 2.1;

.3 cargo loading doors in the collision bulkhead;

.4 weathertight ramps forming an alternative closure to those defined in paragraphs 2.1 to 2.3 inclusive.

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.

3 Notwithstanding the requirements of paragraph 2.1 and 2.4, 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.

4 The master shall ensure that an effective system of supervision and reporting of the closing and opening of the doors referred to in paragraph 2 is implemented.

5 The master shall ensure, before the ship proceeds on any voyage, that an entry in the log-book, as required in regulation 25, is made of the time of the last closing of the doors specified in paragraph 2 and the time of any opening of particular doors in accordance with paragraph 3.

Regulation 20-2

Watertight integrity from the ro–ro deck (bulkhead deck) to spaces below

1 In ro–ro passenger ships constructed on or after 1 July 1997:

.1 subject to the provisions of subparagraphs .2 and .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;

.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;

.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 to the navigation bridge;

.4 the accesses referred to in subparagraphs .2 and .3 shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth;

.5 the master shall ensure that an effective system of supervision and reporting of the closing and opening of such accesses referred to in subparagraphs .2 and .3 is implemented; and

.6 the master shall ensure, before the ship leaves the berth on any voyage, that an entry in the log-book, as required by regulation 25, is made of the time of the last closing of the accesses referred to in subparagraphs .2 and .3.

2 In ro–ro passenger ships constructed before 1 July 1997:

.1 all accesses from the ro–ro deck that lead to spaces below the bulkhead deck shall be made weathertight and means shall be provided on the navigation bridge, indicating whether the access is open or closed;

.2 all such accesses shall be closed before the ship leaves the berth on any voyage and shall remain closed until the ship is at its next berth;

.3 notwithstanding the requirements of subparagraph .2, 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; and

.4 the requirements of subparagraph .1 shall apply not later than the date of the first periodical survey after 1 July 1997.

Regulation 20-3

Access to ro–ro decks

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 20-4

Closure of bulkheads on the ro–ro deck

1 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.

2 Notwithstanding the requirements of paragraph 1, 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.

Regulation 21
Bilge pumping arrangements

(Paragraphs 1.6 and 2.9 of this regulation apply to ships constructed on or after 1 February 1992)

1 Passenger ships and cargo ships

1.1 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.

1.2 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.

1.3 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.

1.4 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.

1.5 All distribution boxes and manually operated valves in connection with the bilge pumping arrangements shall be in positions which are accessible under ordinary circumstances.

1.6 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.

1.6.1 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 17 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.

1.6.2 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.

2 Passenger ships

2.1 The bilge pumping system required by paragraph 1.1 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 8.2.1 to 8.2.3 show that the survival capability of the ship will not be impaired.

2.2 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 criterion numeral is 30 or more, one additional independent power pump shall be provided.

2.3 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.

2.4 On a ship of 91.5 m in length and upwards or having a criterion numeral 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.

2.5 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 1.1.

2.6 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.

2.7.1 In addition to the direct bilge suction or suctions required by paragraph 2.6 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.

2.7.2 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.

2.7.3 The spindles of the sea inlet and direct suction valves shall extend well above the engine-room platform.

2.8 All bilge suction piping up to the connection to the pumps shall be independent of other piping.

2.9 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 1.6.2 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.

2.10 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.

2.11 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 2.1; 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.

2.12 All cocks and valves referred to in paragraph 2.11 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.

3 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.

Regulation 22
*Stability information for passenger ships and cargo ships**

1 Every passenger ship regardless of size and every cargo ship having a length, as defined in the International Convention on Load Lines in force, of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined. 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 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.

3 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L is found or anticipated.

* 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) as amended by resolution MSC.75(69). Refer also to: MSC/Circ.456, Guidelines for the preparation of intact stability information; MSC/Circ.706, Guidance on intact stability of existing tankers during transfer operations; and MSC/Circ.707, Guidance to the master for avoiding dangerous situations in following and quartering seas.

4 The Administration may allow the inclining test of an individual 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 paragraph 1.

5 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.

Regulation 23

*Damage control plans in passenger ships**

There shall be permanently exhibited, 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.

Regulation 23-1

*Damage control in dry cargo ships**

(This regulation applies to ships constructed on or after 1 February 1992)

1 There shall be permanently exhibited or readily available on the navigation bridge, for the guidance of the officer in charge of the ship, a plan 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 Indicators shall be provided for all sliding doors and for hinged doors in watertight bulkheads. Indication showing whether the doors are open or closed shall be given on the navigation bridge. In addition, shell doors and other openings which, in the opinion of the Administration, could lead to

* Refer to MSC/Circ. 919, Guidelines for damage control plans.

† Refer to MSC/Circ.434, Guidelines for the preparation of information on the effect of flooding to be provided to masters of dry cargo ships.

major flooding if left open or not properly secured, shall be provided with such indicators.

3.1 General precautions 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.

3.2 Specific precautions 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 and its crew.

Regulation 23-2
Integrity of the hull and superstructure, damage prevention and control

(This regulation applies to all ro–ro passenger ships, except that for ships constructed before 1 July 1997, paragraph 2 shall apply not later than the date of the first periodical survey after 1 July 1997)

1 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 cargo 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. The indicator systems, approved by the Administration, which were installed on ships constructed before 1 July 1997 need not be changed.

2 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 cargo spaces.

3 Special category spaces and ro–ro cargo 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 under way.

4 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 cargo space, shall be kept on board and posted at an appropriate place.

Regulation 24
Marking, periodical operation and inspection of watertight doors, etc., in passenger ships

1 This regulation applies to all ships.

2.1 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.

2.2 All watertight doors, both hinged and power operated, in main transverse bulkheads, in use at sea, shall be operated daily.

3.1 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.

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

Regulation 25
Entries in log of passenger ships

1 This regulation applies to all ships.

2 Hinged doors, portable plates, sidescuttles, gangway, cargo and coaling 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.

3 A record of all drills and inspections required by regulation 24 shall be entered in the log-book with an explicit record of any defects which may be disclosed.

Part B-1
*Subdivision and damage stability of cargo ships**

(This part applies to cargo ships constructed
on or after 1 February 1992)

Regulation 25-1
Application

1 The requirements in this part shall apply to cargo ships over 100 m in length (L_s) but shall exclude those ships which are shown to comply with subdivision and damage stability regulations in other instruments† developed by the Organization. The requirements in this part shall also apply to cargo ships of 80 m in L_s and upwards but not exceeding 100 m in L_s constructed on or after 1 July 1998.

2 Any reference hereinafter to regulations refers to the set of regulations contained in this part.

3 The Administration may for a particular ship or group of ships accept alternative arrangements, 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 arrangements shall communicate to the Organization particulars thereof.

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* The Maritime Safety Committee, in adopting the regulations contained in part B-1, invited Administrations to note that the regulations should be applied in conjunction with the Explanatory notes to the SOLAS regulations on subdivision and damage stability of cargo ships of 100 metres in length and over, which were adopted by the Organization by resolution A.684(17), in order to ensure their uniform application. Refer also to resolution MSC.76(69) on Extended application of the Explanatory Notes to the SOLAS regulations on subdivision and damage stability of cargo ships of 100 metres in length and over (resolution A.684(17)).

† 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;
.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 Line Convention as applied in compliance with resolutions A.320(IX) and A.514(13), provided that in the case of 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).

Regulation 25-2
Definitions

For the purpose of these regulations, unless expressly provided otherwise:

1.1 *Subdivision load line* is a waterline used in determining the subdivision of the ship.

1.2 *Deepest subdivision load line* is the subdivision load line which corresponds to the summer draught to be assigned to the ship.

1.3 *Partial load line* is the light ship draught plus 60% of the difference between the light ship draught and deepest subdivision load line.

2.1 *Subdivision length of the ship (L_s)* 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 load line.

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

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

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

3 *Breadth (B)* is the greatest moulded breadth of the ship at or below the deepest subdivision load line.

4 *Draught (d)* is the vertical distance from the moulded baseline at mid-length to the waterline in question.

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

Regulation 25-3
Required subdivision index R

1 These regulations are intended to provide ships with a minimum standard of subdivision.

2 The degree of subdivision to be provided shall be determined by the required subdivision index R, as follows:

.1 for ships over 100 m in L_s:

$R = (0.002 + 0.0009L_s)^{\frac{1}{3}}$,

where L_s is in metres; and

.2 for ships of 80 m in L_s and upwards but not exceeding 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.

Regulation 25-4
Attained subdivision index A

1 The attained subdivision index A, calculated in accordance with this regulation, shall not be less than the required subdivision index R, calculated in accordance with paragraph 2 of regulation 25-3.

2 The attained subdivision index A shall be calculated for the ship by the following formula:

$$A = \sum p_i s_i$$

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,

s_i accounts for the probability of survival after flooding the compartment or group of compartments under consideration, including the effects of any horizontal subdivision.

3 In calculating A, level trim shall be used.

4 This summation covers only those cases of flooding which contribute to the value of the attained subdivision index A.

5 The summation indicated by the above formula shall be taken over the ship's length for all cases of flooding in which a single compartment or two or more adjacent compartments are involved.

6 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; and additionally, for all cases of simultaneous flooding of a wing compartment or compartments and the adjacent inboard compartment or compartments, assuming a rectangular penetration which extends to the ship's centreline, but excludes damage to any centreline bulkhead.

7 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 will give a more severe result, such extent is to be assumed.

8 If pipes, ducts or tunnels are situated within assumed flooded compartments, 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.

9 In the flooding calculations carried out according to the regulations, only one breach of the hull need be assumed.

Regulation 25-5

Calculation of the factor p_i

1 The factor p_i shall be calculated according to paragraph 1.1 as appropriate, using the following notations:

x_1 = the distance from the aft terminal of L_s to the foremost portion of the aft end of the compartment being considered;

x_2 = the distance from the aft terminal of L_s to the aftermost portion of the forward end of the compartment being considered;

$E_1 = \frac{x_1}{L_s}$

$E_2 = \frac{x_2}{L_s}$

$E = E_1 + E_2 - 1$

$J = E_2 - E_1$

$J' = J - E$, if $E \geqslant 0$

$J' = J + E$, if $E < 0$

The maximum nondimensional damage length

$J_{\max} = \frac{48}{L_s}$, but not more than 0.24.

The assumed distribution density of damage location along the ship's length

$a = 1.2 + 0.8E$, but not more than 1.2.

The assumed distribution function of damage location along the ship's length

$F = 0.4 + 0.25E\ (1.2 + a)$

$\gamma = \frac{J}{J_{\max}}$

$p = F_1 J_{\max}$

$q = 0.4F_2(J_{\max})^2$

$$F_1 = \gamma^2 - \frac{\gamma^3}{3}, \quad \text{if } \gamma < 1,$$

$$F_1 = \gamma - \frac{1}{3} \quad \text{otherwise;}$$

$$F_2 = \frac{\gamma^3}{3} - \frac{\gamma^4}{12}, \quad \text{if } \gamma < 1,$$

$$F_2 = \frac{\gamma^2}{2} - \frac{\gamma}{3} + \frac{1}{12} \quad \text{otherwise.}$$

1.1 The factor p_i is determined for each single compartment:

1.1.1 Where the compartment considered extends over the entire ship length L_s:

$$p_i = 1$$

1.1.2 Where the aft limit of the compartment considered coincides with the aft terminal:

$$p_i = F + 0.5ap + q$$

1.1.3 Where the forward limit of the compartment considered coincides with the forward terminal:

$$p_i = 1 - F + 0.5ap$$

1.1.4 When both ends of the compartment considered are inside the aft and forward terminals of the ship length L_s:

$$p_i = ap$$

1.1.5 In applying the formulae of paragraphs 1.1.2, 1.1.3 and 1.1.4, where the compartment considered extends over the ''mid-length'', these formulae values shall be reduced by an amount determined according to the formula for q, in which F_2 is calculated taking γ to be $J'/J_{\max}$.

2 Wherever wing compartments are fitted, the p_i-value for a wing compartment shall be obtained by multiplying the value, as determined in paragraph 3, by the reduction factor r according to paragraph 2.2, which represents the probability that the inboard spaces will not be flooded.

2.1 The p_i-value for the case of simultaneous flooding of a wing and adjacent inboard compartment shall be obtained by using the formulae of paragraph 3, multiplied by the factor $(1 - r)$.

2.2 The reduction factor r shall be determined by the following formulae:

For $J \geqslant 0.2\,\frac{b}{B}$:

$$r = \frac{b}{B}\left(2.3 + \frac{0.08}{J + 0.02}\right) + 0.1, \quad \text{if } \frac{b}{B} \leqslant 0.2$$

$$r = \left(\frac{0.016}{J + 0.02} + \frac{b}{B} + 0.36\right), \quad \text{if } \frac{b}{B} > 0.2$$

For $J < 0.2\frac{b}{B}$ the reduction factor r shall be determined by linear interpolation between:

$r = 1$, for $J = 0$

and

r = as for the case where $J \geqslant 0.2\frac{b}{B}$, for $J = 0.2\frac{b}{B}$

where:

b = the mean transverse distance in metres measured at right angles to the centreline at the deepest subdivision load line between the shell and a plane through the outermost portion of and parallel to that part of the longitudinal bulkhead which extends between the longitudinal limits used in calculating the factor p_i.

3 To evaluate p_i for compartments taken singly the formulae in paragraphs 1 and 2 shall be applied directly.

3.1 To evaluate the p_i-values attributable to groups of compartments the following applies:

for compartments taken by pairs:

$p_i = p_{12} - p_1 - p_2$
$p_i = p_{23} - p_2 - p_3$, etc.

for compartments taken by groups of three:

$p_i = p_{123} - p_{12} - p_{23} + p_2$
$p_i = p_{234} - p_{23} - p_{34} + p_3$, etc.

for compartments taken by groups of four:

$p_i = p_{1234} - p_{123} - p_{234} + p_{23}$
$p_i = p_{2345} - p_{234} - p_{345} + p_{34}$, etc.

where:

p_{12}, p_{23}, p_{34}, etc.,
p_{123}, p_{234}, p_{345}, etc., and
p_{1234}, p_{2345}, p_{3456}, etc.

shall be calculated according to the formulae in paragraphs 1 and 2 for a single compartment whose nondimensional length J corresponds to that of a group consisting of the compartments indicated by the indices assigned to p.

3.2 The factor p_i for a group of three or more adjacent compartments equals zero if the nondimensional length of such a group minus the nondimensional length of the aftermost and foremost compartments in the group is greater than J_{max}.

Regulation 25-6
Calculation of the factor s_i

1 The factor s_i shall be determined for each compartment or group of compartments according to the following:

1.1 In general for any condition of flooding from any initial loading condition s shall be:

$$s = C\sqrt{0.5(GZ_{max})(\text{range})}$$

with:

$C = 1$, if $\theta e \leqslant 25°$,

$C = 0$, if $\theta e > 30°$,

$C = \sqrt{\frac{30 - \theta e}{5}}$ otherwise;

GZ_{max} = maximum positive righting lever (metres) within the range as given below but not more than 0.1 m;

range = range of positive righting levers beyond the angle of equilibrium (degrees) but not more than 20°; however, the range shall be terminated at the angle where openings not capable of being closed weathertight are immersed;

θe = final equilibrium angle of heel (degrees).

1.2 $s = 0$ where the final waterline taking into account sinkage, heel and trim, immerses the lower edge of openings through which progressive flooding may take place. Such opening shall include air-pipes, ventilators and openings which are closed by means of weathertight doors or hatch covers, and may exclude those openings closed by means of watertight manhole covers and flush scuttles, small watertight hatch covers which maintain the high integrity of the deck, remotely operated sliding watertight doors, access doors and access hatch covers, of watertight integrity, normally closed at sea and sidescuttles of the non-opening type. However, if the compartments so flooded are taken into account in the calculations the requirements of this regulation shall be applied.

1.3 For each compartment or group of compartments s_i shall be weighted according to draught considerations as follows:

$$s_i = 0.5s_l + 0.5s_p$$

where:

s_l is the s-factor at the deepest subdivision load line

s_p is the s-factor at the partial load line.

2 For all compartments forward of the collision bulkhead, the *s*-value, calculated assuming the ship to be at its deepest subdivision load line and with assumed unlimited vertical extent of damage, is to be equal to 1.

3 Wherever a horizontal subdivision is fitted above the waterline in question the following applies.

3.1 The *s*-value 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 according to paragraph 3.3, which represents the probability that the spaces above the horizontal subdivision will not be flooded.

3.2 In cases of positive contribution to index A due to simultaneous flooding of the spaces above the horizontal subdivision, the resulting *s*-value for such a compartment or group of compartments shall be obtained by an increase of the value as determined by paragraph 3.1 by the *s*-value for simultaneous flooding according to paragraph 1.1, multiplied by the factor $(1 - v)$.

3.3 The probability factor v_i shall be calculated according to:

$v_i = \dfrac{H - d}{H_{\max} - d}$ for the assumed flooding up to the horizontal subdivision above the subdivision load line, where H is to be restricted to a height of $H_{\max}$,

$v_i = 1$, if the uppermost horizontal subdivision in way of the assumed damaged region is below $H_{\max}$,

where:

H is the height of the horizontal subdivision above the base-line (metres) which is assumed to limit the vertical extent of damage,

$H_{\max}$ is the maximum possible vertical extent of damage above the baseline (metres), or

$H_{\max} = d + 0.056 L_s \left(1 - \dfrac{L_s}{500}\right)$, if $L_s \leqslant 250$ m

$H_{\max} = d + 7$, if $L_s > 250$ m

whichever is less.

Regulation 25-7
*Permeability**

For the purpose of the subdivision and damage stability calculations of the regulations, the permeability of each space or part of a space 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
Dry cargo spaces	0.70
Intended for liquid	0 or 0.95†

Regulation 25-8
Stability information

1 The master of the ship shall be supplied with such reliable information as is necessary to enable him by rapid and simple means to obtain accurate guidance as to the stability of the ship under varying conditions of service. The information shall include:

.1 a curve of minimum operational metacentric height (GM) versus draught which assures compliance with the relevant intact stability requirements and the requirements of regulations 25-1 to 25-6, alternatively a corresponding curve 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 stability after damage.

2 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.‡

* Refer to MSC/Circ.651, Interpretations of regulations of part B-1 of SOLAS chapter II-1.

† Whichever results in the more severe requirements.

‡ Refer to MSC/Circ. 919, Guidelines for damage control plans.

3 In order to provide the information referred to in paragraph 1.1, the limiting GM (or KG) values to be used, if they have been determined from considerations related to the subdivision index, the limiting GM shall be varied linearly between the deepest subdivision load line and the partial load line.* In such cases, for draughts below the partial load line if the minimum GM requirement at this draught results from the calculation of the subdivision index, then this GM value shall be assumed for lesser draughts, unless the intact stability requirements apply.

Regulation 25-9
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. The use of such doors and hatch covers shall be authorized by the officer of the watch.

4 Watertight doors or ramps of satisfactory construction may be fitted to internally subdivide large cargo spaces, provided that the Administration is

* Refer to MSC/Circ.651, Interpretations of regulations of part B-1 of SOLAS chapter II-1.

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.* Such doors or ramps shall be closed before the voyage commences and shall be kept closed during navigation; the time of opening such doors or ramps in port and of closing them before the ship leaves port shall be entered in the logbook. 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 25-10
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 be of sufficient strength and, except for cargo hatch covers, shall be fitted with indicators on the bridge.

3 Openings in the shell plating below the deck limiting the vertical extent of damage shall be kept permanently closed while at sea. Should any of these openings be accessible during the voyage, they shall be fitted with a device which prevents unauthorized opening.

4 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.

5 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.

* Refer to MSC/Circ.651, Interpretations of regulations of part B-1 of SOLAS chapter II-1.

Part C

Machinery installations

(Except where expressly provided otherwise part C applies to passenger ships and cargo ships)

Regulation 26

General

1 The machinery, boilers and other pressure vessels, associated piping systems and fittings shall be of a design and construction adequate for the service for which they are intended and shall be so installed and protected as to reduce to a minimum any danger to persons on board, due regard being paid to moving parts, hot surfaces and other hazards. The design shall have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.*

2 The Administration shall give special consideration to the reliability of single essential propulsion components and may require a separate source of propulsion power sufficient to give the ship a navigable speed, especially in the case of unconventional arrangements.

3 Means shall be provided whereby normal operation of propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative. Special consideration shall be given to the malfunctioning of:

- **.1** a generating set which serves as a main source of electrical power;
- **.2** the sources of steam supply;
- **.3** the boiler feedwater systems;
- **.4** the fuel oil supply systems for boilers or engines;†
- **.5** the sources of lubricating oil pressure;
- **.6** the sources of water pressure;
- **.7** a condensate pump and the arrangements to maintain vacuum in condensers;

* Refer to MSC/Circ. 834, Guidelines for engine-room lay-out, design and arrangement.

† Refer to MSC/Circ.647, Guidelines to minimize leakage from flammable liquid systems, as supplemented by MSC/Circ. 851, Guidelines on engine-room oil fuel systems.

.8 the mechanical air supply for boilers;

.9 an air compressor and receiver for starting or control purposes;

.10 the hydraulic, pneumatic or electrical means for control in main propulsion machinery including controllable pitch propellers.

However, the Administration, having regard to overall safety considerations, may accept a partial reduction in propulsion capability from normal operation.

4 Means shall be provided to ensure that the machinery can be brought into operation from the dead ship condition without external aid.

5 All boilers, all parts of machinery, all steam, hydraulic, pneumatic and other systems and their associated fittings which are under internal pressure shall be subjected to appropriate tests including a pressure test before being put into service for the first time.

6 Main propulsion machinery and all auxiliary machinery essential to the propulsion and the safety of the ship shall, as fitted in the ship, be designed to operate when the ship is upright and when inclined at any angle of list up to and including 15° either way under static conditions and 22.5° under dynamic conditions (rolling) either way and simultaneously inclined dynamically (pitching) 7.5° by bow or stern. The Administration may permit deviation from these angles, taking into consideration the type, size and service conditions of the ship.

7 Provision shall be made to facilitate cleaning, inspection and maintenance of main propulsion and auxiliary machinery including boilers and pressure vessels.

8 Special consideration shall be given to the design, construction and installation of propulsion machinery systems so that any mode of their vibrations shall not cause undue stresses in this machinery in the normal operating ranges.

9 Non-metallic expansion joints in piping systems, if located in a system which penetrates the ship's side and both the penetration and the non-metallic expansion joint are located below the deepest load waterline, shall be inspected as part of the surveys prescribed in regulation I/10(a) and replaced as necessary, or at an interval recommended by the manufacturer.

10 Operating and maintenance instructions and engineering drawings for ship machinery and equipment essential to the safe operation of the ship shall be written in a language understandable by those officers and crew members who are required to understand such information in the performance of their duties.

11 Location and arrangement of vent pipes for fuel oil service, settling and lubrication oil tanks shall be such that in the event of a broken vent pipe

this shall not directly lead to the risk of ingress of seawater splashes or rainwater. Two fuel oil service tanks for each type of fuel used on board necessary for propulsion and vital systems or equivalent arrangements shall be provided on each new ship, with a capacity of at least 8 h at maximum continuous rating of the propulsion plant and normal operating load at sea of the generator plant.* This paragraph applies only to ships constructed on or after 1 July 1998.

Regulation 27
Machinery

1 Where risk from overspeeding of machinery exists, means shall be provided to ensure that the safe speed is not exceeded.

2 Where main or auxiliary machinery including pressure vessels or any parts of such machinery are subject to internal pressure and may be subject to dangerous overpressure, means shall be provided where practicable to protect against such excessive pressure.

3 All gearing and every shaft and coupling used for transmission of power to machinery essential for the propulsion and safety of the ship or for the safety of persons on board shall be so designed and constructed that they will withstand the maximum working stresses to which they may be subjected in all service conditions, and due consideration shall be given to the type of engines by which they are driven or of which they form part.

4 Internal combustion engines of a cylinder diameter of 200 mm or a crankcase volume of 0.6 m^3 and above shall be provided with crankcase explosion relief valves of a suitable type with sufficient relief area. The relief valves shall be arranged or provided with means to ensure that discharge from them is so directed as to minimize the possibility of injury to personnel.

5 Main turbine propulsion machinery and, where applicable, main internal combustion propulsion machinery and auxiliary machinery shall be provided with automatic shutoff arrangements in the case of failures such as lubricating oil supply failure which could lead rapidly to complete breakdown, serious damage or explosion. The Administration may permit provisions for overriding automatic shutoff devices.

* Refer to regulation II-2/15, "Arrangements for oil fuel, lubricating oil and other flammable oils".

Regulation 28
*Means of going astern**

1 Sufficient power for going astern shall be provided to secure proper control of the ship in all normal circumstances.

2 The ability of the machinery to reverse the direction of thrust of the propeller in sufficient time, and so to bring the ship to rest within a reasonable distance from maximum ahead service speed, shall be demonstrated and recorded.

3 The stopping times, ship headings and distances recorded on trials, together with the results of trials to determine the ability of ships having multiple propellers to navigate and manoeuvre with one or more propellers inoperative, shall be available on board for the use of the master or designated personnel.

4 Where the ship is provided with supplementary means for manoeuvring or stopping, the effectiveness of such means shall be demonstrated and recorded as referred to in paragraphs 2 and 3.

Regulation 29
Steering gear†

1 Unless expressly provided otherwise, every ship shall be provided with a main steering gear and an auxiliary steering gear to the satisfaction of the Administration. The main steering gear and the auxiliary steering gear shall be so arranged that the failure of one of them will not render the other one inoperative.

2.1 All the steering gear components and the rudder stock shall be of sound and reliable construction to the satisfaction of the Administration. Special consideration shall be given to the suitability of any essential component which is not duplicated. Any such essential component shall, where appropriate, utilize antifriction bearings such as ball-bearings, roller-bearings or sleeve-bearings which shall be permanently lubricated or provided with lubrication fittings.

2.2 The design pressure for calculations to determine the scantlings of piping and other steering gear components subjected to internal hydraulic pressure shall be at least 1.25 times the maximum working pressure to be

* Refer to the Recommendation on the provision and the display of manoeuvring information on board ships (resolution A.601(15)), the Interim standards for ship manoeuvrability (resolution A.751(18)), and the Explanatory notes to the interim standards for ship manoeuvrability (MSC/Circ.644).

† Refer to resolution A.415(XI) on improved steering gear standards for passenger and cargo ships and resolution A.416(XI) on examination of steering gears on existing tankers.

expected under the operational conditions specified in paragraph 3.2, taking into account any pressure which may exist in the low-pressure side of the system. At the discretion of the Administration, fatigue criteria shall be applied for the design of piping and components, taking into account pulsating pressures due to dynamic loads.

2.3 Relief valves shall be fitted to any part of the hydraulic system which can be isolated and in which pressure can be generated from the power source or from external forces. The setting of the relief valves shall not exceed the design pressure. The valves shall be of adequate size and so arranged as to avoid an undue rise in pressure above the design pressure.

3 The main steering gear and rudder stock shall be:

.1 of adequate strength and capable of steering the ship at maximum ahead service speed which shall be demonstrated;

.2 capable of putting the rudder over from 35° on one side to 35° on the other side with the ship at its deepest seagoing draught and running ahead at maximum ahead service speed and, under the same conditions, from 35° on either side to 30° on the other side in not more than 28 s;

.3 operated by power where necessary to meet the requirements of paragraph 3.2 and in any case when the Administration requires a rudder stock of over 120 mm diameter in way of the tiller, excluding strengthening for navigation in ice; and

.4 so designed that they will not be damaged at maximum astern speed; however, this design requirement need not be proved by trials at maximum astern speed and maximum rudder angle.

4 The auxiliary steering gear shall be:

.1 of adequate strength and capable of steering the ship at navigable speed and of being brought speedily into action in an emergency;

.2 capable of putting the rudder over from 15° on one side to 15° on the other side in not more than 60 s with the ship at its deepest seagoing draught and running ahead at one half of the maximum ahead service speed or 7 knots, whichever is the greater; and

.3 operated by power where necessary to meet the requirements of paragraph 4.2 and in any case when the Administration requires a rudder stock of over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice.

5 Main and auxiliary steering gear power units shall be:

.1 arranged to restart automatically when power is restored after a power failure; and

.2 capable of being brought into operation from a position on the navigation bridge. In the event of a power failure to any one of the steering gear power units, an audible and visual alarm shall be given on the navigation bridge.

6.1 Where the main steering gear comprises two or more identical power units, an auxiliary steering gear need not be fitted, provided that:

.1 in a passenger ship, the main steering gear is capable of operating the rudder as required by paragraph 3.2 while any one of the power units is out of operation;

.2 in a cargo ship, the main steering gear is capable of operating the rudder as required by paragraph 3.2 while operating with all power units;

.3 the main steering gear is so arranged that after a single failure in its piping system or in one of the power units the defect can be isolated so that steering capability can be maintained or speedily regained.

6.2 The Administration may, until 1 September 1986, accept the fitting of a steering gear which has a proven record of reliability but does not comply with the requirements of paragraph 6.1.3 for a hydraulic system.

6.3 Steering gears, other than of the hydraulic type, shall achieve standards equivalent to the requirements of this paragraph to the satisfaction of the Administration.

7 Steering gear control shall be provided:

.1 for the main steering gear, both on the navigation bridge and in the steering gear compartment;

.2 where the main steering gear is arranged in accordance with paragraph 6, by two independent control systems, both operable from the navigation bridge. This does not require duplication of the steering wheel or steering lever. Where the control system consists of a hydraulic telemotor, a second independent system need not be fitted, except in a tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards;

.3 for the auxiliary steering gear, in the steering gear compartment and, if power-operated, it shall also be operable from the navigation bridge and shall be independent of the control system for the main steering gear.

8 Any main and auxiliary steering gear control system operable from the navigation bridge shall comply with the following:

.1 if electric, it shall be served by its own separate circuit supplied from a steering gear power circuit from a point within the steering gear compartment, or directly from switchboard

busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit;

.2 means shall be provided in the steering gear compartment for disconnecting any control system operable from the navigation bridge from the steering gear it serves;

.3 the system shall be capable of being brought into operation from a position on the navigation bridge;

.4 in the event of a failure of electrical power supply to the control system, an audible and visual alarm shall be given on the navigation bridge; and

.5 short circuit protection only shall be provided for steering gear control supply circuits.

9 The electrical power circuits and the steering gear control systems with their associated components, cables and pipes required by this regulation and by regulation 30 shall be separated as far as is practicable throughout their length.

10 A means of communication shall be provided between the navigation bridge and the steering gear compartment.

11 The angular position of the rudder shall:

.1 if the main steering gear is power-operated, be indicated on the navigation bridge. The rudder angle indication shall be independent of the steering gear control system;

.2 be recognizable in the steering gear compartment.

12 Hydraulic power-operated steering gear shall be provided with the following:

.1 arrangements to maintain the cleanliness of the hydraulic fluid taking into consideration the type and design of the hydraulic system;

.2 a low-level alarm for each hydraulic fluid reservoir to give the earliest practicable indication of hydraulic fluid leakage. Audible and visual alarms shall be given on the navigation bridge and in the machinery space where they can be readily observed; and

.3 a fixed storage tank having sufficient capacity to recharge at least one power actuating system including the reservoir, where the main steering gear is required to be power-operated. The storage tank shall be permanently connected by piping in such a manner that the hydraulic systems can be readily recharged from a position within the steering gear compartment and shall be provided with a contents gauge.

13 The steering gear compartments shall be:

.1 readily accessible and, as far as practicable, separated from machinery spaces; and

.2 provided with suitable arrangements to ensure working access to steering gear machinery and controls. These arrangements shall include handrails and gratings or other nonslip surfaces to ensure suitable working conditions in the event of hydraulic fluid leakage.

14 Where the rudder stock is required to be over 230 mm diameter in way of the tiller, excluding strengthening for navigation in ice, an alternative power supply, sufficient at least to supply the steering gear power unit which complies with the requirements of paragraph 4.2 and also its associated control system and the rudder angle indicator, shall be provided automatically, within 45 s, either from the emergency source of electrical power or from an independent source of power located in the steering gear compartment. This independent source of power shall be used only for this purpose. In every ship of 10,000 gross tonnage and upwards, the alternative power supply shall have a capacity for at least 30 min of continuous operation and in any other ship for at least 10 min.

15 In every tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards and in every other ship of 70,000 gross tonnage and upwards, the main steering gear shall comprise two or more identical power units complying with the provisions of paragraph 6.

16 Every tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards shall, subject to paragraph 17, comply with the following:

.1 the main steering gear shall be so arranged that in the event of loss of steering capability due to a single failure in any part of one of the power actuating systems of the main steering gear, excluding the tiller, quadrant or components serving the same purpose, or seizure of the rudder actuators, steering capability shall be regained in not more than 45 s after the loss of one power actuating system;

.2 the main steering gear shall comprise either:

.2.1 two independent and separate power actuating systems, each capable of meeting the requirements of paragraph 3.2; or

.2.2 at least two identical power actuating systems which, acting simultaneously in normal operation, shall be capable of meeting the requirements of paragraph 3.2. Where necessary to comply with this requirement, interconnection of hydraulic power actuating systems shall be provided. Loss of hydraulic fluid from one system shall be capable of being detected and

the defective system automatically isolated so that the other actuating system or systems shall remain fully operational;

.3 steering gears other than of the hydraulic type shall achieve equivalent standards.

17 For tankers, chemical tankers or gas carriers of 10,000 gross tonnage and upwards, but of less than 100,000 tonnes deadweight, solutions other than those set out in paragraph 16, which need not apply the single failure criterion to the rudder actuator or actuators, may be permitted provided that an equivalent safety standard is achieved and that:

.1 following loss of steering capability due to a single failure of any part of the piping system or in one of the power units, steering capability shall be regained within 45 s; and

.2 where the steering gear includes only a single rudder actuator, special consideration is given to stress analysis for the design including fatigue analysis and fracture mechanics analysis, as appropriate, to the material used, to the installation of sealing arrangements and to testing and inspection and to the provision of effective maintenance. In consideration of the foregoing, the Administration shall adopt regulations which include the provisions of the Guidelines for acceptance of non-duplicated rudder actuators for tankers, chemical tankers and gas carriers of 10,000 gross tonnage and above but less than 100,000 tonnes deadweight, adopted by the Organization.*

18 For a tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards, but less than 70,000 tonnes deadweight, the Administration may, until 1 September 1986, accept a steering gear system with a proven record of reliability which does not comply with the single failure criterion required for a hydraulic system in paragraph 16.

19 Every tanker, chemical tanker or gas carrier of 10,000 gross tonnage and upwards, constructed before 1 September 1984, shall comply, not later than 1 September 1986, with the following:

.1 the requirements of paragraphs 7.1, 8.2, 8.4, 10, 11, 12.2, 12.3 and 13.2;

.2 two independent steering gear control systems shall be provided each of which can be operated from the navigation bridge. This does not require duplication of the steering wheel or steering lever;

* Adopted by the Organization by resolution A.467(XII).

.3 if the steering gear control system in operation fails, the second system shall be capable of being brought into immediate operation from the navigation bridge; and

.4 each steering gear control system, if electric, shall be served by its own separate circuit supplied from the steering gear power circuit or directly from switchboard busbars supplying that steering gear power circuit at a point on the switchboard adjacent to the supply to the steering gear power circuit.

20 In addition to the requirements of paragraph 19, in every tanker, chemical tanker or gas carrier of 40,000 gross tonnage and upwards, constructed before 1 September 1984, the steering gear shall, not later than 1 September 1988, be so arranged that, in the event of a single failure of the piping or of one of the power units, steering capability can be maintained or the rudder movement can be limited so that steering capability can be speedily regained. This shall be achieved by:

.1 an independent means of restraining the rudder; or

.2 fast-acting valves which may be manually operated to isolate the actuator or actuators from the external hydraulic piping together with a means of directly refilling the actuators by a fixed independent power-operated pump and piping system; or

.3 an arrangement such that, where hydraulic power systems are interconnected, loss of hydraulic fluid from one system shall be detected and the defective system isolated either automatically or from the navigation bridge so that the other system remains fully operational.

Regulation 30
Additional requirements for electric and electrohydraulic steering gear

1 Means for indicating that the motors of electric and electrohydraulic steering gear are running shall be installed on the navigation bridge and at a suitable main machinery control position.

2 Each electric or electrohydraulic steering gear comprising one or more power units shall be served by at least two exclusive circuits fed directly from the main switchboard; however, one of the circuits may be supplied through the emergency switchboard. An auxiliary electric or electrohydraulic steering gear associated with a main electric or electrohydraulic steering gear may be connected to one of the circuits supplying this main steering gear. The circuits supplying an electric or electrohydraulic steering gear shall have adequate rating for supplying all motors which can be simultaneously connected to them and may be required to operate simultaneously.

3 Short circuit protection and an overload alarm shall be provided for such circuits and motors. Protection against excess current, including starting current, if provided, shall be for not less than twice the full load current of the motor or circuit so protected, and shall be arranged to permit the passage of the appropriate starting currents. Where a three-phase supply is used an alarm shall be provided that will indicate failure of any one of the supply phases. The alarms required in this paragraph shall be both audible and visual and shall be situated in a conspicuous position in the main machinery space or control room from which the main machinery is normally controlled and as may be required by regulation 51.

4 When in a ship of less than 1,600 gross tonnage an auxiliary steering gear which is required by regulation 29.4.3 to be operated by power is not electrically powered or is powered by an electric motor primarily intended for other services, the main steering gear may be fed by one circuit from the main switchboard. Where such an electric motor primarily intended for other services is arranged to power such an auxiliary steering gear, the requirement of paragraph 3 may be waived by the Administration if satisfied with the protection arrangement together with the requirements of regulation 29.5.1 and .2 and 29.7.3 applicable to auxiliary steering gear.

Regulation 31
Machinery controls

1 Main and auxiliary machinery essential for the propulsion and safety of the ship shall be provided with effective means for its operation and control.

2 Where remote control of propulsion machinery from the navigation bridge is provided and the machinery spaces are intended to be manned, the following shall apply:

.1 the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigation bridge under all sailing conditions, including manoeuvring;

.2 the remote control shall be performed, for each independent propeller, by a control device so designed and constructed that its operation does not require particular attention to the operational details of the machinery. Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device;

.3 the main propulsion machinery shall be provided with an emergency stopping device on the navigation bridge which shall be independent of the navigation bridge control system;

.4 propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room or at the manoeuvring platform as appropriate;

.5 remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigation bridge and machinery spaces shall be possible only in the main machinery space or the main machinery control room. This system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another;

.6 it shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system;

.7 the design of the remote control system shall be such that in case of its failure an alarm will be given. Unless the Administration considers it impracticable the preset speed and direction of thrust of the propellers shall be maintained until local control is in operation;

.8 indicators shall be fitted on the navigation bridge for:

.8.1 propeller speed and direction of rotation in the case of fixed pitch propellers;

.8.2 propeller speed and pitch position in the case of controllable pitch propellers;

.9 an alarm shall be provided on the navigation bridge and in the machinery space to indicate low starting air pressure which shall be set at a level to permit further main engine starting operations. If the remote control system of the propulsion machinery is designed for automatic starting, the number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting air pressure for starting locally.

3 Where the main propulsion and associated machinery, including sources of main electrical supply, are provided with various degrees of automatic or remote control and are under continuous manual supervision from a control room the arrangements and controls shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision; for this purpose regulations 46 to 50 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding.

4 In general, automatic starting, operational and control systems shall include provisions for manually overriding the automatic controls. Failure of any part of such systems shall not prevent the use of the manual override.

5 Ships constructed on or after 1 July 1998 shall comply with the requirements of paragraphs 1 to 4, as amended, as follows:

.1 paragraph 1 is replaced by the following:

"**1** Main and auxiliary machinery essential for the propulsion, control and safety of the ship shall be provided with effective means for its operation and control. All control systems essential for the propulsion, control and safety of the ship shall be independent or designed such that failure of one system does not degrade the performance of another system.";

.2 in the second and third lines of paragraph 2, the words "and the machinery spaces are intended to be manned" are deleted;

.3 the first sentence of paragraph 2.2 is replaced by the following:

"**.2** the control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery.";

.4 paragraph 2.4 is replaced by the following:

"**.4** propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room and at the manoeuvring platform;";

.5 a new sentence is added at the end of paragraph 2.6 to read as follows:

"It shall also be possible to control the auxiliary machinery, essential for the propulsion and safety of the ship, at or near the machinery concerned;" and

.6 paragraphs 2.8, 2.8.1 and 2.8.2 are replaced by the following:

"**.8** indicators shall be fitted on the navigation bridge, the main machinery control room and at the manoeuvring platform, for:

.8.1 propeller speed and direction of rotation in the case of fixed pitch propellers; and

.8.2 propeller speed and pitch position in the case of controllable pitch propellers;".

Regulation 32

Steam boilers and boiler feed systems

1 Every steam boiler and every unfired steam generator shall be provided with not less than two safety valves of adequate capacity. However, having regard to the output or any other features of any boiler or unfired steam generator, the Administration may permit only one safety valve to be

fitted if it is satisfied that adequate protection against overpressure is thereby provided.

2 Each oil-fired boiler which is intended to operate without manual supervision shall have safety arrangements which shut off the fuel supply and give an alarm in the case of low water level, air supply failure or flame failure.

3 Water tube boilers serving turbine propulsion machinery shall be fitted with a high-water-level alarm.

4 Every steam generating system which provides services essential for the safety of the ship, or which could be rendered dangerous by the failure of its feedwater supply, shall be provided with not less than two separate feedwater systems from and including the feed pumps, noting that a single penetration of the steam drum is acceptable. Unless overpressure is prevented by the pump characteristics, means shall be provided which will prevent over-pressure in any part of the systems.

5 Boilers shall be provided with means to supervise and control the quality of the feedwater. Suitable arrangements shall be provided to preclude, as far as practicable, the entry of oil or other contaminants which may adversely affect the boiler.

6 Every boiler essential for the safety of the ship and designed to contain water at a specified level shall be provided with at least two means for indicating its water level, at least one of which shall be a direct reading gauge glass.

Regulation 33

Steam pipe systems

1 Every steam pipe and every fitting connected thereto through which steam may pass shall be so designed, constructed and installed as to withstand the maximum working stresses to which it may be subjected.

2 Means shall be provided for draining every steam pipe in which dangerous water hammer action might otherwise occur.

3 If a steam pipe or fitting may receive steam from any source at a higher pressure than that for which it is designed a suitable reducing valve, relief valve and pressure gauge shall be fitted.

Regulation 34

Air pressure systems

1 In every ship means shall be provided to prevent overpressure in any part of compressed air systems and wherever water jackets or casings of air

compressors and coolers might be subjected to dangerous overpressure due to leakage into them from air pressure parts. Suitable pressure relief arrangements shall be provided for all systems.

2 The main starting air arrangements for main propulsion internal combustion engines shall be adequately protected against the effects of backfiring and internal explosion in the starting air pipes.

3 All discharge pipes from starting air compressors shall lead directly to the starting air receivers, and all starting pipes from the air receivers to main or auxiliary engines shall be entirely separate from the compressor discharge pipe system.

4 Provision shall be made to reduce to a minimum the entry of oil into the air pressure systems and to drain these systems.

Regulation 35
Ventilating systems in machinery spaces

Machinery spaces of category A shall be adequately ventilated so as to ensure that when machinery or boilers therein are operating at full power in all weather conditions including heavy weather, an adequate supply of air is maintained to the spaces for the safety and comfort of personnel and the operation of the machinery. Any other machinery space shall be adequately ventilated appropriate for the purpose of that machinery space.

Regulation 36
*Protection against noise**

Measures shall be taken to reduce machinery noise in machinery spaces to acceptable levels as determined by the Administration. If this noise cannot be sufficiently reduced the source of excessive noise shall be suitably insulated or isolated or a refuge from noise shall be provided if the space is required to be manned. Ear protectors shall be provided for personnel required to enter such spaces, if necessary.

Regulation 37
Communication between navigation bridge and machinery space

1 At least two independent means shall be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the engines are normally controlled: one of

* Refer to the Code on Noise Levels on Board Ships adopted by the Organization by resolution A.468(XII).

these shall be an engine-room telegraph which provides visual indication of the orders and responses both in the machinery space and on the navigation bridge. Appropriate means of communication shall be provided to any other positions from which the engines may be controlled.

2 For ships constructed on or after 1 October 1994 the following requirements apply in lieu of the provisions of paragraph 1:

> At least two independent means shall be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the speed and direction of thrust of the propellers are normally controlled; one of these shall be an engine-room telegraph which provides visual indication of the orders and responses both in the machinery spaces and on the navigation bridge. Appropriate means of communication shall be provided from the navigation bridge and the engine-room to any other position from which the speed or direction of thrust of the propellers may be controlled.

Regulation 38
Engineers' alarm

An engineers' alarm shall be provided to be operated from the engine control room or at the manoeuvring platform as appropriate, and shall be clearly audible in the engineers' accommodation.

Regulation 39
Location of emergency installations in passenger ships

Emergency sources of electrical power, fire pumps, bilge pumps except those specifically serving the spaces forward of the collision bulkhead, any fixed fire-extinguishing system required by chapter II-2 and other emergency installations which are essential for the safety of the ship, except anchor windlasses, shall not be installed forward of the collision bulkhead.

Part D
Electrical installations

(Except where expressly provided otherwise part D applies to passenger ships and cargo ships)

Regulation 40
General

1 Electrical installations shall be such that:

.1 all electrical auxiliary services necessary for maintaining the ship in normal operational and habitable conditions will be ensured without recourse to the emergency source of electrical power;

.2 electrical services essential for safety will be ensured under various emergency conditions; and

.3 the safety of passengers, crew and ship from electrical hazards will be ensured.

2 The Administration shall take appropriate steps to ensure uniformity in the implementation and application of the provisions of this part in respect of electrical installations.*

Regulation 41
Main source of electrical power and lighting systems

1.1 A main source of electrical power of sufficient capacity to supply all those services mentioned in regulation 40.1.1 shall be provided. This main source of electrical power shall consist of at least two generating sets.

1.2 The capacity of these generating sets shall be such that in the event of any one generating set being stopped it will still be possible to supply those services necessary to provide normal operational conditions of propulsion and safety. Minimum comfortable conditions of habitability shall also be ensured which include at least adequate services for cooking, heating, domestic refrigeration, mechanical ventilation, sanitary and fresh water.

* Refer to the recommendations published by the International Electrotechnical Commission and, in particular, Publication 92 – *Electrical Installations in Ships.*

1.3 The arrangements of the ship's main source of electrical power shall be such that the services referred to in regulation 40.1.1 can be maintained regardless of the speed and direction of rotation of the propulsion machinery or shafting.

1.4 In addition, the generating sets shall be such as to ensure that with any one generator or its primary source of power out of operation, the remaining generating sets shall be capable of providing the electrical services necessary to start the main propulsion plant from a dead ship condition. The emergency source of electrical power may be used for the purpose of starting from a dead ship condition if its capability either alone or combined with that of any other source of electrical power is sufficient to provide at the same time those services required to be supplied by regulations 42.2.1 to 42.2.3 or 43.2.1 to 43.2.4.

1.5 Where transformers constitute an essential part of the electrical supply system required by this paragraph, the system shall be so arranged as to ensure the same continuity of the supply as is stated in this paragraph.

2.1 A main electric lighting system which shall provide illumination throughout those parts of the ship normally accessible to and used by passengers or crew shall be supplied from the main source of electrical power.

2.2 The arrangement of the main electric lighting system shall be such that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, the main switchboard and the main lighting switchboard, will not render the emergency electric lighting system required by regulations 42.2.1 and 42.2.2 or 43.2.1, 43.2.2 and 43.2.3 inoperative.

2.3 The arrangement of the emergency electric lighting system shall be such that a fire or other casualty in spaces containing the emergency source of electrical power, associated transforming equipment, if any, the emergency switchboard and the emergency lighting switchboard will not render the main electric lighting system required by this regulation inoperative.

3 The main switchboard shall be so placed relative to one main generating station that, as far as is practicable, the integrity of the normal electrical supply may be affected only by a fire or other casualty in one space. An environmental enclosure for the main switchboard, such as may be provided by a machinery control room situated within the main boundaries of the space, is not to be considered as separating the switchboards from the generators.

4 Where the total installed electrical power of the main generating sets is in excess of 3 MW, the main busbars shall be subdivided into at least two parts which shall normally be connected by removable links or other

approved means; so far as is practicable, the connection of generating sets and any other duplicated equipment shall be equally divided between the parts. Equivalent arrangements may be permitted to the satisfaction of the Administration.

5 Ships constructed on or after 1 July 1998:

.1 in addition to paragraphs 1 to 3, shall comply with the following:

.1.1 where the main source of electrical power is necessary for propulsion and steering of the ship, the system shall be so arranged that the electrical supply to equipment necessary for propulsion and steering and to ensure safety of the ship will be maintained or immediately restored in the case of loss of any one of the generators in service;

.1.2 load shedding or other equivalent arrangements shall be provided to protect the generators required by this regulation against sustained overload;

.1.3 where the main source of electrical power is necessary for propulsion of the ship, the main busbar shall be subdivided into at least two parts which shall normally be connected by circuit breakers or other approved means; so far as is practicable, the connection of generating sets and other duplicated equipment shall be equally divided between the parts; and

.2 need not comply with paragraph 4.

Regulation 42

Emergency source of electrical power in passenger ships

(Paragraphs 2.6.1 and 4.2 of this regulation apply to ships constructed on or after 1 February 1992)

1.1 A self-contained emergency source of electrical power shall be provided.

1.2 The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead.

1.3 The location of the emergency source of electrical power and associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency electric

lighting switchboards in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable, the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, or the main switchboard.

1.4 Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used exceptionally, and for short periods, to supply non-emergency circuits.

2 The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1 For a period of 36 h, emergency lighting:

.1 at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/16.7;

.2 in alleyways, stairways and exits giving access to the muster and embarkation stations, as required by regulation III/11.5;

.3 in all service and accommodation alleyways, stairways and exits, personnel lift cars;

.4 in the machinery spaces and main generating stations including their control positions;

.5 in all control stations, machinery control rooms, and at each main and emergency switchboard;

.6 at all stowage positions for firemen's outfits;

.7 at the steering gear; and

.8 at the fire pump, the sprinkler pump and the emergency bilge pump referred to in paragraph 2.4 and at the starting position of their motors.

2.2 For a period of 36 h:

.1 the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force; and

.2 on ships constructed on or after 1 February 1995, the VHF radio installation required by regulation IV/7.1.1 and IV/7.1.2; and, if applicable:

.2.1 the MF radio installation required by regulations IV/9.1.1, IV/9.1.2, IV/10.1.2 and IV/10.1.3;

.2.2 the ship earth station required by regulation IV/10.1.1; and

.2.3 the MF/HF radio installation required by regulations IV/10.2.1, IV/10.2.2 and IV/11.1.

2.3 For a period of 36 h:

.1 all internal communication equipment required in an emergency;

.2 the shipborne navigational equipment as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 gross tonnage;

.3 the fire detection and fire alarm system, and the fire door holding and release system; and

.4 for intermittent operation of the daylight signalling lamp, the ship's whistle, the manually operated call points, and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 36 h from an accumulator battery suitably located for use in an emergency.

2.4 For a period of 36 h:

.1 one of the fire pumps required by regulation II-2/4.3.1 and 4.3.3;

.2 the automatic sprinkler pump, if any; and

.3 the emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves.

2.5 For the period of time required by regulation 29.14 the steering gear if required to be so supplied by that regulation.

2.6 For a period of half an hour:

.1 any watertight doors required by regulation 15 to be power-operated together with their indicators and warning signals;

.2 the emergency arrangements to bring the lift cars to deck level for the escape of persons. The passenger lift cars may be brought to deck level sequentially in an emergency.

2.7 In a ship engaged regularly on voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 36 h period specified in paragraphs 2.1 to 2.5 but not less than 12 h.

3 The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1 Where the emergency source of electrical power is a generator, it shall be:

.1 driven by a suitable prime mover with an independent supply of fuel having a flashpoint (closed cup test) of not less than 43°C;

.2 started automatically upon failure of the electrical supply from the main source of electrical power and shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be transferred automatically to the emergency generating set. The automatic starting system and the characteristic of the prime mover shall be such as to permit the emergency generator to carry its full rated load as quickly as is safe and practicable, subject to a maximum of 45 s; unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

.3 provided with a transitional source of emergency electrical power according to paragraph 4.

3.2 Where the emergency source of electrical power is an accumulator battery, it shall be capable of:

.1 carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

.2 automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

.3 immediately supplying at least those services specified in paragraph 4.

3.3 The following provisions in paragraph 3.1.2 shall not apply to ships constructed on or after 1 October 1994:

Unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system.

3.4 For ships constructed on or after 1 July 1998, where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore

propulsion to the ship in conjunction with other machinery, as appropriate, from a dead ship condition within 30 min after blackout.

4 The transitional source of emergency electrical power required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:

4.1 For half an hour:

.1 the lighting required by paragraphs 2.1 and 2.2;

.2 all services required by paragraphs 2.3.1, 2.3.3 and 2.3.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

4.2 Power to operate the watertight doors, as required by regulation 15.7.3.3, but not necessarily all of them simultaneously, unless an independent temporary source of stored energy is provided. Power to the control, indication and alarm circuits as required by regulation 15.7.2 for half an hour.

5.1 The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2 Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3 No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of emergency electrical power referred to in paragraph 3.1.3 or 4 are being discharged.

5.4 The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

5.5 In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that power shall be available to the emergency circuits.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7 Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 42-1
Supplementary emergency lighting for ro–ro passenger ships

(This regulation applies to all passenger ships with ro–ro cargo spaces or special category spaces as defined in regulation II-2/3, except that for ships constructed before 22 October 1989, this regulation shall apply not later than 22 October 1990)

1 In addition to the emergency lighting required by regulation 42.2, on every passenger ship with ro–ro cargo spaces or special category spaces as defined in regulation II-2/3:

.1 all passenger public spaces and alleyways shall be provided with supplementary electric lighting that can operate for at least 3 h when all other sources of electrical power have failed and under any condition of heel. The illumination provided shall be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting shall consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting which is at least as effective may be accepted by the Administration. The supplementary lighting shall be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided shall be replaced at intervals having regard to the specified service life in the ambient conditions that they are subject to in service; and

.2 a portable rechargeable battery operated lamp shall be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by subparagraph .1, is provided.

Regulation 43

Emergency source of electrical power in cargo ships

1.1 A self-contained emergency source of electrical power shall be provided.

1.2 The emergency source of electrical power, associated transforming equipment, if any, transitional source of emergency power, emergency switchboard and emergency lighting switchboard shall be located above the uppermost continuous deck and shall be readily accessible from the open deck. They shall not be located forward of the collision bulkhead, except where permitted by the Administration in exceptional circumstances.

1.3 The location of the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency power, the emergency switchboard and the emergency lighting switchboard in relation to the main source of electrical power, associated transforming equipment, if any, and the main switchboard shall be such as to ensure to the satisfaction of the Administration that a fire or other casualty in the space containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard, or in any machinery space of category A will not interfere with the supply, control and distribution of emergency electrical power. As far as practicable the space containing the emergency source of electrical power, associated transforming equipment, if any, the transitional source of emergency electrical power and the emergency switchboard shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing the main source of electrical power, associated transforming equipment, if any, and the main switchboard.

1.4 Provided that suitable measures are taken for safeguarding independent emergency operation under all circumstances, the emergency generator may be used, exceptionally, and for short periods, to supply non-emergency circuits.

2 The electrical power available shall be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power shall be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:

2.1 For a period of 3 h, emergency lighting at every muster and embarkation station and over the sides as required by regulations III/11.4 and III/16.7.

2.2 For a period of 18 h, emergency lighting:

.1 in all service and accommodation alleyways, stairways and exits, personnel lift cars and personnel lift trunks;

.2 in the machinery spaces and main generating stations including their control positions;

.3 in all control stations, machinery control rooms, and at each main and emergency switchboard;

.4 at all stowage positions for firemen's outfits;

.5 at the steering gear; and

.6 at the fire pump referred to in paragraph 2.5, at the sprinkler pump, if any, and at the emergency bilge pump, if any, and at the starting positions of their motors.

2.3 For a period of 18 h:

.1 the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force;

.2 on ships constructed on or after 1 February 1995 the VHF radio installation required by regulation IV/7.1.1 and IV/7.1.2; and, if applicable:

.2.1 the MF radio installation required by regulations IV/9.1.1, IV/9.1.2, IV/10.1.2 and IV/10.1.3;

.2.2 the ship earth station required by regulation IV/10.1.1; and

.2.3 the MF/HF radio installation required by regulations IV/10.2.1, IV/10.2.2 and IV/11.1.

2.4 For a period of 18 h:

.1 all internal communication equipment as required in an emergency;

.2 the shipborne navigational equipment as required by regulation V/12; where such provision is unreasonable or impracticable the Administration may waive this requirement for ships of less than 5,000 gross tonnage;

.3 the fire detection and fire alarm system; and

.4 intermittent operation of the daylight signalling lamp, the ship's whistle, the manually operated call points and all internal signals that are required in an emergency;

unless such services have an independent supply for the period of 18 h from an accumulator battery suitably located for use in an emergency.

2.5 For a period of 18 h one of the fire pumps required by regulation II-2/4.3.1 and 4.3.3 if dependent upon the emergency generator for its source of power.

2.6.1 For the period of time required by regulation 29.14 the steering gear where it is required to be so supplied by that regulation.

2.6.2 In a ship engaged regularly in voyages of short duration, the Administration if satisfied that an adequate standard of safety would be attained may accept a lesser period than the 18 h period specified in paragraphs 2.2 to 2.5 but not less than 12 h.

3 The emergency source of electrical power may be either a generator or an accumulator battery, which shall comply with the following:

3.1 Where the emergency source of electrical power is a generator, it shall be:

.1 driven by a suitable prime mover with an independent supply of fuel, having a flashpoint (closed cup test) of not less than 43°C;

.2 started automatically upon failure of the main source of electrical power supply unless a transitional source of emergency electrical power in accordance with paragraph 3.1.3 is provided; where the emergency generator is automatically started, it shall be automatically connected to the emergency switchboard; those services referred to in paragraph 4 shall then be connected automatically to the emergency generator; and unless a second independent means of starting the emergency generator is provided the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system; and

.3 provided with a transitional source of emergency electrical power as specified in paragraph 4 unless an emergency generator is provided capable both of supplying the services mentioned in that paragraph and of being automatically started and supplying the required load as quickly as is safe and practicable subject to a maximum of 45 s.

3.2 Where the emergency source of electrical power is an accumulator battery it shall be capable of:

.1 carrying the emergency electrical load without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage;

.2 automatically connecting to the emergency switchboard in the event of failure of the main source of electrical power; and

.3 immediately supplying at least those services specified in paragraph 4.

3.3 The following provision in paragraph 3.1.2 shall not apply to ships constructed on or after 1 October 1994:

> Unless a second independent means of starting the emergency generating set is provided, the single source of stored energy shall be protected to preclude its complete depletion by the automatic starting system.

3.4 For ships constructed on or after 1 July 1998, where electrical power is necessary to restore propulsion, the capacity shall be sufficient to restore propulsion to the ship in conjunction with other machinery, as appropriate, from a dead ship condition within 30 min after blackout.

4 The transitional source of emergency electrical power where required by paragraph 3.1.3 shall consist of an accumulator battery suitably located for use in an emergency which shall operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and shall be so arranged as to supply automatically in the event of failure of either the main or the emergency source of electrical power for half an hour at least the following services if they depend upon an electrical source for their operation:

.1 the lighting required by paragraphs 2.1, 2.2 and 2.3.1. For this transitional phase, the required emergency electric lighting, in respect of the machinery space and accommodation and service spaces may be provided by permanently fixed, individual, automatically charged, relay operated accumulator lamps; and

.2 all services required by paragraphs 2.4.1, 2.4.3 and 2.4.4 unless such services have an independent supply for the period specified from an accumulator battery suitably located for use in an emergency.

5.1 The emergency switchboard shall be installed as near as is practicable to the emergency source of electrical power.

5.2 Where the emergency source of electrical power is a generator, the emergency switchboard shall be located in the same space unless the operation of the emergency switchboard would thereby be impaired.

5.3 No accumulator battery fitted in accordance with this regulation shall be installed in the same space as the emergency switchboard. An indicator shall be mounted in a suitable place on the main switchboard or in the machinery control room to indicate when the batteries constituting either the emergency source of electrical power or the transitional source of electrical power referred to in paragraph 3.2 or 4 are being discharged.

5.4 The emergency switchboard shall be supplied during normal operation from the main switchboard by an interconnector feeder which is to be adequately protected at the main switchboard against overload and

short circuit and which is to be disconnected automatically at the emergency switchboard upon failure of the main source of electrical power. Where the system is arranged for feedback operation, the interconnector feeder is also to be protected at the emergency switchboard at least against short circuit.

5.5 In order to ensure ready availability of the emergency source of electrical power, arrangements shall be made where necessary to disconnect automatically non-emergency circuits from the emergency switchboard to ensure that electrical power shall be available automatically to the emergency circuits.

6 The emergency generator and its prime mover and any emergency accumulator battery shall be so designed and arranged as to ensure that they will function at full rated power when the ship is upright and when inclined at any angle of list up to 22.5° or when inclined up to 10° either in the fore or aft direction, or is in any combination of angles within those limits.

7 Provision shall be made for the periodic testing of the complete emergency system and shall include the testing of automatic starting arrangements.

Regulation 44

Starting arrangements for emergency generating sets

1 Emergency generating sets shall be capable of being readily started in their cold condition at a temperature of 0°C. If this is impracticable, or if lower temperatures are likely to be encountered, provision acceptable to the Administration shall be made for the maintenance of heating arrangements, to ensure ready starting of the generating sets.

2 Each emergency generating set arranged to be automatically started shall be equipped with starting devices approved by the Administration with a stored energy capability of at least three consecutive starts. A second source of energy shall be provided for an additional three starts within 30 min unless manual starting can be demonstrated to be effective.

2.1 Ships constructed on or after 1 October 1994, in lieu of the provision of the second sentence of paragraph 2, shall comply with the following requirements:

> The source of stored energy shall be protected to preclude critical depletion by the automatic starting system, unless a second independent means of starting is provided. In addition, a second source of energy shall be provided for an additional three starts within 30 min unless manual starting can be demonstrated to be effective.

3 The stored energy shall be maintained at all times, as follows:

.1 electrical and hydraulic starting systems shall be maintained from the emergency switchboard;

.2 compressed air starting systems may be maintained by the main or auxiliary compressed air receivers through a suitable non-return valve or by an emergency air compressor which, if electrically driven, is supplied from the emergency switchboard;

.3 all of these starting, charging and energy storing devices shall be located in the emergency generator space; these devices are not to be used for any purpose other than the operation of the emergency generating set. This does not preclude the supply to the air receiver of the emergency generating set from the main or auxiliary compressed air system through the non-return valve fitted in the emergency generator space.

4.1 Where automatic starting is not required, manual starting is permissible, such as manual cranking, inertia starters, manually charged hydraulic accumulators, or powder charge cartridges, where they can be demonstrated as being effective.

4.2 When manual starting is not practicable, the requirements of paragraphs 2 and 3 shall be complied with except that starting may be manually initiated.

Regulation 45

Precautions against shock, fire and other hazards of electrical origin

1.1 Exposed metal parts of electrical machines or equipment which are not intended to be live but which are liable under fault conditions to become live shall be earthed unless the machines or equipment are:

.1 supplied at a voltage not exceeding 50 V direct current or 50 V root mean square between conductors; auto-transformers shall not be used for the purpose of achieving this voltage; or

.2 supplied at a voltage not exceeding 250 V by safety isolating transformers supplying only one consuming device; or

.3 constructed in accordance with the principle of double insulation.

1.2 The Administration may require additional precautions for portable electrical equipment for use in confined or exceptionally damp spaces where particular risks due to conductivity may exist.

1.3 All electrical apparatus shall be so constructed and so installed as not to cause injury when handled or touched in the normal manner.

2 Main and emergency switchboards shall be so arranged as to give easy access as may be needed to apparatus and equipment, without danger to personnel. The sides and the rear and, where necessary, the front of switchboards shall be suitably guarded. Exposed live parts having voltages to earth exceeding a voltage to be specified by the Administration shall not be installed on the front of such switchboards. Where necessary, nonconducting mats or gratings shall be provided at the front and rear of the switchboard.

3.1 The hull return system of distribution shall not be used for any purpose in a tanker, or for power, heating, or lighting in any other ship of 1,600 gross tonnage and upwards.

3.2 The requirement of paragraph 3.1 does not preclude under conditions approved by the Administration the use of:

.1 impressed current cathodic protective systems;

.2 limited and locally earthed systems; or

.3 insulation level monitoring devices provided the circulation current does not exceed 30 mA under the most unfavourable conditions.

3.2-1 For ships constructed on or after 1 October 1994, the requirement of paragraph 3.1 does not preclude the use of limited and locally earthed systems, provided that any possible resulting current does not flow directly through any dangerous spaces.

3.3 Where the hull return system is used, all final subcircuits, i.e. all circuits fitted after the last protective device, shall be two-wire and special precautions shall be taken to the satisfaction of the Administration.

4.1 Earthed distribution systems shall not be used in a tanker. The Administration may exceptionally permit in a tanker the earthing of the neutral for alternating current power networks of 3,000 V (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

4.2 When a distribution system, whether primary or secondary, for power, heating or lighting, with no connection to earth is used, a device capable of continuously monitoring the insulation level to earth and of giving an audible or visual indication of abnormally low insulation values shall be provided.

4.3 Ships constructed on or after 1 October 1994, in lieu of the provisions of paragraph 4.1, shall comply with the following requirements:

.1 Except as permitted by paragraph 4.3.2, earthed distribution systems shall not be used in a tanker.

.2 The requirement of paragraph 4.3.1 does not preclude the use of earthed intrinsically safe circuits and in addition, under conditions approved by the Administration, the use of the following earthed systems:

.2.1 power-supplied control circuits and instrumentation circuits where technical or safety reasons preclude the use of a system with no connection to earth, provided the current in the hull is limited to not more than 5 A in both normal and fault conditions; or

.2.2 limited and locally earthed systems, provided that any possible resulting current does not flow directly through any of the dangerous spaces; or

.2.3 alternating current power networks of 1,000 V root mean square (line to line) and over, provided that any possible resulting current does not flow directly through any of the dangerous spaces.

5.1 Except as permitted by the Administration in exceptional circumstances, all metal sheaths and armour of cables shall be electrically continuous and shall be earthed.

5.2 All electric cables and wiring external to equipment shall be at least of a flame-retardant type and shall be so installed as not to impair their original flame-retarding properties. Where necessary for particular applications the Administration may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.

5.3 Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall so far as practicable be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. In ro–ro passenger ships, cabling for emergency alarms and public address systems installed on or after 1 July 1998 shall be approved by the Administration having regard to the recommendations developed by the Organization.* Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.

5.4 Where cables which are installed in hazardous areas introduce the risk of fire or explosion in the event of an electrical fault in such areas, special precautions against such risks shall be taken to the satisfaction of the Administration.

* Refer to MSC/Circ.808, Recommendation on performance standards for public address systems on passenger ships, including cabling.

5.5 Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage.

5.6 Terminations and joints in all conductors shall be so made as to retain the original electrical, mechanical, flame-retarding and, where necessary, fire-resisting properties of the cable.

6.1 Each separate circuit shall be protected against short circuit and against overload, except as permitted in regulations 29 and 30 or where the Administration may exceptionally otherwise permit.

6.2 The rating or appropriate setting of the overload protective device for each circuit shall be permanently indicated at the location of the protective device.

7 Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

8 All lighting and power circuits terminating in a bunker or cargo space shall be provided with a multiple-pole switch outside the space for disconnecting such circuits.

9.1 Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

9.2 Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments except as permitted in paragraph 10.

9.3 Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Administration.

10 No electrical equipment shall be installed in any space where flammable mixtures are liable to collect including those on board tankers or in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Administration is satisfied that such equipment is:

.1 essential for operational purposes;

.2 of a type which will not ignite the mixture concerned;

.3 appropriate to the space concerned; and

.4 appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

11 In a passenger ship, distribution systems shall be so arranged that fire in any main vertical zone as is defined in regulation II-2/3.9 will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

Part E
Additional requirements for periodically unattended machinery spaces

(Part E applies to cargo ships except that regulation 54 refers to passenger ships)

Regulation 46
General

1 The arrangements provided shall be such as to ensure that the safety of the ship in all sailing conditions, including manoeuvring, is equivalent to that of a ship having the machinery spaces manned.

2 Measures shall be taken to the satisfaction of the Administration to ensure that the equipment is functioning in a reliable manner and that satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.

3 Every ship shall be provided with documentary evidence, to the satisfaction of the Administration, of its fitness to operate with periodically unattended machinery spaces.

Regulation 47
Fire precautions

1 Means shall be provided to detect and give alarms at an early stage in case of fires:

.1 in boiler air supply casings and exhausts (uptakes); and

.2 in scavenging air belts of propulsion machinery,

unless the Administration considers this to be unnecessary in a particular case.

2 Internal combustion engines of 2,250 kW and above or having cylinders of more than 300 mm bore shall be provided with crankcase oil mist detectors or engine bearing temperature monitors or equivalent devices.

Regulation 48
Protection against flooding

1 Bilge wells in periodically unattended machinery spaces shall be located and monitored in such a way that the accumulation of liquids is detected at normal angles of trim and heel, and shall be large enough to accommodate easily the normal drainage during the unattended period.

2 Where the bilge pumps are capable of being started automatically, means shall be provided to indicate when the influx of liquid is greater than the pump capacity or when the pump is operating more frequently than would normally be expected. In these cases, smaller bilge wells to cover a reasonable period of time may be permitted. Where automatically controlled bilge pumps are provided, special attention shall be given to oil pollution prevention requirements.

3 The location of the controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level.

Regulation 49
Control of propulsion machinery from the navigation bridge

1 Under all sailing conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigation bridge.

1.1 Such remote control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery.

1.2 The main propulsion machinery shall be provided with an emergency stopping device on the navigation bridge which shall be independent of the navigation bridge control system.

2 Propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate.

3 Remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing

which location is in control of the propulsion machinery. The transfer of control between the navigation bridge and machinery spaces shall be possible only in the main machinery space or in the main machinery control room. The system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another.

4 It shall be possible for all machinery essential for the safe operation of the ship to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems.

5 The design of the remote automatic control system shall be such that in case of its failure an alarm will be given. Unless the Administration considers it impracticable, the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation.

6 Indicators shall be fitted on the navigation bridge for:

.1 propeller speed and direction of rotation in the case of fixed pitch propellers; or

.2 propeller speed and pitch position in the case of controllable pitch propellers.

7 The number of consecutive automatic attempts which fail to produce a start shall be limited to safeguard sufficient starting air pressure. An alarm shall be provided to indicate low starting air pressure set at a level which still permits starting operations of the propulsion machinery.

Regulation 50
Communication

A reliable means of vocal communication shall be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigation bridge and the engineer officers' accommodation.

Regulation 51
Alarm system

1 An alarm system shall be provided indicating any fault requiring attention and shall:

.1 be capable of sounding an audible alarm in the main machinery control room or at the propulsion machinery control position, and indicate visually each separate alarm function at a suitable position;

.2 have a connection to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure

connection to at least one of those cabins. Administrations may permit equivalent arrangements;

.3 activate an audible and visual alarm on the navigation bridge for any situation which requires action by or attention of the officer on watch;

.4 as far as is practicable be designed on the fail-to-safety principle; and

.5 activate the engineers' alarm required by regulation 38 if an alarm function has not received attention locally within a limited time.

2.1 The alarm system shall be continuously powered and shall have an automatic change-over to a stand-by power supply in case of loss of normal power supply.

2.2 Failure of the normal power supply of the alarm system shall be indicated by an alarm.

3.1 The alarm system shall be able to indicate at the same time more than one fault and the acceptance of any alarm shall not inhibit another alarm.

3.2 Acceptance at the position referred to in paragraph 1 of any alarm condition shall be indicated at the positions where it was shown. Alarms shall be maintained until they are accepted and the visual indications of individual alarms shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Regulation 52

Safety systems

A safety system shall be provided to ensure that serious malfunction in machinery or boiler operations, which presents an immediate danger, shall initiate the automatic shutdown of that part of the plant and that an alarm shall be given. Shutdown of the propulsion system shall not be automatically activated except in cases which could lead to serious damage, complete breakdown, or explosion. Where arrangements for overriding the shutdown of the main propelling machinery are fitted, these shall be such as to preclude inadvertent operation. Visual means shall be provided to indicate when the override has been activated.

Regulation 53

Special requirements for machinery, boiler and electrical installations

1 The special requirements for the machinery, boiler and electrical installations shall be to the satisfaction of the Administration and shall include at least the requirements of this regulation.

2 The main source of electrical power shall comply with the following:

2.1 Where the electrical power can normally be supplied by one generator, suitable load-shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the ship. In the case of loss of the generator in operation, adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety of the ship with automatic restarting of the essential auxiliaries including, where necessary, sequential operations. The Administration may dispense with this requirement for a ship of less than 1,600 gross tonnage, if it is considered impracticable.

2.2 If the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision shall be made, for instance by load shedding, to ensure that, in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering, and to ensure the safety of the ship.

3 Where stand-by machines are required for other auxiliary machinery essential to propulsion, automatic change-over devices shall be provided.

4 Automatic control and alarm system

4.1 The control system shall be such that the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured through the necessary automatic arrangements.

4.2 An alarm shall be given on the automatic change-over.

4.3 An alarm system complying with regulation 51 shall be provided for all important pressures, temperatures and fluid levels and other essential parameters.

4.4 A centralized control position shall be arranged with the necessary alarm panels and instrumentation indicating any alarm.

5 Means shall be provided to keep the starting air pressure at the required level where internal combustion engines are used for main propulsion.

Regulation 54

Special consideration in respect of passenger ships

Passenger ships shall be specially considered by the Administration as to whether or not their machinery spaces may be periodically unattended and if so whether additional requirements to those stipulated in these regulations are necessary to achieve equivalent safety to that of normally attended machinery spaces.

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

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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 July 1998.

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 July 1998.

.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.

2 Unless expressly provided otherwise, for ships constructed before 1 July 1998 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) and MSC.31(63), are complied with.

3.1 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 1 July 1998 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,

* Refer to MSC/Circ.847 and Corr.1, Interpretations of vague expressions and other vague wording in SOLAS chapter II-2.

alterations and modifications of a major character* and outfitting related thereto shall meet the requirements for ships constructed on or after 1 July 1998 in so far as the Administration deems reasonable and practicable.

3.2 Notwithstanding the provisions of paragraph 3.1, passenger ships carrying more than 36 passengers when undergoing repairs, alterations, modifications and outfitting related thereto shall comply with the following:

.1 all materials introduced to these ships shall comply with the requirements with regard to material applicable to ships constructed on or after 1 October 1994; and

.2 all repairs, alterations, modifications and outfitting related thereto involving the replacement of material of 50 tonnes or above, other than that required by regulation 41-1, shall comply with the requirements applicable to such ships constructed on or after 1 October 1994.

4.1 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.

4.2 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 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.

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* The following repairs, alterations and modifications should be recognized as being "of a major character":

1 Any change that substantially alters the dimensions of a ship.
Example – Lengthening by adding new midbody.
New midbody should comply with chapter II-2 of SOLAS 1974 as amended.

2 Any change that substantially alters the passenger-carrying capacity of a ship.
Example – Vehicle deck converted to passenger accommodation.
New accommodation should comply with chapter II-2 of SOLAS 1974 as amended.

3 Any change that substantially increases a ship's service life.
Example – Renewal of passenger accommodation on one entire deck.
Renewed accommodation should comply with chapter II-2 of SOLAS 1974 as amended.

(Interpretation agreed by the Maritime Safety Committee at its fiftieth session.)

Regulation 2
Basic principles

1 The purpose of this chapter is to require the fullest practicable degree of fire protection, fire detection and fire extinction in ships.

2 The following basic principles underlie the regulations in this chapter and are embodied in the regulations as appropriate, having regard to the type of ships and the potential fire hazard involved:

.1 division of ship into main vertical zones by thermal and structural boundaries;

.2 separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;

.3 restricted use of combustible materials;

.4 detection of any fire in the zone of origin;

.5 containment and extinction of any fire in the space of origin;

.6 protection of means of escape or access for fire fighting;

.7 ready availability of fire-extinguishing appliances;

.8 minimization of possibility of ignition of flammable cargo vapour.

Regulation 3
Definitions

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

1 *Non-combustible material* is a material which neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the Fire Test Procedures Code. Any other material is a combustible material.

2 A *standard fire test* is one in which the specimens of the relevant bulkheads and decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve. The test methods shall be in accordance with the Fire Test Procedures Code.

3 *"A" class divisions* are those divisions formed by bulkheads and decks which comply with the following:

.1 they shall be constructed of steel or other equivalent material;

.2 they shall be suitably stiffened;

.3 they shall be so constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test;

.4 they shall be insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below:

class "A-60"	60 min
class "A-30"	30 min
class "A-15"	15 min
class "A-0"	0 min

.5 the Administration shall require a test of a prototype bulkhead or deck "in accordance with the Fire Test Procedures Code" to ensure that it meets the above requirements for integrity and temperature rise.

4 *"B" class divisions* are those divisions formed by bulkheads, decks, ceiling or linings which comply with the following:

.1 they shall be so constructed as to be capable of preventing the passage of flame to the end of the first half hour of the standard fire test;

.2 they shall have an insulation value such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below:

class "B-15"	15 min
class "B-0"	0 min

.3 they shall be constructed of approved non-combustible materials and all materials entering into the construction and erection of "B" class divisions shall be non-combustible, with the exception that combustible veneers may be permitted provided they meet other requirements of this chapter;

.4 the Administration shall require a test of a prototype division, in accordance with the Fire Test Procedures Code, to ensure that it meets the above requirements for integrity and temperature rise.

5 *"C" class divisions* are divisions constructed of approved non-combustible materials. They need meet neither requirements relative to the passage of smoke and flame nor limitations relative to the temperature

rise. Combustible veneers are permitted provided they meet other requirements of this chapter.

6 *Continuous ''B'' class ceilings or linings* are those "B" class ceilings or linings which terminate only at an "A" or "B" class division.

7 *Steel or other equivalent material.* Where the words *steel or other equivalent material* occur, *equivalent material* means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).

8 *Low flame spread* means that the surface thus described will adequately restrict the spread of flame, this being determined in accordance with the Fire Test Procedures Code.

9 *Main vertical zones* are those sections into which the hull, superstructure, and deckhouses are divided by "A" class divisions, the mean length of which on any deck does not in general exceed 40 m.

10 *Accommodation spaces* are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, barber shops, pantries containing no cooking appliances and similar spaces.

11 *Public spaces* are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

12 *Service spaces* are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

13 *Cargo spaces* are all spaces used for cargo (including cargo oil tanks) and trunks to such spaces.

14 *Ro–ro cargo spaces* are spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the ship in which goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction.

15 *Open ro–ro cargo spaces* are ro–ro cargo spaces either open at both ends, or open at one end and provided with adequate natural ventilation effective over their entire length through permanent openings in the side plating or deckhead to the satisfaction of the Administration.

16 *Closed ro–ro cargo spaces* are ro–ro cargo spaces which are neither open ro–ro cargo spaces nor weather decks.

17 *Weather deck* is a deck which is completely exposed to the weather from above and from at least two sides.

18 *Special category spaces* are those enclosed spaces above or below the bulkhead deck intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, into and from which such vehicles can be driven and to which passengers have access.

19 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain:

.1 internal combustion machinery used for main propulsion; or

.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.

20 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propulsion 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.

21 *Oil fuel unit* is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 0.18 N/mm^2.

22 *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.

22-1 *Central control station* is a control station in which the following control and indicator functions are centralized:

.1 fixed fire detection and alarm systems;

.2 automatic sprinklers, fire detection and alarm systems;

.3 fire door indicator panels;

.4 fire door closures;

.5 watertight door indicator panels;

.6 watertight door closures;

.7 ventilation fans;

.8 general/fire alarms;

.9 communication systems including telephones; and

.10 microphones to public address systems.

22-2 *Continuously manned central control station* is a central control station which is continuously manned by a responsible member of the crew.

23 *Rooms containing furniture and furnishings of restricted fire risk* are, for the purpose of regulation 26, those rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which:

.1 all case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, is constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the working surface of such articles;

.2 all free-standing furniture such as chairs, sofas, tables, is constructed with frames of non-combustible materials;

.3 all draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame not inferior to those of wool of mass 0.8 kg/m^2, this being determined in accordance with the Fire Test Procedures Code;

.4 all floor coverings have low flame spread characteristics;

.5 all exposed surfaces of bulkheads, linings and ceilings have low flame-spread characteristics;

.6 all upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code; and

.7 all bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code.

24 *Bulkhead deck* is the uppermost deck up to which the transverse watertight bulkheads are carried.

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

26 *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.

27 *Combination carrier* is a tanker designed to carry oil or alternatively solid cargoes in bulk.

28 *Crude oil* is any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:

.1 crude oil from which certain distillate fractions may have been removed; and

.2 crude oil to which certain distillate fractions may have been added.

29 *Dangerous goods* are those goods referred to in regulation VII/2.

30 *Chemical tanker* is a tanker constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature 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.

31 *Gas carrier* is a tanker constructed or adapted and used for the carriage in bulk of any liquefied gas or other products of a flammable nature 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 Assembly of 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.

32 *Cargo area* is that part of the ship that contains cargo tanks, slop tanks and cargo pump-rooms including pump-rooms, cofferdams, ballast and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces.

33 For ships constructed on or after 1 October 1994, in lieu of the definition of main vertical zones provided in paragraph 9, the following definition shall be applied:

Main vertical zones are those sections into which the hull, superstructure and deckhouses are divided by "A" class divisions, the mean length and width of which on any deck does not in general exceed 40 m.

34 *Ro–ro passenger ship* means a passenger ship with ro–ro cargo spaces or special category spaces as defined in this regulation.

35 *Fire Test Procedures Code* means the International Code for Application of Fire Test Procedures, as adopted by the Maritime Safety Committee of the Organization by resolution MSC.61(67), 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.

Regulation 4

Fire pumps, fire mains, hydrants and hoses

(Paragraph 3.3.2.5 of this regulation applies to ships constructed on or after 1 February 1992)

1 Every ship shall be provided with fire pumps, fire mains, hydrants and hoses complying as applicable with the requirements of this regulation.

2 Capacity of fire pumps

2.1 The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the pressure specified in paragraph 4, as follows:

.1 pumps in passenger ships, not less than two thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping; and

.2 pumps in cargo ships, other than any emergency pump, not less than four thirds of the quantity required under regulation II-1/21 to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in no cargo ship need the total required capacity of the fire pumps exceed 180 m^3/h.

2.2 Each of the required fire pumps (other than any emergency pump required in paragraph 3.3.2 for cargo ships) shall have a capacity not less than 80% of the total required capacity divided by the minimum number of required fire pumps but in any case not less than 25 m^3/h and each such pump shall in any event be capable of delivering at least the two required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions. Where more pumps than the minimum of required pumps are installed the capacity of such additional pumps shall be to the satisfaction of the Administration.

3 Arrangements of fire pumps and of fire mains

3.1 Ships shall be provided with independently driven fire pumps as follows:

.1	Passenger ships of 4,000 tons gross tonnage and upwards	at least three
.2	Passenger ships of less than 4,000 gross tonnage and cargo ships of 1,000 tons gross tonnage and upwards	at least two
.3	Cargo ships of less than 1,000 tons gross tonnage	to the satisfaction of the Administration

3.2 Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

3.3 The arrangement of sea connections, fire pumps and their sources of power shall be such as to ensure that:

.1 In passenger ships of 1,000 gross tonnage and upwards, in the event of a fire in any one compartment all the fire pumps will not be put out of action.

.2 In cargo ships of 2,000 gross tonnage and upwards, if a fire in any one compartment could put all the pumps out of action there shall be an alternative means consisting of a fixed independently driven emergency pump which shall be capable of supplying two jets of water to the satisfaction of the Administration. The pump and its location shall comply with the following requirements:

.2.1 The capacity of the pump shall not be less than 40% of the total capacity of the fire pumps required by this regulation and in any case not less than 25 m^3/h.

.2.2 When the pump is delivering the quantity of water required by paragraph 3.3.2.1, the pressure at any hydrant shall be not less than the minimum pressures given in paragraph 4.2.

.2.3 Any diesel driven power source for the pump shall be capable of being readily started in its cold condition down to a temperature of 0°C by hand (manual) cranking. If this is impracticable, or if lower temperatures are likely to be encountered, consideration is to be given to the provision and maintenance of heating arrangements, acceptable to the Administration, so that ready starting will be assured. If hand (manual) starting is impracticable, the Administration may permit other means of starting. These means shall be such as to

enable the diesel driven power source to be started at least six times within a period of 30 min, and at least twice within the first 10 min.

.2.4 Any service fuel tank shall contain sufficient fuel to enable the pump to run on full load for at least 3 h and sufficient reserves of fuel shall be available outside the main machinery space to enable the pump to be run on full load for an additional 15 h.

.2.5 The total suction head and the net positive suction head of the pump shall be such that the requirements of paragraphs 3.3.2, 3.3.2.1, 3.3.2.2 and 4.2 of this regulation shall be obtained under all conditions of list, trim, roll and pitch likely to be encountered in service.

.2.6 The boundaries of the space containing the fire pump shall be insulated to a standard of structural fire protection equivalent to that required for a control station in regulation 44.

.2.7 No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable an Administration may accept an arrangement where the access is by means of an airlock, each of the two doors being self-closing, or through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In such cases a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

.2.8 Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

.2.9 Ships constructed on or after 1 October 1994, in lieu of the provisions of paragraph 3.3.2.6, shall comply with the following requirements:

The space containing the fire pump shall not be contiguous to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the two spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station in regulation 44.

.3 In passenger ships of less than 1,000 gross tonnage and cargo ships of less than 2,000 gross tonnage, if a fire in any one

compartment could put all the pumps out of action the alternative means of providing water for fire-fighting purposes are to the satisfaction of the Administration.

.3.1 For ships constructed on or after 1 October 1994, the alternative means to be provided in accordance with the provisions of paragraph 3.3.3 shall be an independently driven, power-operated emergency fire pump with its source of power and sea connection located outside the machinery space.

.4 In addition, in cargo ships where other pumps, such as general service, bilge and ballast, etc., are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by paragraphs 2.2 and 4.2, is capable of providing water to the fire main.

3.4 The arrangements for the ready availability of water supply shall be:

.1 in passenger ships of 1,000 gross tonnage and upwards such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of a required fire pump;

.2 in passenger ships of less than 1,000 gross tonnage and in cargo ships to the satisfaction of the Administration;

.3 in cargo ships with a periodically unattended machinery space or when only one person is required on watch, there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigation bridge and fire control station, if any, or permanent pressurization of the fire main system by one of the main fire pumps, except that the Administration may waive this requirement for cargo ships of less than 1,600 gross tonnage if the arrangement of the machinery space access makes it unnecessary;

.4 in passenger ships, if fitted with periodically unattended machinery spaces in accordance with regulation II-1/54, the Administration shall determine provisions for fixed water fire-extinguishing arrangement for such spaces equivalent to those required for normally attended machinery spaces.

3.5 Relief valves shall be provided in conjunction with all fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

3.6 In tankers isolation valves shall be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

4 Diameter of, and pressure in, the fire mains

4.1 The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously, except that in the case of cargo ships the diameter need only be sufficient for the discharge of 140 m^3/h.

4.2 With the two pumps simultaneously delivering through nozzles specified in paragraph 8 the quantity of water specified in paragraph 4.1, through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants:

Passenger ships:	
4,000 gross tonnage and upwards	0.31 N/mm^2
1,000 gross tonnage and upwards but under 4,000 gross tonnage	0.27 N/mm^2
Under 1,000 gross tonnage	To the satisfaction of the Administration
Cargo ships:	
6,000 gross tonnage and upwards	0.27 N/mm^2
1,000 gross tonnage and upwards but under 6,000 gross tonnage	0.25 N/mm^2
Under 1,000 gross tonnage	To the satisfaction of the Administration

.1 Passenger ships constructed on or after 1 October 1994, in lieu of the provisions of paragraph 4.2, shall comply with the following requirements:

With the two pumps simultaneously delivering through the nozzles specified in paragraph 8 and with sufficient hydrants to provide for the quantity of water specified in paragraph 4.1, a minimum pressure of 0.4 N/mm^2 for ships of 4,000 gross tonnage and above and 0.3 N/mm^2 for ships of less than 4,000 gross tonnage shall be maintained at all hydrants.

4.3 The maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

5 Number and position of hydrants

5.1 The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be

from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any part of any cargo space when empty, any ro–ro cargo space or any special category space in which latter case the two jets shall reach any part of such space, each from a single length of hose. Furthermore, such hydrants shall be positioned near the accesses to the protected spaces.

5.2 In the accommodation, service and machinery spaces of passenger ships the number and position of hydrants shall be such that the requirements of paragraph 5.1 may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed.

5.3 Where, in a passenger ship, access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, two hydrants shall be provided external to, but near the entrance to that machinery space. Where such access is provided from other spaces, in one of those spaces two hydrants shall be provided near the entrance to the machinery space of category A. Such provision need not be made where the tunnel or adjacent spaces are not part of the escape route.

6 Pipes and hydrants

6.1 Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo. Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

6.2 A valve shall be fitted to serve each fire hose so that any fire hose may be removed while the fire pumps are at work.

6.3 Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in an easily accessible and tenable position outside the machinery spaces. The fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by a fire pump not located in this machinery space through pipes which do not enter this space. Exceptionally, the Administration may permit short lengths of the emergency fire pump suction and discharge piping to penetrate the machinery space if it is impracticable to route it externally provided that the integrity of the fire main is maintained by the enclosure of the piping in a substantial steel casing.

7 Fire hoses

7.1 Fire hoses shall be of non-perishable material approved by the Administration and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Fire hoses of non-perishable material shall be provided in ships constructed on or after 1 February 1992, and on ships constructed before 1 February 1992 when the existing fire hoses are replaced. Their maximum length shall be to the satisfaction of the Administration. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in this chapter as "fire hoses" shall, together with any necessary fittings and tools, be kept ready for use in conspicuous positions near the water service hydrants or connections. Additionally, in interior locations in passenger ships carrying more than 36 passengers fire hoses shall be connected to the hydrants at all times.

7.2 Ships shall be provided with fire hoses the number and diameter of which shall be to the satisfaction of the Administration.

7.3 In passenger ships there shall be at least one fire hose for each of the hydrants required by paragraph 5 and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

7.4.1 In cargo ships of 1,000 gross tonnage and upwards the number of fire hoses to be provided shall be one for each 30 m length of the ship and one spare but in no case less than five in all. This number does not include any hoses required in any engine or boiler room. The Administration may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of trade in which the ship is employed.

7.4.2 In cargo ships of less than 1,000 gross tonnage the number of fire hoses to be provided shall be to the satisfaction of the Administration.

8 Nozzles

8.1 For the purposes of this chapter, standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Administration.

8.2 For accommodation and service spaces, a nozzle size greater than 12 mm need not be used.

8.3 For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in paragraph 4 from the smallest pump, provided that a nozzle size greater than 19 mm need not be used.

8.4 All nozzles shall be of an approved dual-purpose type (i.e., spray/jet type) incorporating a shutoff.

9 Location and arrangement of water pumps, etc., for other fire-extinguishing systems

Pumps required for the provision of water for other fire-extinguishing systems required by this chapter, their sources of power and their controls shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the space or spaces protected will not put any such system out of action.

Regulation 5
Fixed gas fire-extinguishing systems

1 General

1.1 The use of a fire-extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.

1.2 The necessary pipes for conveying fire-extinguishing medium into protected spaces shall be provided with control valves so marked as to indicate clearly the spaces to which the pipes are led. Suitable provision shall be made to prevent inadvertent admission of the medium to any space. Where a cargo space fitted with a gas fire-extinguishing system is used as a passenger space, the gas connection shall be blanked during such use.

1.3 The piping for the distribution of fire-extinguishing medium shall be arranged and discharge nozzles so positioned that a uniform distribution of medium is obtained.

1.4 Means shall be provided to close all openings which may admit air to or allow gas to escape from a protected space.

1.5 Where the volume of free air contained in air receivers in any space is such that, if released in such space in the event of fire, such release of air within that space would seriously affect the efficiency of the fixed fire-extinguishing system, the Administration shall require the provision of an additional quantity of fire-extinguishing medium.

1.6 Means shall be provided for automatically giving audible warning of the release of fire-extinguishing medium into any space in which personnel normally work or to which they have access. The alarm shall operate for a suitable period before the medium is released.

1.7 The means of control of any fixed gas fire-extinguishing system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

1.8 Automatic release of fire-extinguishing medium shall not be permitted, except as permitted by paragraph 3.3.5 and in respect of local automatically operated units referred to in paragraphs 3.4 and 3.5.

1.9 Where the quantity of extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected.

1.10 Except as otherwise permitted by paragraphs 3.3, 3.4 or 3.5, pressure containers required for the storage of fire-extinguishing medium, other than steam, shall be located outside protected spaces in accordance with paragraph 1.13.

1.11 Means shall be provided for the crew to safely check the quantity of medium in the containers.

1.12 Containers for the storage of fire-extinguishing medium and associated pressure components shall be designed to pressure codes of practice to the satisfaction of the Administration having regard to their locations and maximum ambient temperatures expected in service.

1.13 When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible position and shall be effectively ventilated to the satisfaction of the Administration. Any entrance to such a storage room shall preferably be from the open deck and in any case shall be independent of the protected space. Access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjoining enclosed spaces shall be gas-tight. For the purpose of the application of the integrity tables in regulations 26, 27, 44 and 58, such storage rooms shall be treated as control stations.

1.14 Spare parts for the system shall be stored on board and be to the satisfaction of the Administration.

2 Carbon dioxide systems

2.1 For cargo spaces the quantity of carbon dioxide available shall, unless otherwise provided, be sufficient to give a minimum volume of free gas equal to 30% of the gross volume of the largest cargo space so protected in the ship.

2.2 For machinery spaces the quantity of carbon dioxide carried shall be sufficient to give a minimum volume of free gas equal to the larger of the following volumes, either:

.1 40% of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40% or less

of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing; or

.2 35% of the gross volume of the largest machinery space protected, including the casing;

provided that the above-mentioned percentages may be reduced to 35% and 30% respectively for cargo ships of less than 2,000 gross tonnage; provided also that if two or more machinery spaces are not entirely separate they shall be considered as forming one space.

2.3 For the purpose of this paragraph the volume of free carbon dioxide shall be calculated at 0.56 m^3/kg.

2.4 For machinery spaces the fixed piping system shall be such that 85% of the gas can be discharged into the space within 2 min.

2.5 Carbon dioxide systems installed on or after 1 October 1994 shall comply with the following requirements:

.1 Two separate controls shall be provided for releasing carbon dioxide into a protected space and to ensure the activities of the alarm. One control shall be used to discharge the gas from its storage containers. A second control shall be used for opening the valve of the piping which conveys the gas into the protected space.

.2 The two controls shall be located inside a release box clearly identified for the particular space. If the box containing the controls is to be locked, a key to the box shall be in a break-glass-type enclosure conspicuously located adjacent to the box.

3 Halogenated hydrocarbon systems*

3.1 The use of halogenated hydrocarbons as fire-extinguishing media is only permitted in machinery spaces, pump-rooms and in cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo. New installations of halogenated carbon systems shall be prohibited on all ships.

3.2 When halogenated hydrocarbons are used as the fire-extinguishing media in total flooding systems:

.1 The system shall be arranged for manual initiation of power release only.

.2 If the charge of halogenated hydrocarbon is required to supply more than one space, the arrangements for its storage and release

* Refer to resolution A.719(17) concerning prevention of air pollution from ships and to MSC/Circ.668 on alternative arrangements for halon fire-extinguishing systems in machinery spaces and pump-rooms.

shall be such that compliance with paragraphs 3.2.9 or 3.2.10 respectively, is obtained.

.3 Means shall be provided for automatically stopping all ventilation fans serving the protected space before the medium is released.

.4 Means shall be provided to manually close all dampers in the ventilation system serving a protected space.

.5 The discharge arrangements shall be so designed that the minimum quantity of medium required for cargo spaces or machinery spaces in paragraphs 3.2.9 or 3.2.10 respectively can be substantially discharged in a nominal 20 s or less based on the discharge of the liquid phase.

.6 The system shall be designed to operate within a temperature range to the satisfaction of the Administration.

.7 The discharge shall not endanger personnel engaged on maintenance of equipment or using the normal access ladders and escapes serving the space.

.8 Means shall be provided for the crew to safely check the pressure within containers.

.9 The quantity of extinguishing medium for cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo shall be calculated in accordance with table 5.1. This quantity shall be based on the gross volume of the protected space. In respect of Halon 1301 and 1211, the quantity shall be calculated on a volumetric ratio basis, and in respect of Halon 2402 on a mass per unit volume basis.

Table 5.1

Halon	Minimum	Maximum
1301	5%	7%
1211	5%	5.5%
2402	0.23 kg/m^3	0.30 kg/m^3

.10 The quantity of extinguishing media for machinery spaces shall be calculated in accordance with table 5.2. This quantity shall be based on the gross volume of the space in respect of the minimum concentration and the net volume of the space in respect of the maximum concentration, including the casing. In

respect of Halon 1301 and 1211, the quantity shall be calculated on a volumetric ratio basis, and in respect of Halon 2402 on a mass per unit volume basis.

Table 5.2

Halon	Minimum	Maximum
1301	4.25%	7%
1211	4.25%	5.5%
2402	0.20 kg/m^3	0.30 kg/m^3

.11 For the purpose of paragraphs 3.2.9 and 3.2.10, the volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.

3.3 Only Halon 1301 may be stored within a protected machinery space. Containers shall be individually distributed throughout that space and the following requirements shall be complied with:

.1 A manually initiated power release, located outside the protected space, shall be provided. Duplicate sources of power shall be provided for this release and shall be located outside the protected space and be immediately available except that for machinery spaces, one of the sources of power may be located inside the protected space.

.2 Electric power circuits connecting the containers shall be monitored for fault conditions and loss of power. Visual and audible alarms shall be provided to indicate this.

.3 Pneumatic or hydraulic power circuits connecting the containers shall be duplicated. The sources of pneumatic or hydraulic pressure shall be monitored for loss of pressure. Visual and audible alarms shall be provided to indicate this.

.4 Within the protected space, electrical circuits essential for the release of the system shall be heat-resistant, e.g. mineral-insulated cable or equivalent. Piping systems essential for the release of systems designed to be operated hydraulically or pneumatically shall be of steel or other equivalent heat-resisting material to the satisfaction of the Administration.

.5 Each pressure container shall be fitted with an automatic over-pressure release device which, in the event of the container being exposed to the effects of fire and the system not being operated, will safely vent the contents of the container into the protected space.

.6 The arrangement of containers and the electrical circuits and piping essential for the release of any system shall be such that in

the event of damage to any one power release line through fire or explosion in a protected space, i.e., a single fault concept, at least two thirds of the fire-extinguishing charge required by paragraphs 3.2.9 or 3.2.10 for that space can still be discharged having regard to the requirement for uniform distribution of medium throughout the space. The arrangments in respect of systems for spaces requiring only one or two containers shall be to the satisfaction of the Administration.

.7 Not more than two discharge nozzles shall be fitted to any pressure container and the maximum quantity of agent in each container shall be to the satisfaction of the Administration having regard to the requirement for uniform distribution of medium throughout the space.

.8 The containers shall be monitored for decrease in pressure due to leakage and discharge. Visual and audible alarms in the protected area and on the navigation bridge or in the space where the fire control equipment is centralized shall be provided to indicate this condition, except that for cargo spaces, alarms are only required on the navigation bridge or the space where the fire control equipment is centralized.

3.4 Local automatically operated fixed fire-extinguishing units containing Halon 1301 or 1211, fitted in enclosed areas of high fire risk within machinery spaces, in addition to, and independent of, any required fixed fire-extinguishing system may be accepted subject to compliance with the following:

.1 The space in which such additional local protection is provided shall preferably be on one working level and on the same level as the access. At the discretion of the Administration more than one working level may be permitted subject to an access being provided on each level.

.2 The size of the space and arrangements of accesses thereto and machinery therein, shall be such that escape from anywhere in the space can be effected in not more than 10 s.

.3 The operation of any unit shall be signalled both visually and audibly outside each access to the machinery space and at the navigation bridge or in the space where the fire control equipment is centralized.

.4 A notice indicating that the space contains one or more automatically operated fire-extinguishing units and stating which medium is used, shall be displayed outside each access thereto.

.5 Discharge nozzles shall be so positioned that the discharge does not endanger personnel using the normal access ladders and escapes serving the compartment. Provision shall also be made to protect personnel engaged in maintenance of machinery from inadvertent discharge of the medium.

.6 The fire-extinguishing units shall be designed to operate within a temperature range to the satisfaction of the Administration.

.7 Means shall be provided for the crew to safely check the pressure within the containers.

.8 The total quantity of extinguishing medium provided in the local automatically operated units shall be such that a concentration of 7% in respect of Halon 1301 and 5.5% in respect of Halon 1211 at 20°C based on the net volume of the enclosed space is not exceeded. This requirement applies when either a local automatically operated unit or a fixed system fitted in compliance with paragraph 3.2 has operated, but not when both have operated. The volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.

.9 The time of discharge of a unit, based on the discharge of the liquid phase, shall be 10 s or less.

.10 The arrangement of local automatically operated fire-extinguishing units shall be such that their release does not result in loss of electrical power or reduction of the manoeuvrability of the ship.

3.5 Automatically operated fire-extinguishing units, as described in paragraph 3.4, fitted in machinery spaces over equipment having a high fire risk, in addition to and independent of any required fixed fire-extinguishing system, may be accepted subject to compliance with paragraphs 3.4.3 to 3.4.6, 3.4.9 and 3.4.10 and with the following:

.1 The quantity of medium provided in local automatically operated units shall be such that a vapour in air concentration not greater than 1.25% at 20°C based on the gross volume of the machinery space is obtained in the event of their simultaneous operation.

.2 The volume of Halon 1301 shall be calculated at 0.16 m^3/kg and the volume of Halon 1211 shall be calculated at 0.14 m^3/kg.

4 Steam systems

In general, the Administration shall not permit the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems. Where the used of steam is permitted by the Administration it shall be used only in restricted areas as an addition to the required fire-extinguishing medium and with the proviso that the boiler or boilers available for supplying steam shall have an evaporation of at least 1.0 kg of steam per hour for each 0.75 m^3 of the gross volume of the largest space so protected. In addition to complying with the foregoing requirements the systems in all respects shall be as determined by, and to the satisfaction of, the Administration.

5 Other gas systems

5.1 Where gas other than carbon dioxide or halogenated hydrocarbons, or steam as permitted by paragraph 4 is produced on the ship and is used as a fire-extinguishing medium, it shall be a gaseous product of fuel combustion in which the oxygen content, the carbon monoxide content, the corrosive elements and any solid combustible elements have been reduced to a permissible minimum.

5.2 Where such gas is used as the fire-extinguishing medium in a fixed fire-extinguishing system for the protection of machinery spaces, it shall afford protection equivalent to that provided by a fixed system using carbon dioxide as the medium.

5.3 Where such gas is used as a fire-extinguishing medium in a fixed fire-extinguishing system for the protection of cargo spaces, a sufficient quantity of such gas shall be available to supply hourly a volume of free gas at least equal to 25% of the gross volume of the largest space protected in this way for a period of 72 h.

Regulation 6
*Fire extinguishers**

1 All fire extinguishers shall be of approved types and designs.

1.1 The capacity of required portable fluid extinguishers shall be not more than 13.5 *l* and not less than 9 *l*. Other extinguishers shall be at least as portable as the 13.5 *l* fluid extinguisher and shall have a fire-extinguishing capability at least equivalent to that of a 9 *l* fluid extinguisher.

1.2 The Administration shall determine the equivalents of fire extinguishers.

2 Spare charges shall be provided in accordance with requirements to be specified by the Administration.

3 Fire extinguishers containing an extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.

4 A portable foam applicator unit shall consist of an air-foam nozzle of an inductor type capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 *l* of foam-making liquid and one spare tank. The nozzle shall be capable of producing effective foam suitable for extinguishing an oil fire, at the rate of at least 1.5 m^3/min.

* Refer to the Revised guidelines for marine portable fire extinguishers adopted by the Organization by resolution A.602(15).

5 Fire extinguishers shall be periodically examined and subjected to such tests as the Administration may require.

6 One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

7 Accommodation spaces, service spaces and control stations shall be provided with portable fire extinguishers of appropriate types and in sufficient number to the satisfaction of the Administration. Ships of 1,000 gross tonnage and upwards shall carry at least five portable fire extinguishers.

Regulation 7

Fire-extinguishing arrangements in machinery spaces

1 Spaces containing oil-fired boilers or oil fuel units

1.1 Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with any one of the following fixed fire-extinguishing systems:

- **.1** a gas system complying with the provisions of regulation 5;*
- **.2** a high-expansion foam system complying with the provisions of regulation 9;
- **.3** a pressure water-spraying system complying with the provisions of regulation 10.*

In each case if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

1.2 There shall be in each boiler room at least one set of portable foam applicator units complying with the provisions of regulation 6.4.

1.3 There shall be at least two portable foam extinguishers or equivalent in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be not less than one approved foam-type extinguisher of at least 135 *l* capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW in cargo ships the Administration may consider relaxing the requirements of this paragraph.

1.4 In each firing space there shall be a receptacle containing sand, sawdust impregnated with soda, or other approved dry material in such quantity as may be required by the Administration. An approved portable extinguisher may be substituted as an alternative.

* Refer to the Revised Guidelines for approval of equivalent fixed gas fire-extinguishing systems, as referred to in SOLAS chapter II-2, for machinery spaces and cargo pump-rooms adopted by the Maritime Safety Committee at its sixty-seventh session in December 1996 (MSC/Circ. 848).

2 Spaces containing internal combustion machinery

Machinery spaces of category A containing internal combustion machinery shall be provided with:

.1 One of the fire-extinguishing systems required by paragraph 1.1.

.2 At least one set of portable air-foam equipment complying with the provisions of regulation 6.4.

.3 In each such space approved foam-type fire extinguishers, each of at least 45 *l* capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space. For smaller spaces of cargo ships the Administration may consider relaxing this requirement.

3 Spaces containing steam turbines or enclosed steam engines

In spaces containing steam turbines or enclosed steam engines used either for main propulsion or for other purposes when such machinery has in the aggregate a total output of not less than 375 kW there shall be provided:

.1 Approved foam fire extinguishers each of at least 45 *l* capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards. However, such extinguishers shall not be required if protection at least equivalent to that required by this subparagraph is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with paragraph 1.1.

.2 A sufficient number of portable foam extinguishers or equivalent which shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with paragraph 1.3.

.3 One of the fire-extinguishing systems required by paragraph 1.1, where such spaces are periodically unattended.

4 Fire-extinguishing appliances in other machinery spaces

Where, in the opinion of the Administration, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing

appliances are prescribed in paragraphs 1, 2 and 3, there shall be provided in, or adjacent to, that space such a number of approved portable fire extinguishers or other means of fire extinction as the Administration may deem sufficient.

5 Fixed fire-extinguishing systems not required by this chapter

Where a fixed fire-extinguishing system not required by this chapter is installed, such a system shall be to the satisfaction of the Administration.*

6 Machinery spaces of category A in passenger ships

In passenger ships carrying more than 36 passengers each machinery space of category A shall be provided with at least two suitable water fog applicators.†

Regulation 8
Fixed low-expansion foam fire-extinguishing systems in machinery spaces‡

1 Where in any machinery space a fixed low-expansion foam fire-extinguishing system is fitted in addition to the requirements of regulation 7, such system shall be capable of discharging through fixed discharge outlets in not more than 5 min a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread. The system shall be capable of generating foam suitable for extinguishing oil fires. Means shall be provided for effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The expansion ratio of the foam shall not exceed 12 to 1.

2 The means of control of any such systems shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

* Refer to MSC/Circ. 913, Guidelines for the approval of alternative fixed water-based local application fire-fighting systems for use in category A machinery spaces.

† A water fog applicator might consist of a metal L-shaped pipe, the long limb being about 2 m in length capable of being fitted to a fire hose and the short limb being about 250 mm in length fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

‡ Refer to MSC/Circ. 582 and Corr. 1, Guidelines for the performance and testing criteria and surveys of low-expansion foam concentrates for fixed fire-extinguishing systems.

Regulation 9
*Fixed high-expansion foam fire-extinguishing systems in machinery spaces**

1.1 Any required fixed high-expansion foam system in machinery spaces shall be capable of rapidly discharging through fixed discharge outlets a quantity of foam sufficient to fill the greatest space to be protected at a rate of at least 1 m in depth per minute. The quantity of foam-forming liquid available shall be sufficient to produce a volume of foam equal to five times the volume of the largest space to be protected. The expansion ratio of the foam shall not exceed 1,000 to 1.

1.2 The Administration may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.

2 Supply ducts for delivering foam, air intakes to the foam generator and the number of foam-producing units shall in the opinion of the Administration be such as will provide effective foam production and distribution.

3 The arrangement of the foam generator delivery ducting shall be such that a fire in the protected space will not affect the foam generating equipment.

4 The foam generator, its sources of power supply, foam-forming liquid and means of controlling the system shall be readily accessible and simple to operate and shall be grouped in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

Regulation 10
Fixed pressure water-spraying fire-extinguishing systems in machinery spaces

1 Any required fixed pressure water-spraying fire-extinguishing system in machinery spaces shall be provided with spraying nozzles of an approved type.

2 The number and arrangement of the nozzles shall be to the satisfaction of the Administration and shall be such as to ensure an effective average distribution of water of at least 5 $l/m^2/min$ in the spaces to be protected. Where increased application rates are considered necessary, these shall be to the satisfaction of the Administration. Nozzles shall be fitted above bilges, tank tops and other areas over which oil fuel is liable to spread and also above other specific fire hazards in the machinery spaces.

3 The system may be divided into sections, the distribution valves of which shall be operated from easily accessible positions outside the spaces to be protected and will not be readily cut off by a fire in the protected space.

* Refer to MSC/Circ.670, Guidelines for the performance and testing criteria and surveys of high-expansion foam concentrates for fixed fire-extinguishing systems.

4 The system shall be kept charged at the necessary pressure and the pump supplying the water for the system shall be put automatically into action by a pressure drop in the system.

5 The pump shall be capable of simultaneously supplying at the necessary pressure all sections of the system in any one compartment to be protected. The pump and its controls shall be installed outside the space or spaces to be protected. It shall not be possible for a fire in the space or spaces protected by the water-spraying system to put the system out of action.

6 The pump may be driven by independent internal combustion machinery but, if it is dependent upon power being supplied from the emergency generator fitted in compliance with the provisions of regulation II-1/44 or regulation II-1/45, as appropriate, that generator shall be so arranged as to start automatically in case of main power failure so that power for the pump required by paragraph 5 is immediately available. When the pump is driven by independent internal combustion machinery it shall be so situated that a fire in the protected space will not affect the air supply to the machinery.

7 Precautions shall be taken to prevent the nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pump.

Regulation 11

Special arrangements in machinery spaces

1 The provisions of this regulation shall apply to machinery spaces of category A and, where the Administration considers it desirable, to other machinery spaces.

2.1 The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

2.2 Skylights shall be of steel and shall not contain glass panels. Suitable arrangements shall be made to permit the release of smoke, in the event of fire, from the space to be protected.

2.3 In passenger ships, doors other than power-operated watertight doors, shall be so arranged that positive closure is assured in case of fire in the space, by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3.5° opposing closure and having a fail-safe hook-back facility, provided with a remotely operated release device.

3 Windows shall not be fitted in machinery space boundaries. This does not preclude the use of glass in control rooms within the machinery spaces.

4 Means of control shall be provided for:

.1 opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation, and closure of ventilator dampers;

.2 permitting the release of smoke;

.3 closing power-operated doors or actuating release mechanism on doors other than power-operated watertight doors;

.4 stopping ventilating fans; and

.5 stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps.

5 The controls required in paragraph 4 and in regulation 15.2.5 shall be located outside the space concerned, where they will not be cut off in the event of fire in the space they serve. In passenger ships such controls and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Administration. Such positions shall have a safe access from the open deck.

6 When access to any machinery space of category A is provided at a low level from an adjacent shaft tunnel, there shall be provided in the shaft tunnel, near the watertight door, a light steel fire-screen door operable from each side.

7 For periodically unattended machinery spaces in cargo ships, the Administration shall give special consideration to maintaining fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the required shutdown arrangements (e.g. ventilation, fuel pumps, etc.) and may require additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus. In passenger ships these requirements shall be at least equivalent to those of machinery spaces normally attended.

8 A fixed fire detection and alarm system complying with the provisions of regulation 14 shall be fitted in any machinery space:

.1 where the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and

.2 where the main propulsion and associated machinery including sources of main electrical supply are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room.

Regulation 12
*Automatic sprinkler, fire detection and fire alarm systems**

1.1 Any required automatic sprinkler, fire detection and fire alarm system shall be capable of immediate operation at all times and no action by the crew

* Refer to the Revised guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12 adopted by the Organization by resolution A.800(18).

shall be necessary to set it in operation. It shall be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of the Administration this is a necessary precaution. Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing. It shall be kept charged at the necessary pressure and shall have provision for a continuous supply of water as required in this regulation.

1.2 Each section of sprinklers shall include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. Such alarm systems shall be such as to indicate if any fault occurs in the system. Such units shall indicate in which section served by the system fire has occurred and shall be centralized on the navigation bridge and in addition, visible and audible alarms from the unit shall be located in a position other than on the navigation bridge, so as to ensure that the indication of fire is immediately received by the crew.

2.1 Sprinklers shall be grouped into separate sections, each of which shall contain not more than 200 sprinklers. In passenger ships any section of sprinklers shall not serve more than two decks and shall not be situated in more than one main vertical zone. However, the Administration may permit such a section of sprinklers to serve more than two decks or be situated in more than one main vertical zone, if it is satisfied that the protection of the ship against fire will not thereby be reduced.

2.2 Each section of sprinklers shall be capable of being isolated by one stop valve only. The stop valve in each section shall be readily accessible and its location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the stop valves by any unauthorized person.

2.3 A gauge indicating the pressure in the system shall be provided at each section stop valve and at a central station.

2.4 The sprinklers shall be resistant to corrosion by marine atmosphere. In accommodation and service spaces the sprinklers shall come into operation within the temperature range from 68°C to 79°C, except that in locations such as drying rooms, where high ambient temperatures might be expected, the operating temperature may be increased by not more than 30°C above the maximum deckhead temperature.

2.5 A list or plan shall be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.

3 Sprinklers shall be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 $l/m^2/min$ over the nominal area covered by the sprinklers. However, the Administration may permit the use of sprinklers providing such an alternative amount of water suitably distributed as has been shown to the satisfaction of the Administration to be not less effective.

4.1 A pressure tank having a volume equal to at least twice that of the charge of water specified in this subparagraph shall be provided. The tank shall contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in paragraph 5.2, and the arrangements shall provide for maintaining an air pressure in the tank such as to ensure that where the standing charge of fresh water in the tank has been used the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank shall be provided. A glass gauge shall be provided to indicate the correct level of the water in the tank.

4.2 Means shall be provided to prevent the passage of seawater into the tank.

5.1 An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.

5.2 The pump and the piping system shall be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 280 m^2 at the application rate specified in paragraph 3.

5.3 The pump shall have fitted on the delivery side a test valve with a short open-ended discharge pipe. The effective area through the valve and pipe shall be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in paragraph 4.1.

5.4 The sea inlet to the pump shall wherever possible be in the space containing the pump and shall be so arranged that when the ship is afloat it will not be necessary to shut off the supply of seawater to the pump for any purpose other than the inspection or repair of the pump.

6 The sprinkler pump and tank shall be situated in a position reasonably remote from any machinery space of category A and shall not be situated in any space required to be protected by the sprinkler system.

7.1 In passenger ships there shall be not less than two sources of power supply for the seawater pump and automatic alarm and detection system. Where the sources of power for the pump are electrical, these shall be a main generator and an emergency source of power. One supply for the pump shall be taken from the main switchboard, and one from the emergency switchboard by separate feeders reserved solely for that purpose. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to

reach the appropriate switchboards, and shall be run to an automatic change-over switch situated near the sprinkler pump. This switch shall permit the supply of power from the main switchboard so long as a supply is available therefrom, and be so designed that upon failure of that supply it will automatically change over to the supply from the emergency switchboard. The switches on the main switchboard and the emergency switchboard shall be clearly labelled and normally kept closed. No other switch shall be permitted in the feeders concerned. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph 6, be so situated that a fire in any protected space will not affect the air supply to the machinery.

7.2 In cargo ships there shall not be less than two sources of power supply for the seawater pump and automatic alarm and detection system. If the pump is electrically driven it shall be connected to the main source of electrical power, which shall be capable of being supplied by at least two generators. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph 6, be so situated that a fire in any protected space will not affect the air supply to the machinery.

8 The sprinkler system shall have a connection from the ship's fire main by way of a lockable screw-down non-return valve at the connection which will prevent a backflow from the sprinkler system to the fire main.

9.1 A test valve shall be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section shall be situated near the stop valve for that section.

9.2 Means shall be provided for testing the automatic operation of the pump on reduction of pressure in the system.

9.3 Switches shall be provided at one of the indicating positions referred to in paragraph 1.2 which will enable the alarm and the indicators for each section of sprinklers to be tested.

10 Spare sprinkler heads shall be provided for each section of sprinklers to the satisfaction of the Administration.

Regulation 13
Fixed fire detection and fire alarm systems

1 General requirements

1.1 Any required fixed fire detection and fire alarm system with manually operated call points shall be capable of immediate operation at all times.

1.2 Power supplies and electric circuits necessary for the operation of the system shall be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition shall initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.

1.3 There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire detection and fire alarm system, one of which shall be an emergency source. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall run to an automatic change-over switch situated in or adjacent to the control panel for the fire detection system.

1.4 Detectors and manually operated call points shall be grouped into sections. The activation of any detector or manually operated call point shall initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within 2 min an audible alarm shall be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of category A. This alarm sounder system need not be an integral part of the detection system.

1.5 The control panel shall be located on the navigation bridge or in the main fire control station.

1.6 Indicating units shall, as a minimum, denote the section in which a detector or manually operated call point has operated. At least one unit shall be so located that it is easily accessible to responsible members of the crew at all times, when at sea or in port, except when the ship is out of service. One indicating unit shall be located on the navigation bridge if the control panel is located in the main fire control station.

1.7 Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.

1.8 Where the fire detection system does not include means of remotely identifying each detector individually, no section covering more than one deck within accommodation, service and control stations shall normally be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of fire, the number of enclosed spaces included in each section shall be limited as determined by the Adminis-

tration. In no case shall more than 50 enclosed spaces be permitted in any section. If the detection system is fitted with remotely and individually identifiable fire detectors, the sections may cover several decks and serve any number of enclosed spaces.

1.9 In passenger ships, if there is no fire detection system capable of remotely and individually identifying each detector, a section of detectors shall not serve spaces on both sides of the ship nor on more than one deck and neither shall it be situated in more than one main vertical zone except that the Administration, if it is satisfied that the protection of the ship against fire will not thereby be reduced, may permit such a section of detectors to serve both sides of the ship and more than one deck. In passenger ships fitted with individually identifiable fire detectors, a section may serve spaces on both sides of the ship and on several decks but may not be situated in more than one main vertical zone.

1.10 A section of fire detectors which covers a control station, a service space or an accommodation space shall not include a machinery space of category A.

1.11 Detectors shall be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered by the Administration provided that they are no less sensitive than such detectors. Flame detectors shall only be used in addition to smoke or heat detectors.

1.12 Suitable instructions and component spares for testing and maintenance shall be provided.

1.13 The function of the detection system shall be periodically tested to the satisfaction of the Administration by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond. All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

1.14 The fire detection system shall not be used for any other purpose, except that closing of fire doors and similar functions may be permitted at the control panel.

1.15 Fire detection systems with a zone address identification capability fitted on or after 1 October 1994 shall be so arranged that:

.1 a loop cannot be damaged at more than one point by a fire;

.2 means are provided to ensure that any fault (e.g. power break, short circuit, earth) occurring in the loop will not render the whole loop ineffective;

.3 all arrangements are made to enable the initial configuration of the system to be restored in the event of failure (electrical, electronic, informatic); and

.4 the first initiated fire alarm will not prevent any other detector from initiating further fire alarms.

2 Installation requirements

2.1 Manually operated call points shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.

2.2 Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

2.3 Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph 2.2, at least one detector complying with paragraph 1.11 shall be installed in each such space.

2.4 Detectors shall be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely shall be avoided. In general, detectors which are located on the overhead shall be a minimum distance of 0.5 m away from bulkheads.

2.5 The maximum spacing of detectors shall be in accordance with the table below:

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m^2	9 m	4.5 m
Smoke	74 m^2	11 m	5.5 m

The Administration may require or permit other spacings based upon test data which demonstrate the characteristics of the detectors.

2.6 Electrical wiring which forms part of the system shall be so arranged as to avoid galleys, machinery spaces of category A, and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarm in such spaces or to connect to the appropriate power supply.

3 Design requirements

3.1 The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships.

3.2 Smoke detectors required by paragraph 2.2 shall be certified to operate before the smoke density exceeds 12.5% obscuration per metre, but not until the smoke density exceeds 2% obscuration per metre. Smoke detectors to be installed in other spaces shall operate within sensitivity limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

3.3 Heat detectors shall be certified to operate before the temperature exceeds 78°C but not until the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector shall operate within temperature limits to the satisfaction of the Administration having regard to the avoidance of detector insensitivity or oversensitivity.

3.4 At the discretion of the Administration, the permissible temperature of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

Regulation 13-1

Sample extraction smoke detection systems

(This regulation applies to ships constructed on or after 1 February 1992)

1 General requirements

1.1 Wherever in the text of this regulation the word *system* appears, it shall mean *sample extraction smoke detection system*.

1.2 Any required system shall be capable of continuous operation at all times except that systems operating on a sequential scanning principle may be accepted, provided that the interval between scanning the same position twice gives an overall response time to the satisfaction of the Administration.

1.3 Power supplies necessary for the operation of the system shall be monitored for loss of power. Any loss of power shall initiate a visual and audible signal at the control panel and the navigation bridge which shall be distinct from a signal indicating smoke detection.

1.4 An alternative power supply for the electrical equipment used in the operation of the system shall be provided.

1.5 The control panel shall be located on the navigation bridge or in the main fire control station.

1.6 The detection of smoke or other products of combustion shall initiate a visual and audible signal at the control panel and the navigation bridge.

1.7 Clear information shall be displayed on or adjacent to the control panel designating the spaces covered.

1.8 The sampling pipe arrangements shall be such that the location of the fire can be readily identified.

1.9 Suitable instructions and component spares shall be provided for the testing and maintenance of the system.

1.10 The functioning of the system shall be periodically tested to the satisfaction of the Administration. The system shall be of a type that can be tested for correct operation and restored to normal surveillance without the renewal of any component.

1.11 The system shall be designed, constructed and installed so as to prevent the leakage of any toxic or flammable substances or fire-extinguishing media into any accommodation and service space, control station or machinery space.

2 Installation requirements

2.1 At least one smoke accumulator shall be located in every enclosed space for which smoke detection is required. However, where a space is designed to carry oil or refrigerated cargo alternatively with cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments for the system. Such means shall be to the satisfaction of the Administration.

2.2 Smoke accumulators shall be located for optimum performance and shall be spaced so that no part of the overhead deck area is more than 12 m measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators shall be considered having regard to the effects of ventilation.

2.3 Smoke accumulators shall be positioned where impact or physical damage is unlikely to occur.

2.4 Not more than four accumulators shall be connected to each sampling point.

2.5 Smoke accumulators from more than one enclosed space shall not be connected to the same sampling point.

2.6 Sampling pipes shall be self-draining and suitably protected from impact or damage from cargo working.

3 Design requirements

3.1 The system and equipment shall be suitably designed to withstand supply voltage variations and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships and to avoid the possibility of ignition of flammable gas air mixture.

3.2 The sensing unit shall be certified to operate before the smoke density within the sensing chamber exceeds 6.65% obscuration per metre.

3.3 Duplicate sample extraction fans shall be provided. The fans shall be of sufficient capacity to operate with the normal conditions of ventilation in the protected area and shall give an overall response time to the satisfaction of the Administration.

3.4 The control panel shall permit observation of smoke in the individual sampling pipe.

3.5 Means shall be provided to monitor the airflow through the sampling pipes so designed as to ensure that as far as practicable equal quantities are extracted from each interconnected accumulator.

3.6 Sampling pipes shall be a minimum of 12 mm internal diameter except when used in conjunction with fixed gas fire-extinguishing systems when the minimum size of pipe should be sufficient to permit the fire-extinguishing gas to be discharged within the appropriate time.

3.7 Sampling pipes shall be provided with an arrangement for periodically purging with compressed air.

Regulation 14

Fixed fire detection and fire alarm systems for periodically unattended machinery spaces

1 A fixed fire detection and fire alarm system of an approved type in accordance with the relevant provisions of regulation 13 shall be installed in periodically unattended machinery spaces.

2 This fire detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and

observed on the navigation bridge and by a responsible engineer officer. When the navigation bridge is unmanned the alarm shall sound in a place where a responsible member of the crew is on duty.

3 After installation the system shall be tested under varying conditions of engine operation and ventilation.

Regulation 15

*Arrangements for oil fuel, lubricating oil and other flammable oils**

(Paragraphs 2.6 and 3 of this regulation apply to ships constructed on or after 1 February 1992. Paragraphs 2.9 to 2.12 of this regulation apply to all ships.)

1 Limitations in the use of oil as fuel

The following limitations shall apply to the use of oil as fuel:

.1 Except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60°C shall be used.†

.2 In emergency generators oil fuel with a flashpoint of not less than 43°C may be used.

.3 Subject to such additional precautions as it may consider necessary and on condition that the ambient temperature of the space in which such oil fuel is stored or used shall not be allowed to rise to within 10°C below the flashpoint of the oil fuel, the Administration may permit the general use of oil fuel having a flashpoint of less than 60°C but not less than 43°C.

.4 In cargo ships the use of fuel having a lower flashpoint than otherwise specified in this paragraph, 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.

The flashpoint of oils shall be determined by an approved closed cup method.

2 Oil fuel arrangements‡

In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety

* Refer to the Guidelines to minimize leakage from flammable liquid systems, adopted by the Maritime Safety Committee at its sixty-third session in May 1994 (MSC/Circ. 647).

† Refer to the Recommended procedures to prevent the illegal or accidental use of low-flashpoint cargo as fuel adopted by the Organization by resolution A.565(14).

‡ Refer to the Guidelines on engine-room fuel systems adopted by the Maritime Safety Committee at its sixty-ninth session in May 1998 (MSC/Circ. 851).

of the ship and persons on board and shall at least comply with the following provisions:

.1 As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm^2 shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.

.2 The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent accumulation of oil vapour.

.3 As far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of category A they shall not contain oil fuel having a flashpoint of less than 60°C. In general the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

.4 No oil fuel tank shall be situated where spillage or leakage therefrom can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

.5 Every oil fuel pipe, which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom, shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such additional valve is fitted in the machinery space it shall be operated from a position outside this space.

.6 Safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided.

.6.1 Where sounding pipes are used, they shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they shall not terminate in passenger or crew spaces. As a general rule, they shall not terminate in machinery spaces. However, where the Administration considers that these latter requirements are impracticable, it may permit termination of sounding pipes in machinery spaces on condition that all the following requirements are met:

.6.1.1 in addition, an oil-level gauge is provided meeting the requirements of subparagraph .6.2;

.6.1.2 the sounding pipes terminate in locations remote from ignition hazards unless precautions are taken, such as the fitting of effective screens, to prevent the oil fuel in the case of spillage through the terminations of the sounding pipes from coming into contact with a source of ignition;

.6.1.3 the termination of sounding pipes are fitted with self-closing blanking devices and with a small-diameter self-closing control cock located below the blanking device for the purpose of ascertaining before the blanking device is opened that oil fuel is not present. Provision shall be made so as to ensure that any spillage of oil fuel through the control cock involves no ignition hazard.

.6.2 Other oil-level gauges may be used in place of sounding pipes. Such means, like the means provided in subparagraph .6.1.1, are subject to the following conditions:

.6.2.1 in passenger ships, such means shall not require penetration below the top of the tank and their failure or overfilling of the tanks shall not permit release of fuel;

.6.2.2 in cargo ships, the failure of such means or overfilling of the tank shall not permit release of fuel into the space. The use of cylindrical gauge glasses is prohibited. The Administration may permit the use of oil-level gauges with flat glasses and self-closing valves between the gauges and fuel tanks.

.6.3 Means prescribed in subparagraph .6.2.1 or .6.2.2 which are acceptable to the Administration shall be maintained in the proper condition to ensure their continued accurate functioning in service.

.7 Provision shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes.

Any relief valves and air or overflow pipes shall discharge to a position which, in the opinion of the Administration, is safe.

.8 Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that restricted use of flexible pipes shall be permissible in positions where the Administration is satisfied that they are necessary. Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Administration.

.9 All external high-pressure fuel delivery lines between the high-pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A jacketed pipe incorporates an outer pipe into which the high-pressure fuel pipe is placed, forming a permanent assembly. The jacketed piping system shall include a means for collection of leakages and arrangements shall be provided for an alarm to be given of a fuel line failure.

.10 All surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated.

.11 Oil fuel lines shall be screened or otherwise suitably protected to avoid, as far as practicable, oil spray or oil leakages onto hot surfaces, into machinery air intakes, or other sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

.12 Ships constructed before 1 July 1998 shall comply with the requirements of paragraphs 2.9 to 2.11 not later than 1 July 2003, except that a suitable enclosure on engines having an output of 375 kW or less having fuel injection pumps serving more than one injector may be used as an alternative to the jacketed piping system in paragraph 2.9.

3 Lubricating oil arrangements

The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board. The arrangements made in machinery spaces of category A, and whenever practicable in other machinery spaces, shall at least comply with the provisions of paragraphs 2.1, 2.4, 2.5, 2.6, 2.7, 2.8, 2.10 and 2.11, except that:

.1 this does not preclude the use of sight-flow glasses in lubricating systems provided that they are shown by test to have a suitable degree of fire resistance;

.2 sounding pipes may be authorized in machinery spaces; the requirements of paragraphs 2.6.1.1 and 2.6.1.3 need not be applied on condition that the sounding pipes are fitted with appropriate means of closure.

4 Arrangements for other flammable oils

The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. In locations where means of ignition are present, such arrangements shall at least comply with the provisions of paragraphs 2.4, 2.6, 2.10 and 2.11, and with the provisions of paragraphs 2.7 and 2.8 in respect of strength and construction.

5 Periodically unattended machinery spaces

In addition to the requirements of paragraphs 1 to 4, the oil fuel and lubricating oil systems shall comply with the following:

.1 Where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically, e.g. oil fuel purifiers, which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages.

.2 Where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

6 Prohibition of carriage of flammable oils in forepeak tanks

Fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks.

Regulation 16

Ventilation systems in ships other than passenger ships carrying more than 36 passengers

1 Ventilation ducts shall be of non-combustible material. Short ducts, however, not generally exceeding 2 m in length and with a cross-section not exceeding 0.02 m^2 need not be non-combustible, subject to the following conditions:

.1 these ducts shall be of a material which has low flame spread characteristics.

.2 they may only be used at the end of the ventilation device;

.3 they shall not be situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division including continuous "B" class ceilings.

2 Where the ventilation ducts with a free-sectional area exceeding 0.02 m^2 pass through class "A" bulkheads or decks, the opening shall be lined with a steel sheet sleeve unless the ducts passing through the bulkheads or decks are of steel in the vicinity of passage through the deck or bulkhead and the ducts and sleeves shall comply in this part with the following:

.1 The 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 bulkhead or deck through which the duct passes. Equivalent penetration protection may be provided to the satisfaction of the Administration.

.2 Ducts with a free cross-sectional area exceeding 0.075 m^2 shall be fitted with fire dampers in addition to the requirements of paragraph 2.1. The fire damper shall operate automatically but shall also be capable of being closed manually from both sides of the bulkhead or deck. The damper shall be provided with an indicator which shows whether the damper is open or closed. 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 pierce.

3 Ducts provided for the ventilation of machinery spaces of category A, galleys, car deck spaces, ro–ro cargo spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless they comply with the conditions specified in subparagraphs .1.1 to .1.4 or .2.1 and .2.2 below:

.1.1 the ducts are constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;

.1.2 the ducts are suitably supported and stiffened;

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

.1.4 the ducts are insulated to "A-60" standard from the machinery spaces, galleys, car deck spaces, ro–ro cargo spaces or special category spaces to a point at least 5 m beyond each fire damper;

or

.2.1 the ducts are constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2; and

.2.2 the ducts are insulated to "A-60" standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 8.

4 Ducts provided for ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, car deck spaces, ro–ro cargo spaces or special category spaces unless they comply with the conditions specified in subparagraphs .1.1 to .1.3 or .2.1 and .2.2 below:

.1.1 the ducts where they pass through a machinery space of category A, galley, car deck space, ro–ro cargo space or special category space are constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2;

.1.2 automatic fire dampers are fitted close to the boundaries penetrated; and

.1.3 the integrity of the machinery space, galley, car deck space, ro–ro cargo space or special category space boundaries is maintained at the penetrations;

or

.2.1 the ducts where they pass through a machinery space of category A, galley, car deck space, ro–ro cargo space or special category space are constructed of steel in accordance with paragraphs 3.1.1 and 3.1.2; and

.2.2 the ducts are insulated to "A-60" standard within the machinery space, galley, car deck space, ro–ro cargo space or special category space;

except that penetrations of main zone divisions shall also comply with the requirements of paragraph 8.

5 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.

6 Such measures as are practicable shall be taken in respect of control stations outside machinery spaces in order to ensure that ventilation,

visibility and freedom from smoke are maintained, so that in the event of fire the machinery and equipment contained therein may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided; air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. At the discretion of the Administration, such requirements need not apply to control stations situated on, and opening on to, an open deck, or where local closing arrangements would be equally effective.

7 Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of "A" class divisions. Each exhaust duct shall be fitted with:

.1 a grease trap readily removable for cleaning;

.2 a fire damper located in the lower end of the duct;

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

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

8 Where in a passenger ship it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing 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 operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of regulation 18.1.1. The damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

9 The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated.

10 Power ventilation of accommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position should not be readily cut off in the event of a fire in the spaces served. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

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

.1 fire dampers, including relevant means of operation; and

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

Regulation 17
Fireman's outfit

1 A fireman's outfit shall consist of:

1.1 Personal equipment comprising:

.1 Protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding by steam. The outer surface shall be water-resistant.

.2 Boots and gloves of rubber or other electrically nonconducting material.

.3 A rigid helmet providing effective protection against impact.

.4 An electric safety lamp (hand lantern) of an approved type with a minimum burning period of 3 h.

.5 An axe to the satisfaction of the Administration

1.2 A breathing apparatus of an approved type which may be either:

.1 a smoke helmet or smoke mask which shall be provided with a suitable air pump and a length of air hose sufficient to reach from the open deck, well clear of hatch or doorway, to any part of the holds or machinery spaces. If, in order to comply with this subparagraph, an air hose exceeding 36 m in length would be necessary, a self-contained breathing apparatus shall be substituted or provided in addition as determined by the Administration; or

.2 a self-contained compressed-air-operated breathing apparatus, the volume of air contained in the cylinders of which shall be at least 1,200 *l*, or other self-contained breathing apparatus which shall be capable of functioning for at least 30 min. A number of spare charges, suitable for use with the apparatus provided, shall be available on board to the satisfaction of the Administration. In passenger ships carrying more than 36 passengers, at least two spare charges for each breathing apparatus shall be provided, and all air cylinders for breathing apparatus shall be interchangeable.

2 For each breathing apparatus a fireproof lifeline of sufficient length and strength shall be provided capable of being attached by means of a snaphook to the harness of the apparatus or to a separate belt in order to prevent the breathing apparatus becoming detached when the lifeline is operated.

3 All ships shall carry at least two fireman's outfits complying with the requirements of paragraph 1.

3.1 In addition, there shall be provided:

.1 in passenger ships for every 80 m, or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, two fireman's outfits and two sets of personal equipment, each set comprising the items stipulated in paragraphs 1.1.1, 1.1.2 and 1.1.3. In passenger ships carrying more than 36 passengers, two additional fireman's outfits shall be provided for each main vertical zone. However, for stairway enclosures which constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories 26.2.2(6), (7), (8) or (12), no additional fireman's outfits are required;

.2 in tankers, two fireman's outfits.

3.2 In passenger ships carrying more than 36 passengers, for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

3.3 The Administration may require additional sets of personal equipment and breathing apparatus, having due regard to the size and type of the ship.

4 The fireman's outfits or sets of personal equipment shall be so stored as to be easily accessible and ready for use and, where more than one fireman's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions. In passenger ships at least two fireman's outfits and one set of personal equipment shall be available at any one position. At least two fireman's outfits shall be stored in each main vertical zone.

Regulation 18

Miscellaneous items

(Paragraph 2.4 of this regulation applies to ships constructed on or after 1 February 1992. Paragraph 7 of this regulation applies to all ships. Paragraph 8 of this regulation applies to ships constructed on or after 1 July 1998.)

1.1 Where "A" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements shall be made to ensure that the fire resistance is not impaired, subject to the provisions of regulation 30.5.

1.2 Where "B" class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired.

2.1 Pipes penetrating "A" or "B" class divisions shall be of materials approved by the Administration having regard to the temperature such divisions are required to withstand.

2.2 Where the Administration may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk.

2.3 Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

2.4 For the protection of cargo tanks carrying crude oil and petroleum products having a flashpoint not exceeding 60°C, materials readily rendered ineffective by heat shall not be used for valves, fittings, tank opening covers, cargo vent piping, and cargo piping so as to prevent the spread of fire to the cargo.

3 Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

4 Cellulose-nitrate-based films shall not be used for cinematograph installations.

5 All waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

6 In spaces where penetration of oil products is possible, the surface of insulation shall be impervious to oil or oil vapours.

7 Paint lockers and flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Administration.

8 Provisions for helicopter facilities shall be in accordance with the standards developed by the Organization.*

Regulation 19
International shore connection†

1 Ships of 500 gross tonnage and upwards shall be provided with at least one international shore connection, complying with provisions of paragraph 3.

* Refer to the standards for on-board helicopter facilities adopted by the Organization by resolution A.855(20).

† Refer to resolution A.470(XII) concerning international shore connection (shore side).

2 Facilities shall be available enabling such a connection to be used on either side of the ship.

3 Standard dimensions of flanges for the international shore connection shall be in accordance with the following table:

Description	Dimension
Outside diameter	178 mm
Inside diameter	64 mm
Bolt circle diameter	132 mm
Slots in flange	Four holes 19 mm in diameter spaced equidistantly on a bolt circle of the above diameter, slotted to the flange periphery
Flange thickness	14.5 mm minimum
Bolts and nuts	Four, each of 16 mm diameter, 50 mm in length

4 The connection shall be of steel or other suitable material and shall be designed for 1.0 N/mm^2 services. The flange shall have a flat face on one side and on the other shall be permanently attached to a coupling that will fit the ship's hydrant and hose. The connection shall be kept aboard the ship together with a gasket of any material suitable for 1.0 N/mm^2 services, together with four 16 mm bolts, 50 mm in length, and eight washers.

Regulation 20
Fire control plans and fire drills*

(This regulation applies to all ships)

1 In all ships general arrangement plans shall be permanently exhibited for the guidance of the ship's officers, showing clearly for each deck the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks, etc. and the ventilating system including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available on board in an accessible position. Plans and booklets shall

* Refer to resolution A.654(16) concerning graphical symbols for fire control plans.

be kept up to date, any alterations being recorded thereon as soon as practicable. Description in such plans and booklets shall be in the official language of the flag State. If the language is neither English nor French, a translation into one of those languages shall be included. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position.

2 In all ships a duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weather-tight enclosure outside the deckhouse for the assistance of shoreside fire-fighting personnel.*

3 Fire drills shall be conducted in accordance with the provisions of regulation III/19.

4 In ships carrying more than 36 passengers, plans and booklets required by this regulation shall provide information regarding fire protection, fire detection and fire extinction based on the guidelines issued by the Organization.†

Regulation 21
Ready availability of fire-extinguishing appliances‡

(This regulation applies to all ships)

Fire-extinguishing appliances shall be kept in good order and be available for immediate use at all times.

Regulation 22
Acceptance of substitutes

1 This regulation applies to all ships.

2 Where in this chapter any special type of appliance, apparatus, extinguishing medium or arrangement is specified in any ship, any other type of appliance etc., may be allowed, provided the Administration is satisfied that it is not less effective.

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* Refer also to MSC/Circ.451, Guidance concerning the location of fire control plans for assistance of shoreside fire-fighting personnel.

† Refer to the Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2 adopted by the Organization by resolution A.756(18).

‡ Refer to the Guidelines for the maintenance and inspection of fire protection systems and appliances, adopted by the Maritime Safety Committee at its sixty-ninth session in May 1998 (MSC/Circ. 850).

Part B

Fire safety measures for passenger ships

Regulation 23

Structure

1 The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in regulation 3.7 the "applicable fire exposure" shall be according to the integrity and insulation standards given in the tables of regulations 26 and 27. For example, where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour.

2 However, in cases where any part of the structure is of aluminium alloy, the following shall apply:

.1 The insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the Administration, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test.*

.2 Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure:

.2.1 that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in paragraph 2.1 shall apply at the end of one hour; and

.2.2 that for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph 2.1 shall apply at the end of half an hour.

3 Crowns and casings of machinery spaces of category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

* Refer to MSC/Circ. 915, Unified interpretations of vague expressions and other vague wording of SOLAS chapter II-2.

Regulation 24
Main vertical zones and horizontal zones

1.1 In ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by "A-60" class divisions. Steps and recesses shall be kept to a minimum but where they are necessary they shall also be "A-60" class divisions. Where a category 26.2.2(5), (9) or (10) space is on one side or where fuel oil tanks are on both sides of the division, the standard may be reduced to A-0.

1.2 For ships carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by "A" class divisions. These divisions shall have insulation values in accordance with tables in regulation 27.

2 As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck. The length and width of main vertical zones may be extended to a maximum of 48 m in order to bring the ends of main vertical zones to coincide with watertight subdivision bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600 m^2 on any deck. The length or width of a main vertical zone is the maximum distance between the furthermost points of the bulkheads bounding it.

3 Such bulkheads shall extend from deck to deck and to the shell or other boundaries.

4 Where a main vertical zone is subdivided by horizontal "A" class divisions into horizontal zones for the purpose of providing an appropriate barrier between sprinklered and non-sprinklered zones of the ship, the divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in table 27.2.

5.1 On ships designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent means for controlling and limiting a fire shall be substituted and specifically approved by the Administration.

5.2 However, in a ship with special category spaces, any such space shall comply with the applicable provisions of regulation 37 and in so far as such compliance would be inconsistent with compliance with other requirements of this part, the requirements of regulation 37 shall prevail.

Regulation 25
Bulkheads within a main vertical zone

1.1 For ships carrying more than 36 passengers, all bulkheads which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in regulation 26.

1.2 For ships carrying not more than 36 passengers, all bulkheads within accommodation and service spaces which are not required to be "A" class divisions shall be at least "B" class or "C" class divisions as prescribed in the tables in regulation 27.

1.3 All such divisions may be faced with combustible materials in accordance with the provisions of regulation 34.

2 In ships carrying not more than 36 passengers, all corridor bulkheads where not required to be "A" class shall be "B" class divisions which shall extend from deck to deck except:

.1 when continuous "B" class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which, in thickness and composition, is acceptable in the construction of "B" class divisions but which shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration;

.2 in the case of a ship protected by an automatic sprinkler system complying with the provisions of regulation 12, the corridor bulkheads of "B" class materials may terminate at a ceiling in the corridor provided such a ceiling is of material which, in thickness and composition, is acceptable in the construction of "B" class divisions. Notwithstanding the requirements of regulations 26 and 27, such bulkheads and ceilings shall be required to meet "B" class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration. All doors and frames in such bulkheads shall be of non-combustible materials and shall be so constructed and erected as to provide substantial fire resistance to the satisfaction of the Administration.

3 All bulkheads required to be "B" class divisions, except corridor bulkheads prescribed in paragraph 2, shall extend from deck to deck and to the shell or other boundaries unless the continuous "B" class ceilings or linings fitted on both sides of the bulkheads are at least of the same fire resistance as the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

Regulation 26
Fire integrity of bulkheads and decks in ships carrying more than 36 passengers

(Paragraphs 2.2(7) and 2.2(13) of this regulation apply to ships constructed on or after 1 February 1992)

1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of all bulkheads and decks shall be as prescribed in tables 26.1 and 26.2. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the tables the minimum fire integrity value of any divisions, such values shall be determined to the satisfaction of the Administration.

2 The following requirements shall govern application of the tables:

.1 Table 26.1 shall apply to bulkheads not bounding either main vertical zones or horizontal zones. Table 26.2 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones.

.2 For determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this regulation, it shall be treated as a space within the relevant category having the most stringent boundary requirements. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire-extinguishing rooms, fire control rooms and fire-recording stations.

Control room for propulsion machinery when located outside the propulsion machinery space.

Spaces containing centralized fire alarm equipment.

Spaces containing centralized emergency public address system stations and equipment.

(2) *Stairways*

Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto.

In this connection a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.

(3) *Corridors*

Passenger and crew corridors.

(4) *Evacuation stations and external escape routes*

Survival craft stowage area.

Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations.

Muster stations, internal and external.

External stairs and open decks used for escape routes.

The ship's side to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferaft and evacuation slide embarkation areas.

(5) *Open deck spaces*

Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations.

Air spaces (the space outside superstructures and deckhouses).

(6) *Accommodation spaces of minor fire risk*

Cabins containing furniture and furnishings of restricted fire risk.

Offices and dispensaries containing furniture and furnishings of restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m^2.

(7) *Accommodation spaces of moderate fire risk*

Spaces as in category (6) above but containing furniture and furnishings of other than restricted fire risk.

Public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m^2 or more.

Isolated lockers and small store-rooms in accommodation spaces having areas less than 4 m^2 (in which flammable liquids are not stowed).

Sale shops.

Motion picture projection and film stowage rooms.

Diet kitchens (containing no open flame).

Cleaning gear lockers (in which flammable liquids are not stowed).

Laboratories (in which flammable liquids are not stowed).

Pharmacies.

Small drying rooms (having a deck area of 4 m^2 or less).

Specie rooms.

Operating rooms.

(8) *Accommodation spaces of greater fire risk*

Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m^2 or more.

Barber shops and beauty parlours.

(9) *Sanitary and similar spaces*

Communal sanitary facilities, showers, baths, water closets, etc.

Small laundry rooms.

Indoor swimming pool area.

Isolated pantries containing no cooking appliances in accommodation spaces.

Private sanitary facilities shall be considered a portion of the space in which they are located.

(10) *Tanks, voids and auxiliary machinery spaces having little or no fire risk*

Water tanks forming part of the ship's structure.

Voids and cofferdams.

Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:

ventilation and air-conditioning rooms; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; rooms containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA); shaft alleys and pipe tunnels; spaces for pumps and refrigeration machinery (not handling or using flammable liquids).

Closed trunks serving the spaces listed above.

Other closed trunks such as pipe and cable trunks.

(11) *Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk*

Cargo oil tanks.

Cargo holds, trunkways and hatchways.

Refrigerated chambers.

Oil fuel tanks (where installed in a separate space with no machinery).

Shaft alleys and pipe tunnels allowing storage of combustibles.

Auxiliary machinery spaces as in category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted.

Oil fuel filling stations.

Spaces containing oil-filled electrical transformers (above 10 kVA).

Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps, etc.

Closed trunks serving the spaces listed above.

(12) *Machinery spaces and main galleys*

Main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms.

Auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units.

Main galleys and annexes.

Trunks and casings to the spaces listed above.

(13) *Store-rooms, workshops, pantries, etc.*

Main pantries not annexed to galleys.

Main laundry.

Large drying rooms (having a deck area of more than 4 m^2).

Miscellaneous stores.

Mail and baggage rooms.

Garbage rooms.

Workshops (not part of machinery spaces, galleys, etc.).

Lockers and store-rooms having areas greater than 4 m^2, other than those spaces that have provisions for the storage of flammable liquids.

(14) *Other spaces in which flammable liquids are stowed*

Lamp rooms.

Paint rooms.

Store-rooms containing flammable liquids (including dyes, medicines, etc.).

Laboratories (in which flammable liquids are stowed).

.3 Where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases.

.4 Notwithstanding the provisions of regulation 25 there are no special requirements for material or integrity of boundaries where only a dash appears in the tables.

.5 The Administration shall determine in respect of category (5) spaces whether the insulation values in table 26.1 shall apply to ends of deckhouses and superstructures, and whether the insulation values in table 26.2 shall apply to weather decks. In no case shall the requirements of category (5) of table 26.1 or 26.2 necessitate enclosure of spaces which in the opinion of the Administration need not be enclosed.

3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing wholly or in part, to the required insulation and integrity of a division.

4 In approving structural fire protection details, the Administration shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers.

Table 26.1 – Bulkheads not bounding either main vertical zones or horizontal zones

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	B-0[a]	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways	(2)		A-0[a]	A-0	A-0	A-0	A-0	A-15	A-15	A-0[c]	A-0	A-15	A-30	A-15	A-30
Corridors	(3)			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Evacuation stations and external escape routes	(4)					A-0	A-60[d]	A-60[d]	A-60[d]	A-0[d]	A-0	A-60[b]	A-60[b]	A-60[b]	A-60[b]
Open deck spaces	(5)					—	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk	(7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk	(8)								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar spaces	(9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)										A-0[a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)											A-0[a]	A-0	A-0	A-15
Machinery spaces and main galleys	(12)												A-0[a]	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)													A-0[a]	A-0
Other spaces in which flammable liquids are stowed	(14)														A-30

See notes following table 26.2.

Table 26.2 – Decks not forming steps in main vertical zones nor bounding horizontal zones

Space below↓ Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	A-30	A-30	A-15	A-0	A-0	A-0	A-15	A-30	A-0	A-0	A-0	A-60	A-0	A-60
Stairways	(2)	A-0	A-0	—	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30
Corridors	(3)	A-15	A-0	A-0[a]	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Evacuation stations and external escape routes	(4)	A-0	A-0	A-0	A-0	—	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0	A-0	—	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-15	A-0	A-60	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of moderate fire risk	(7)	A-60	A-15	A-15	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of greater fire risk	(8)	A-60	A-15	A-15	A-60	A-0	A-15	A-15	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Sanitary and similar spaces	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0[a]	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-0	A-15	A-30	A-0	A-0	A-0[a]	A-0	A-0	A-30
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30[a]	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-30	A-15	A-60	A-0	A-15	A-30	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Other spaces in which flammable liquids are stowed	(14)	A-60	A-60	A-60	A-60	A-0	A-30	A-60	A-60	A-0	A-0	A-0	A-0	A-0	A-0

Notes: To be applied to tables 26.1 to 26.2.

a Where adjacent spaces are in the same numerical category and superscript[a] appears, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Administration. For example, in category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and a machinery space even though both spaces are in category (12).

b The ship's side, to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below the adjacent to the liferafts and evacuation slides may be reduced to "A-30".

c Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure can be of "B" class integrity.

d Where spaces of category 6, 7, 8 and 9 are located completely within the outer perimeter of the muster station, the bulkheads of these spaces are allowed to be of "B-0" class integrity. Control positions for audio, video and light installations may be considered as part of the muster station.

Regulation 27
Fire integrity of bulkheads and decks in ships carrying not more than 36 passengers

(Paragraphs 2.2(5) and 2.2(9) of this regulation apply to ships constructed on or after 1 February 1992)

1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of bulkheads and decks shall be as prescribed in table 27.1 and table 27.2.

2 The following requirements shall govern application of the tables:

.1 Tables 27.1 and 27.2 shall apply respectively to the bulkheads and decks separating adjacent spaces.

.2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire-extinguishing rooms, fire control rooms and fire-recording stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Passenger and crew corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.10 excluding corridors.

(4) *Stairways*

Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

Table 27.1 – Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0[c]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	★	A-60
Corridors	(2)		C[e]	B-0[e]	A-0[a] B-0[e]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	★	A-15
Accommodation spaces	(3)			C[e]	A-0[a] B-0[e]	B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	★	A-30 A-0[d]
Stairways	(4)				A-0[a] B-0[e]	A-0[a] B-0[e]	A-60	A-0	A-0	A-15 A-0[d]	★ ★	A-15
Service spaces (low risk)	(5)					C[e]	A-60	A-0	A-0	A-0	★	A-0
Machinery spaces of category A	(6)						★	A-0	A-0	A-60	★	A-60
Other machinery spaces	(7)							A-0[b]	A-0	A-0	★	A-0
Cargo spaces	(8)								★	A-0	★	A-0
Service spaces (high risk)	(9)									A-0[b]	★	A-30
Open decks	(10)											A-0
Special category	(11)											A-0

See notes under table 27.2.

Table 27.2 – Fire integrity of decks separating adjacent spaces

Space below	Space above	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	⋆	A-30
Corridors	(2)	A-0	⋆	⋆	A-0	⋆	A-60	A-0	A-0	A-0	⋆	A-0
Accommodation spaces	(3)	A-60	A-0	⋆	A-0	⋆	A-60	A-0	A-0	A-0	⋆	A-30 A-0[d]
Stairways	(4)	A-0	A-0	A-0	⋆	A-0	A-60	A-0	A-0	A-0	⋆	A-0
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	⋆	A-60	A-0	A-0	A-0	⋆	A-0
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	⋆	A-60[f]	A-30	A-60	⋆	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	⋆	A-0	A-0	⋆	A-0
Cargo spaces	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	⋆	A-0	⋆	A-0
Service spaces (high risk)	(9)	A-60	A-30 A-0[d]	A-30 A-0[d]	A-30 A-0[d]	A-0	A-60	A-0	A-0	A-0	⋆	A-30
Open decks	(10)	⋆	⋆	⋆	⋆	⋆	⋆	⋆	⋆	⋆	–	A-0
Special category spaces	(11)	A-60	A-15	A-30 A-0[d]	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

Notes: To be applied to both tables 27.1 and 27.2, as appropriate.

a For clarification as to which applies, see regulations 25 and 29.

b Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

c Bulkheads separating the wheelhouse and chartroom from each other may be "B-0" rating.

d See 2.3 and 2.4 of this regulation.

e For the application of regulation 24.1.2, "B-0" and "C", where appearing in table 27.1, shall be read as "A-0".

f Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk.

⋆ Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

For the application of regulation 24.1.2 an asterisk, where appearing in table 27.2, except for categories (8) and (10), shall be read as "A-0".

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.19.

(7) *Other machinery spaces*

Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

(8) *Cargo spaces*

All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deckhouses).

(11) *Special category spaces*

Spaces as defined in regulation 3.18.

.3 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.

.4 In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of regulation 12 or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply. Where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.

3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4 External boundaries which are required in regulation 23.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in this part. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

Regulation 28
*Means of escape**

(Paragraph 1.8 of this regulation applies to ships constructed on or after 1 January 1994)

1 Stairways and ladders shall be arranged to provide ready means of escape to the lifeboat and liferaft embarkation deck from all passenger and crew spaces and from spaces in which the crew is normally employed, other than machinery spaces. In particular, the following provisions shall be complied with:

.1 Below the bulkhead deck two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Administration may dispense with one of the means of escape, due regard being paid to the nature and location of spaces and to the number of persons who might normally be employed there.

.2 Above the bulkhead deck there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces at least one of which shall give access to a stairway forming a vertical escape.

.3 If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to such station shall be provided, one of which may be a porthole or window of sufficient size or another means to the satisfaction of the Administration.

.4 A corridor, lobby, or part of a corridor from which there is only one route of escape shall be prohibited.

.5 At least one of the means of escape required by paragraphs 1.1 and 1.2 shall consist of a readily accessible enclosed stairway,

* Refer to the Guidelines on the human element considerations for the design and management of emergency escape arrangements on passenger ships, adopted by the Maritime Safety Committee at its sixty-ninth session in May 1998 (MSC/Circ. 846).

which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by way of external open stairways and passageways shall be provided and shall have emergency lighting in accordance with regulation III/11.5 and slip-free surfaces underfoot. Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck shall have fire integrity, including insulation values, in accordance with the tables in regulation 26. The widths, number and continuity of escapes shall be as follows:

.5.1 Stairways shall not be less than 900 mm in clear width. Stairways shall be fitted with handrails on each side. The minimum clear width of stairways shall be increased by 10 mm for every one person provided for in excess of 90 persons. The maximum clear width between handrails where stairways are wider than 900 mm shall be 1,800 mm. The total number of persons to be evacuated by such stairways shall be assumed to be two thirds of the crew and the total number of passengers in the areas served by such stairways. The width of the stairways shall conform to standards not inferior to those adopted by the Organization.*

.5.2 All stairways sized for more than 90 persons shall be aligned fore and aft.

.5.3 Doorways and corridors and intermediate landings included in means of escape shall be sized in the same manner as stairways.

.5.4 Stairways shall not exceed 3.5 m in vertical rise without the provision of a landing and shall not have an angle of inclination greater than 45°.

.5.5 Landings at each deck level shall be not less than 2 m^2 in area and shall increase by 1 m^2 for every 10 persons provided for in excess of 20 persons but need not exceed 16 m^2, except for those landings servicing public spaces having direct access onto the stairway enclosure.

.6 Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be to the satisfaction of the Administration.

.7 Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.

* Refer to the Standards for the calculation of the width of stairways forming means of escape on passenger ships adopted by the Organization by resolution A.757(18).

.8 Where public spaces span three or more decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, each level within the space shall have two means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of paragraph 5.

.9 Where the Administration has granted dispensation under the provisions of paragraph 1.1, this sole means of escape shall provide safe escape. However, stairways shall not be less than 800 mm in clear width with handrails on both sides.

.10 In addition to the emergency lighting required by regulations II-1/42 and III/11.5, the means of escape, including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 0.3 m above the deck at all points of the escape route including angles and intersections. The marking must enable passengers to identify all the routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, all escape route signs and fire equipment location markings shall be of photoluminescent material or marked by lighting. The Administration shall ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with the guidelines developed by the Organization.*

.11 In all passenger ships carrying more than 36 passengers, the requirements of 1.10 and regulation 41-2.4.7 shall also apply to the crew accommodation areas.

2.1 In special category spaces the number and disposition of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Administration and in general the safety of access to the embarkation deck shall be at least equivalent to that provided for under paragraphs 1.1, 1.2, 1.5 and 1.6.

2.2 One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

3.1 Two means of escape shall be provided from each machinery space. In particular, the following provisions shall be complied with:

.1 Where the space is below the bulkhead deck the two means of escape shall consist of either:

* Refer to the Guidelines for the evaluation, testing and application of low-location lighting on passenger ships adopted by the Organization by resolution A.752(18).

.1.1 two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space; or

.1.2 one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the embarkation deck.

.2 Where the space is above the bulkhead deck, the two means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such means of escape require the use of ladders, these shall be of steel.

3.2 In a ship of less than 1,000 gross tonnage, the Administration may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space; and in a ship of 1,000 gross tonnage and above, the Administration may dispense with one means of escape from any such space so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space.

3.3 Two means of escape shall be provided from a machinery control room located within a machinery space, at least one of which will provide continuous fire shelter to a safe position outside the machinery space.

4 In no case shall lifts be considered as forming one of the required means of escape.

Regulation 28-1

Escape routes on ro–ro passenger ships

1 Requirements applicable to all ro–ro passenger ships

1.1 This paragraph shall apply to all ro–ro passenger ships. For ships constructed before 1 July 1997 the requirements of the regulation shall apply not later than the date of the first periodical survey after 1 July 1997.

1.2 Handrails or other handholds shall be provided in all corridors along

the entire escape route, so that a firm handhold is available every step of the way, where possible, to the assembly stations* and embarkation stations. Such handrails shall be provided on both sides of longitudinal corridors more than 1.8 m in width and transverse corridors more than 1 m in width. Particular attention shall be paid to the need to be able to cross lobbies, atriums and other large open spaces along escape routes. Handrails and other handholds shall be of such strength as to withstand a distributed horizontal load of 750 N/m applied in the direction of the centre of the corridor or space, and a distributed vertical load of 750 N/m applied in the downward direction. The two loads need not be applied simultaneously.

1.3 Escape routes shall not be obstructed by furniture and other obstructions. With the exception of tables and chairs which may be cleared to provide open space, cabinets and other heavy furnishings in public spaces and along escape routes shall be secured in place to prevent shifting if the ship rolls or lists. Floor coverings shall also be secured in place. When the ship is underway, escape routes shall be kept clear of obstructions such as cleaning carts, bedding, luggage and boxes of goods.

1.4 Escape routes shall be provided from every normally occupied space on the ship to an assembly station. These escape routes shall be arranged so as to provide the most direct route possible to the assembly station, and shall be marked with symbols in accordance with the recommendations of the Organization.†

1.5 Where enclosed spaces adjoin an open deck, openings from the enclosed space to the open deck shall, where practicable, be capable of being used as an emergency exit.

1.6 Decks shall be sequentially numbered, starting with ''1'' at the tank top or lowest deck. These numbers shall be prominently displayed at stair landings and lift lobbies. Decks may also be named, but the deck number shall always be displayed with the name.

1.7 Simple ''mimic'' plans showing the ''you are here'' position and escape routes marked by arrows, shall be prominently displayed on the inside of each cabin door and in public spaces. The plan shall show the directions of escape, and shall be properly oriented in relation to its position on the ship.

1.8 Cabin and stateroom doors shall not require keys to unlock them from inside the room. Neither shall there be any doors along any designed escape route which require keys to unlock them when moving in the direction of escape.

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* ''Assembly station'' has the same meaning as ''muster station'' (refer to MSC/Circ.777 on indication of the assembly station in passenger ships).

† Refer to the symbols related to life-saving appliances and arrangements adopted by the Organization by resolution A.760(18).

2 Requirements applicable to ro–ro passenger ships constructed on or after 1 July 1997

2.1 The lowest 0.5 m of bulkheads and other partitions forming vertical divisions along escape routes shall be able to sustain a load of 750 N/m to allow them to be used as walking surfaces from the side of the escape route with the ship at large angles of heel.

2.2 The escape route from cabins to stairway enclosures shall be as direct as possible, with a minimum number of changes in direction. It shall not be necessary to cross from one side of the ship to the other to reach an escape route. It shall not be necessary to climb more than two decks up or down in order to reach an assembly station or open deck from any passenger space.

2.3 External routes shall be provided from open decks, referred to in paragraph 2.2, to the survival craft embarkation stations.

3 Requirements applicable to ro–ro passenger ships constructed on or after 1 July 1999

For ro–ro ships constructed on or after 1 July 1999, escape routes shall be evaluated by an evacuation analysis early in the design process.* The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

Regulation 29

Protection of stairways and lifts in accommodation and service spaces

1 All stairways shall be of steel frame construction except where the Administration sanctions the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:

.1 a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or doors in one 'tween-deck space. When a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with the tables for decks in regulations 26 or 27;

* Refer to the Interim Guidelines for simplified evacuation analysis of ro–ro passenger ships, adopted by the Maritime Safety Committee at its seventy-first session in June 1999 (MSC/Circ. 909).

.2 stairways may be fitted in the open in a public space, provided they lie wholly within such public space.

2 Stairway enclosures shall have direct access to the corridors and be of a sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for safety equipment and open information counters are permitted. Only public spaces, corridors, public toilets, special category spaces, other escape stairways required by regulation 28.1.5 and external areas are permitted to have direct access to these stairway enclosures.

3 Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one 'tween-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

Regulation 30

Openings in ''A'' class divisions

1 Except for hatches between cargo, special category, store, and baggage spaces, and between such spaces and the weather decks, all openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.

2 The construction of all doors and door frames in ''A'' class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame, as far as practicable, equivalent to that of the bulkheads in which the doors are situated. Such doors and door frames shall be constructed of steel or other equivalent material. Watertight doors need not be insulated.

3 It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

4 Fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures, other than power-operated watertight doors and those which are normally locked, shall satisfy the following requirements:

.1 the doors shall be self-closing and be capable of closing against an angle of inclination of up to 3.5° opposing closure;

.2 the approximate time of closure for hinged fire doors shall be no more than 40 s and no less than 10 s from the beginning of their movement with the ship in upright position. The approximate uniform rate of closure for sliding fire doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in the upright position;

.3 the doors shall be capable of remote release from the continuously manned central control station, either simultaneously or in groups and shall be capable of release also

individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;

.4 hold-back hooks not subject to central control station release are prohibited;

.5 a door closed remotely from the central control station shall be capable of being reopened at both sides of the door by local control. After such local opening, the door shall automatically close again;

.6 indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each of the remote-released doors are closed;*

.7 the release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system or main source of electric power;

.8 local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated after disruption of the control system or main source of electric power at least ten times (fully opened and closed) using the local controls;

.9 disruption of the control system or main source of electric power at one door shall not impair the safe functioning of the other doors;

.10 remote-released sliding or power-operated doors shall be equipped with an alarm that sounds for at least 5 s but no more than 10 s after the door is released from the central control station and before the door begins to move and continue sounding until the door is completely closed;

.11 a door designed to reopen upon contacting an object in its path shall reopen not more than 1 m from the point of contact;

.12 double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the control system;

.13 doors giving direct access to special category spaces which are power-operated and automatically closed need not be equipped with the alarms and remote-release mechanisms required in .3 and .10;

.14 the components of the local control system shall be accessible for maintenance and adjusting; and

.15 power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire, this

* Refer to MSC/Circ. 915, Unified interpretations of vague expressions and other vague wording of SOLAS chapter II-2.

being determined in accordance with the Fire Test Procedures Code. This system shall satisfy the following requirements:

.15.1 the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 min, served by the power supply;

.15.2 the power supply for all other doors not subject to fire shall not be impaired; and

.15.3 at temperatures exceeding 200°C the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed up to at least 945°C.

5 In ships carrying not more than 36 passengers, where a space is protected by an automatic sprinkler system complying with the provisions of regulation 12 or fitted with a continuous "B" class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizonal zones shall be closed reasonably tight and such decks shall meet the "A" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration.

6 The requirements for "A" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have "A" class integrity in regulation 33.3. The requirements for "A" class integrity of the outer boundaries of the ships shall not apply to exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external muster station areas, external stairs and open decks used for escape routes. Stairway enclosure doors need not meet this requirement.

7 All "A" class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port of material, construction and fire resistance which is equivalent to the door into which it is fitted, and shall be a 150 mm square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges or, in the case of sliding doors, nearest the opening.

Regulation 31

Openings in "B" class divisions

1.1 Doors and door frames in "B" class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to that of the divisions* except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door the total net area of any such opening or openings shall not

* Refer to the Recommendation on fire test procedures for "A", "B" and "F" class divisions adopted by the Organization by resolution A.517(13).

exceed 0.05 m^2. When such opening is cut in a door it shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible.

1.2 Cabin doors in "B" class divisions shall be of a self-closing type. Hold-backs are not permitted.

2 The requirements for "B" class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" class integrity shall not apply to exterior doors in superstructures and deckhouses. For ships carrying not more than 36 passengers, the Administration may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

3 In ships carrying not more than 36 passengers, where an automatic sprinkler system complying with the provisions of regulation 12 is fitted:

.1 openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "B" class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration; and

.2 openings in corridor bulkheads of "B" class materials shall be protected in accordance with the provisions of regulation 25.

Regulation 32
Ventilation systems

(Paragraph 1.7 of this regulation applies to ships constructed on or after 1 January 1994)

1 Passenger ships carrying more than 36 passengers

1.1 The ventilation system of a passenger ship carrying more than 36 passengers shall, in addition to this part of this regulation, also be in compliance with the requirements of regulations 16.2 to 16.6, 16.8, 16.9 and 16.11.

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

1.3 Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the deck required by regulations 18.1.1 and 30.5, to reduce the likelihood of smoke and hot gases passing from one 'tween-deck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall, if necessary, be insulated as required by the appropriate tables in regulation 26.

1.4 Except in cargo spaces, ventilation ducts shall be constructed of the following materials:

.1 ducts not less than 0.075 m^2 in sectional area and all vertical ducts serving more than a single 'tween-deck space shall be constructed of steel or other equivalent material;

.2 ducts less than 0.075 m^2 in sectional area other than the vertical ducts referred to in paragraph 1.4.1, shall be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class divisions due regard shall be given to ensuring the fire integrity of the division;

.3 short lengths of duct, not in general exceeding 0.02 m^2 in sectional area nor 2 m in length, need not be non-combustible provided that all of the following conditions are met:

.3.1 the duct is constructed of a material which has low flame spread characteristics;

.3.2 the duct is used only at the terminal end of the ventilation system; and

.3.3 the duct is not located closer than 600 mm measured along its length to a penetration of an "A" or "B" class division, including continuous "B" class ceilings.

1.5 Stairway enclosures shall be ventilated and shall be served only by an independent fan and duct system which shall not serve any other spaces in the ventilation system.

1.6 All power ventilation, except machinery space and cargo space ventilation and any alternative system which may be required under regulation 16.6, shall be fitted with controls so grouped that all fans may be stopped from either of two separate positions which shall be situated as far apart as practicable. Controls provided for the power ventilation serving machinery spaces shall also be grouped so as to be operable from two positions, one of which shall be outside such spaces. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.

1.7 Where public spaces span three or more decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the space shall be equipped with a smoke extraction system. The smoke extraction system shall be activated by the required smoke detection system and be capable of manual control. The fans shall be sized such that the entire volume within the space can be exhausted in 10 min or less.

1.8 Ventilation ducts shall be provided with suitably located hatches for inspection and cleaning, where reasonable and practicable.

1.9 Exhaust ducts from galley ranges in which grease or fat is likely to accumulate shall meet the requirements of regulations 16.3.2.1 and 16.3.2.2 and shall be fitted with:

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

.2 a fire damper located in the lower end of the duct which is automatically and remotely operated, and in addition a remotely operated fire damper located in the upper end 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 .2 and for operating the fire-extinguishing system, which shall be placed in a position close to the entrance to the galley. Where a multi-branch system is installed, means 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.

2 Passenger ships carrying not more than 36 passengers

2.1 The ventilation system of passenger ships carrying not more than 36 passengers shall be in compliance with regulation 16.

Regulation 33

Windows and sidescuttles

1 All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which the provisions of regulation 30.6 and of regulation 31.2 apply, shall be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

2 Notwithstanding the requirements of the tables in regulations 26 and 27, all windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle.

3 Windows facing life-saving appliances, embarkation and muster areas, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity as required in the tables in regulation 26. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. Windows located in the ship's side below the lifeboat embarkation areas shall have fire integrity at least equal to "A-0" class.

Regulation 34
*Restricted use of combustible materials**

1 Except in cargo spaces, mail rooms, baggage rooms, or refrigerated compartments of service spaces, all linings, grounds, draught stops, ceilings and insulations shall be of non-combustible materials. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible material.

2 Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings, for cold service systems need not be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics.

3 The following surfaces shall have low flame-spread characteristics:†

.1 exposed surfaces in corridors and stairway enclosures, and of bulkheads, wall and ceiling linings in all accommodation and service spaces and control stations;

.2 concealed or inaccessible spaces in accommodation, service spaces and control stations.

4 The total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space shall not exceed a volume equivalent to 2.5 mm veneer on the combined area of the walls and ceilings. In the case of ships fitted with an automatic sprinkler system complying with the provisions of regulation 12, the above volume may include some combustible material used for erection of "C" class divisions.

5 Veneers used on surfaces and linings covered by the requirements of paragraph 3 shall have a calorific value‡ not exceeding 45 MJ/m^2 of the area for the thickness used.

6 Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to six seats on each deck in each stairway enclosure, be of restricted fire risk, and shall not restrict the passenger escape route. The Administration may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture shall not be permitted in

* Refer to MSC/Circ. 965, Unified interpretations of vague expressions and other vague wording of SOLAS chapter II-2.

† Refer to the Guidelines on the evaluation of fire hazard properties of materials adopted by the Organization by resolution A.166(ES.IV) and to the Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials adopted by the Organization by resolution A.653(16).

‡ The gross calorific value measured in accordance with ISO standard 1716, "Building Materials – Determination of Calorific Potential", should be quoted.

passenger and crew corridors forming escape routes in cabin areas. In addition to the above, lockers of non-combustible material, providing storage for safety equipment required by regulations, may be permitted.*

7 Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

8 Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

Regulation 35
Details of construction

1 In accommodation and service spaces, control stations, corridors and stairways:

.1 air spaces enclosed behind ceilings, panelling or linings shall be suitably divided by close-fitting draught stops not more than 14 m apart;

.2 in the vertical direction, such enclosed air spaces, including those behind linings of stairways, trunks, etc. shall be closed at each deck.

2 The construction of ceiling and bulkheading shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Administration there is no risk of fire originating in such places.

Regulation 36
Fixed fire detection and fire alarm systems and automatic sprinkler, fire detection and fire alarm systems

1 In passenger ships carrying not more than 36 passengers there shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary

* Refer to the Recommendation on fire test procedures for upholstered furniture adopted by the Organization by resolution A.652(16) and to the Recommendation on fire test procedures for ignitability of bedding components adopted by the Organization by resolution A.688(17).

by the Administration, in control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc., either:

.1 a fixed fire detection and fire alarm system of an approved type and complying with the requirements of regulation 13 and so installed and arranged as to detect the presence of fire in such spaces; or

.2 an automatic sprinkler, fire detection and fire alarm system of an approved type and complying with the requirements of regulation 12 or the guidelines developed by the Organization* for an approved equivalent sprinkler system and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system of an approved type complying with the requirements of regulation 13 and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

2 Passenger ships carrying more than 36 passengers shall be equipped with an automatic sprinkler, fire detection and fire alarm system of an approved type and complying with the requirements of regulation 12, or the guidelines developed by the Organization* for an approved equivalent sprinkler system in all service spaces, control stations and accommodation spaces, including corridors and stairways. Alternatively, control stations where water may cause damage to essential equipment may be fitted with an approved fixed fire-extinguishing system of another type. A fixed fire detection and fire alarm system of an approved type shall be installed, complying with the requirements of regulation 13 and so installed and arranged as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors and stairways. Smoke detectors need not be fitted in private bathrooms and galleys. Spaces having little or no fire risk such as voids, public toilets and similar spaces need not be fitted with an automatic sprinkler system or fixed fire detection and alarm system.

Regulation 37
Protection of special category spaces

1 Provisions applicable to special category spaces whether above or below the bulkhead deck

1.1 *General*

1.1.1 The basic principle underlying the provisions of this regulation is that as normal main vertical zoning may not be practicable in special category

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

spaces, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and by the provision of an efficient fixed fire-extinguishing system. Under this concept a horizontal zone for the purpose of this regulation may include special category spaces on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

1.1.2 The requirements of regulations 16, 18, 30 and 32 for maintaining the integrity of vertical zones shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.

1.2 *Structural protection*

1.2.1 In passenger ships carrying more than 36 passengers the boundary bulkheads and decks of special category spaces shall be insulated to "A-60" class standard. However, where a category 26.2.2(5), 26.2.2(9) or 26.2.2(10) space is on one side of the division the standard may be reduced to "A-0". Where fuel oil tanks are below a special category space, the integrity of the deck between such spaces may be reduced to "A-0" standard.

1.2.2 In passenger ships carrying not more than 36 passengers the boundary bulkheads of special category spaces shall be insulated as required for category (11) spaces in table 27.1 and the horizontal boundaries as required for category (11) spaces in table 27.2.

1.2.3 Indicators shall be provided on the navigation bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

1.3 *Fixed fire-extinguishing system*[*]

Each special category space shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such space, provided that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test in conditions simulating a flowing petrol fire in a special category space to be not less effective in controlling fires likely to occur in such a space.[†]

1.4 *Patrols and detection*

1.4.1 An efficient patrol system shall be maintained in special category spaces. In any such space in which the patrol is not maintained by a

[*] Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces adopted by the Organization by resolution A.123(V).

[†] Refer to the Guidelines for the approval of alternative fixed water-based fire-fighting systems for special category spaces, adopted by the Maritime Safety Committee at its seventy-first session in June 1999 (MSC/Circ. 914).

continuous fire watch at all times during the voyage there shall be provided a fixed fire detection and fire alarm system of an approved type complying with the requirements of regulation 13. The fixed fire detection system shall be capable of rapidly detecting the onset of fire. The spacing and location of detectors shall be tested to the satisfaction of the Administration taking into account the effects of ventilation and other relevant factors.

1.4.2 Manually operated call points shall be provided as necessary throughout the special category spaces and one shall be placed close to each exit from such spaces.

1.5 *Fire-extinguishing equipment*

There shall be provided in each special category space:

.1 at least three water fog applicators;

.2 one portable foam applicator unit complying with the provisions of regulation 6.4, provided that at least two such units are available in the ship for use in such spaces; and

.3 such number of portable fire extinguishers as the Administration may deem sufficient, provided that at least one portable extinguisher is located at each access to such spaces.

1.6 *Ventilation system*

1.6.1 There shall be provided an effective power ventilation system for the special category spaces sufficient to give at least 10 air changes per hour. The system for such spaces shall be entirely separated from other ventilation systems and shall be operating at all times when vehicles are in such spaces. The Administration may require an increased number of air changes when vehicles are being loaded and unloaded. Ventilation ducts serving special category 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.

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

1.6.3 Means shall be provided to indicate on the navigation bridge any loss or reduction of the required ventilating capacity.

1.6.4 Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

1.6.5 Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

2 Additional provisions applicable only to special category spaces above the bulkhead deck

2.1.1 *Scuppers*

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks consequent on the operation of the fixed pressure water-spraying system, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard.

2.1.2 *Discharges*

2.1.2.1 In all ro–ro passenger ships discharge valves for scuppers, fitted with positive means of closing operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ships are at sea.

2.1.2.2 Any operation of the valves referred to in paragraph 2.1.2.1 shall be recorded in the log-book.

2.2 *Precautions against ignition of flammable vapours*

2.2.1 On any deck or platform, if fitted, on which vehicles are carried and on which explosive vapours might be expected to accumulate, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, equipment which may constitute a source of ignition of flammable vapours and, in particular, electrical equipment and wiring, shall be installed at least 450 mm above the deck or platform. Electrical equipment installed at more than 450 mm above the deck or platform shall be of a type so enclosed and protected as to prevent the escape of sparks. However, if the Administration is satisfied that the installation of electrical equipment and wiring at less than 450 mm above the deck or platform is necessary for the safe operation of the ship, such electrical equipment and wiring may be installed provided that it is of a type approved for use in an explosive petrol and air mixture.

2.2.2 Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol 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.

3 Additional provisions applicable only to special category spaces below the bulkhead deck

3.1 *Bilge pumping and drainage*

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or tank top consequent on the operation of the fixed pressure water-spraying system, the Administration

may require pumping and drainage facilities to be provided additional to the requirements of regulation II-1/21.

3.2 *Precautions against ignition of flammable vapours*

3.2.1 Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

3.2.2 Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol 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 Permanent openings for ventilation

Permanent openings in the side plating, the ends or deckhead of special category spaces shall be so situated that a fire in the special category space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the special category spaces.

Regulation 38

Protection of cargo spaces, other than special category spaces, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion

(Paragraph 1 of this regulation applies to ships constructed on or after 1 February 1992)

In any cargo space (other than special category spaces) containing motor vehicles with fuel in their tanks for their own propulsion, the following provisions shall be complied with.

1 Fixed fire detection

There shall be provided a fixed fire detection and fire alarm system complying with the requirements of regulation 13 or a sample extraction smoke detection system complying with the requirements of regulation 13-1. The design and arrangements of this system shall be considered in conjunction with the ventilation requirements referred to in paragraph 3.

2 Fire-extinguishing arrangements

2.1 There shall be fitted a fixed fire-extinguishing system which shall comply with the provisions of regulation 5, except that, if a carbon dioxide system is fitted, the quantity of gas available shall be at least sufficient to give a

minimum volume of free gas equal to 45% of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced during 10 min. Any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided it gives equivalent protection. Furthermore, any cargo space designated only for vehicles which are not carrying any cargo may be fitted with fixed halogenated hydrocarbon fire-extinguishing systems which shall comply with the provisions of regulation 5.

2.2 As an alternative, a system meeting the requirements of regulation 37.1.3 may be fitted, provided that regulation 37.2.1 or 37.3.1, as appropriate, is also complied with.

2.3 There shall be provided for use in any such space such number of portable fire extinguishers as the Administration may deem sufficient. At least one portable extinguisher shall be located at each access to such spaces.

3 Ventilation system

3.1 There shall be provided an effective power ventilation system sufficient to give at least 10 air changes per hour for ships carrying more than 36 passengers, and 6 air changes per hour for ships carrying not more than 36 passengers. The system for such cargo spaces shall be entirely separate from other ventilation systems and shall be operating at all times when vehicles are in such spaces. 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.

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

3.3 Means shall be provided to indicate on the navigation bridge any loss or reduction of the required ventilating capacity.

3.4 Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

3.5 Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

4 Precautions against ignition of flammable vapours

4.1 Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

4.2 Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol 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.

4.3 Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

5 Permanent openings for ventilation

Permanent openings in the side plating, the ends or deckhead of cargo spaces shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

6 Structural protection

For ro–ro cargo spaces of ships constructed on or after 1 July 1998, the requirements of paragraphs 1.1, 1.2 and 1.3 of regulation 38-1 shall be complied with.

Regulation 38-1

Protection of closed and open ro–ro cargo spaces, other than special category spaces and ro–ro cargo spaces intended for the carriage of motor vehicles with fuel in their tanks

1 General

1.1 The basic principles underlying regulation 37.1.1 also apply to this regulation.

1.2 In passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of closed and open ro–ro cargo spaces shall be insulated to "A-60" class standard. However, where a category 26.2.2(5), (9) or (10) space is on one side of the division, the standard may be reduced to "A-0". Where fuel oil tanks are below a ro–ro cargo space, the integrity of the deck between such spaces may be reduced to "A-0" standard.

1.3 In passenger ships carrying not more than 36 passengers the boundary bulkheads and decks of closed and open ro–ro cargo spaces shall have a fire integrity as required for category (8) spaces in table 27.1 and the horizontal boundaries as required for category (8) spaces in table 27.2.

1.4 Permanent openings in the side plating, the ends or deckhead of open and closed ro–ro cargo spaces shall be so situated that a fire in the cargo

space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

2 Closed ro–ro cargo spaces

Closed ro–ro cargo spaces shall comply with the requirements of regulation 38, except for paragraph 4 of that regulation.

3 Open ro–ro cargo spaces

Open ro–ro cargo spaces shall comply with the requirements of regulations 37.1.3, 37.2.1, 38.1, except that a sample extraction smoke detection system is not permitted, and 38.2.3.

Regulation 39

Fixed fire-extinguishing arrangements in cargo spaces

1 Except as provided for in paragraph 3, the cargo spaces of ships of 1,000 gross tonnage and upwards shall be protected by a fixed gas fire-extinguishing system complying with the provisions of regulation 5, or by a fixed high expansion foam fire-extinguishing system which gives equivalent protection.

2 Where it is shown to the satisfaction of the Administration that a ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of paragraph 1 and also in ships of less than 1,000 gross tonnage, the arrangements in cargo spaces shall be to the satisfaction of the Administration.

3 A ship engaged in the carriage of dangerous goods shall be provided in any cargo spaces with a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or with a fire-extinguishing system which in the opinion of the Administration gives equivalent protection for the cargoes carried.

Regulation 40

Fire patrols, detection, alarms and public address systems

(Paragraph 2 of this regulation applies to ships constructed on or after 1 February 1992; paragraph 7 of this regulation applies to ships constructed on or after 1 January 1994)

1 Manually operated call points complying with the requirements of regulation 13 shall be installed.

2 A fixed fire detection and fire alarm system complying with the requirements of regulation 13 or a sample extraction smoke detection system complying with the requirements of regulation 13-1 shall be provided in any cargo space which, in the opinion of the Administration, is not accessible, except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

3 All ships shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

4 A special alarm, operated from the navigation bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system but it shall be capable of being sounded independently of the alarm to the passenger spaces.

5 A public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations and open decks.

6 For ships carrying more than 36 passengers an efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use. Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

7 Where public spaces span three or more open decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the entire main vertical zone containing the space shall be protected throughout with a smoke detection system complying with regulation 13, with the exception of paragraph 1.9.

7.1 Passenger ships carrying more than 36 passengers shall have the detection alarms for the systems required by regulation 36.2 centralized in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans shall be centralized in the same location. The ventilation fans shall be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station shall be capable of indicating open or closed positions of fire doors and closed or off status of the detectors, alarms and fans. The control panel shall be continuously powered and should have an automatic change-over to standby power supply in case of loss of normal power supply. The control panel shall be powered from the main source of electrical power and the emergency source of electrical power defined by regulation II-1/42 unless other arrangements are permitted by the regulations, as applicable.

7.2 The control panel shall be designed on the fail-safe principle, e.g. an open detector circuit shall cause an alarm condition, as noted in regulations II-2/13.1.3 and II-1/51.1.4.

Regulation 41
Special requirements for ships carrying dangerous goods

The requirements of regulation 54 shall apply, as appropriate, to passenger ships carrying dangerous goods.

Regulation 41-1
Upgrading of passenger ships carrying more than 36 passengers constructed before 1 October 1994

1 This regulation shall apply to passenger ships carrying more than 36 passengers constructed before 1 October 1994.

2 Passenger ships which do not comply with all the requirements of chapter II-2 applicable to ships constructed on or after 25 May 1980 (requirements of chapter II-2 of SOLAS 1974, as adopted by the International Conference on Safety of Life at Sea, 1974, applicable to new passenger ships) shall comply with the following:

.1 paragraph 1 of regulation 41-2 not later than 1 October 1994; and

.2 paragraphs 2, 3, 4 and 5 of regulation 41-2 not later than 1 October 1997; and

.3 paragraph 6 of regulation 41-2 not later than 1 October 2000; and

.4 all the requirements of chapter II-2 applicable to ships constructed on or after 25 May 1980 (requirements of chapter II-2 of SOLAS 1974, as adopted by the International Conference on Safety of Life at Sea, 1974, applicable to new passenger ships) not later than 1 October 2010.

3 Passenger ships which comply with all the requirements applicable to ships constructed on or after 25 May 1980 (applicable requirements of chapter II-2 of SOLAS 1974, as amended by resolutions MSC.1(XLV), MSC.6(48), MSC.11(55), MSC.12(56), MSC.13(57) and MSC.22(59)) shall comply with the following:

.1 paragraph 1 of regulation 41-2 not later than 1 October 1994; and

.2 paragraphs 2 and 4 of regulation 41-2 not later than 1 October 1997; and

.3 paragraph 6 of regulation 41-2 not later than 1 October 2000; and

.4 paragraph 5 of regulation 41-2 not later than 1 October 2005 or 15 years after the date of construction of the ships, whichever is later.

4 For the purpose of this regulation, passenger ships complying in their entirety with all the requirements of part H of chapter II contained in amendments to the International Convention for the Safety of Life at Sea, 1960, adopted by the Assembly of the Organization by resolution A.122(V), may be regarded as passenger ships complying with the requirements applicable to passenger ships constructed on or after 25 May 1980 (requirements of chapter II-2 of SOLAS 1974, as adopted by the International Conference on Safety of Life at Sea, 1974, applicable to new passenger ships).

Regulation 41-2

Requirements for passenger ships carrying more than 36 passengers constructed before 1 October 1994

1.1 Plans and booklets required by regulation 20 shall provide information regarding fire protection, fire detection and fire extinction based on the guidelines developed by the Organization.*

1.2 Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

1.3 Water fog applicators shall be provided as required in regulations 7.6, 17.3.2 and 37.1.5.1.

1.4 Portable foam applicators shall be provided as required in regulations 7.1.2, 7.2.2 and 37.1.5.2.

1.5 All hose nozzles provided shall be of an approved dual-purpose type (i.e. spray/jet type) incorporating a shutoff.

2 All accommodation and service spaces, stairway enclosures and corridors shall be equipped with a smoke detection and alarm system of an approved type and complying with the requirements of regulation 13. Such system need not be fitted in private bathrooms, and spaces having little or no fire risk such as voids and similar spaces. Detectors operated by heat instead of smoke shall be installed in galleys.

* Refer to the Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2 adopted by the Organization by resolution A.756(18).

3 Smoke detectors connected to the smoke detection and alarm system shall also be fitted above ceilings in stairways and corridors in the areas where ceilings are of combustible construction.

4.1 Hinged fire doors in stairway enclosures, main vertical zone bulkheads and galley boundaries which are normally kept open shall be self-closing and be capable of release from a central control station and from a position at the door.

4.2 A panel shall be placed in a continuously manned central control station to indicate whether the fire doors on stairway enclosures, main vertical zone bulkheads and galley boundaries are closed.

4.3 Exhaust ducts from galley ranges where grease or fat is likely to accumulate and which pass through accommodation spaces or spaces containing combustible materials shall be constructed of "A" class divisions. Each galley range exhaust duct shall be fitted with:

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

.2 a fire damper located in the lower end of the duct;

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

.4 fixed means for extinguishing a fire within the duct; and

.5 suitably located hatches for inspection and cleaning.

4.4 Only public toilets, lifts, lockers of non-combustible materials providing storage for safety equipment and open information counters may be located within the stairway enclosure boundaries. Other existing spaces within the stairway enclosure:

.1 shall be emptied, permanently closed and disconnected from the electrical system; or

.2 shall be separated from the stairway enclosure by the provision of "A" class divisions in accordance with regulation 26. Such spaces may have direct access to stairway enclosures by the provision of "A" class doors in accordance with regulation 26, and subject to a sprinkler system being provided in these spaces. However, cabins shall not open directly into the stairway enclosure.

4.5 Spaces other than public spaces, corridors, public toilets, special category spaces, other stairways required by regulation 28.1.5, open deck spaces and spaces covered by paragraph 4.4.2 are not permitted to have direct access to stairway enclosures.

4.6 Existing machinery spaces of category (10) described in regulation 26.2.2 and existing back offices for information counters which open

directly into the stairway enclosure may be retained, provided that they are protected by smoke detectors and that back offices for information counters contain only furniture of restricted fire risk.

4.7 In addition to the emergency lighting required by regulations II-1/42 and III/11.5, the means of escape including stairways and exits shall be marked, at all points of the escape route including angles and intersections, by lighting or photoluminescent strip indicators placed not more than 0.3 m above the deck. The marking must enable passengers to identify all routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light, or cut in a lighting strip, will not result in the marking being ineffective. Additionally, all escape route signs and fire equipment location markings shall be of photoluminescent material. The Administration shall ensure that such lighting or photoluminescent equipment has been evaluated, tested and applied in accordance with the guidelines developed by the Organization.*

4.8 A general emergency alarm system shall be provided. The alarm shall be audible throughout all the accommodation and normal crew working spaces and open decks, and its sound pressure level shall comply with the standard developed by the Organization.† The alarm shall continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

4.9 A public address system or other effective means of communication shall be available and audible throughout the accommodation, public and service spaces, control stations and open decks.

4.10 Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to six seats on each deck in each stairway enclosure, be of restricted fire risk, and shall not restrict the passenger escape route. The Administration may permit additional seating in the main reception area within stairway enclosures, if it is fixed, non-combustible, and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition to the above, lockers of non-combustible material, providing storage for safety equipment required by regulations, may be permitted.

5 Accommodation and service spaces, stairway enclosures and corridors shall be fitted with an automatic sprinkler, fire detection and fire alarm

* Refer to the Guidelines for the evaluation, testing and application of low-location lighting on passenger ships adopted by the Organization by resolution A.752(18).

† Refer to the Code on Alarms and Indicators, 1995, adopted by the Organization by resolution A.830(19).

system complying with the requirements of regulation 12 or the guidelines developed by the Organization* for an approved equivalent sprinkler system. A sprinkler system need not be fitted in private bathrooms, and spaces having little or no fire risk such as voids and similar spaces.

6.1 All stairways in accommodation and service spaces shall be of steel frame construction except where the Administration sanctions the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:

.1 a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or doors in one 'tween-deck space. When a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with the tables for decks in regulation 26;

.2 stairways may be fitted in the open in a public space, provided they lie wholly within such public space.

6.2 Machinery spaces of category A shall be fitted with a fixed fire-extinguishing system complying with the requirements of regulation 7.

6.3 Ventilation ducts passing through divisions between main vertical zones shall be equipped with a fail-safe automatic closing fire damper which shall also be capable of being manually closed from each side of the division. In addition, fail-safe automatic closing fire dampers with manual operation from within the enclosure shall be fitted to all ventilation ducts serving both accommodation and service spaces and stairway enclosures where they pierce such enclosures. Ventilation ducts passing through a main fire zone division without serving spaces on both sides or passing through a stairway enclosure without serving that enclosure need not be fitted with dampers provided that the ducts are constructed and insulated to A-60 standard and have no openings within the stairway enclosure or in the trunk on the side which is not directly served.

6.4 Special category spaces and ro–ro cargo spaces shall comply with the requirements of regulations 37 and 38, respectively.

6.5 All fire doors in stairway enclosures, main vertical zone bulkheads and galley boundaries which are normally kept open shall be capable of release from a central control station and from a position at the door.

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

Part C

Fire safety measures for cargo ships

(Regulation 54 of this part also applies to passenger ships as appropriate)

Regulation 42

Structure

1 Subject to the provisions of paragraph 4, the hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material.

2 The insulation of aluminium alloy components of "A" or "B" class divisions, except structure which in the opinion of the Administration is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable exposure to the standard fire test.*

3 Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions, to ensure:

.1 that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in paragraph 2 shall apply at the end of 1 h; and

.2 that for such members required to support "B" class divisions, the temperature rise limitation specified in paragraph 2 shall apply at the end of half an hour.

4 Crowns and casings of machinery spaces of category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

5 One of the following methods of protection shall be adopted in accommodation and service areas:

.1 *Method IC* – The construction of all internal divisional bulkheading of non-combustible "B" or "C" class divisions generally without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by regulation 52.1; or

* Refer to MSC/Circ. 915, Unified interpretations of vague expressions and other vague wording of SOLAS chapter II-2.

.2 *Method IIC* – The fitting of an automatic sprinkler, fire detection and fire alarm system as required by regulation 52.2 for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading; or

.3 *Method IIIC* – The fitting of a fixed fire detection and fire alarm system as required by regulation 52.3, in all spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheading, except that in no case must the area of any accommodation space or spaces bounded by an "A" or "B" class division exceed 50 m^2. Consideration may be given by the Administration to increasing this area for public spaces.

6 The requirements for the use of non-combustible materials in construction and insulation of the boundary bulkheads of machinery spaces, control stations, service spaces, etc., and the protection of stairway enclosures and corridors will be common to all three methods outlined in paragraph 5.

Regulation 43
Bulkheads within the accommodation and service spaces

1 All bulkheads required to be "B" class divisions shall extend from deck to deck and to the shell or other boundaries, unless continuous "B" class ceilings or linings are fitted on both sides of the bulkhead in which case the bulkhead may terminate at the continuous ceiling or lining.

2 *Method IC* – All bulkheads not required by this or other regulations of this part to be "A" or "B" class divisions, shall be of at least "C" class construction.

3 *Method IIC* – There shall be no restriction on the construction of bulkheads not required by this or other regulations of this part to be "A" or "B" class divisions except in individual cases where "C" class bulkheads are required in accordance with table 44.1.

4 *Method IIIC* – There shall be no restriction on the construction of bulkheads not required by this part to be "A" or "B" class divisions except that the area of any accommodation space or spaces bounded by a continuous "A" or "B" class division must in no case exceed 50 m^2 except in individual cases where "C" class bulkheads are required in accordance with table 44.1. Consideration may be given by the Administration to increasing this area for public space.

Regulation 44
Fire integrity of bulkheads and decks

(Paragraphs 2.2(5) and 2.2(9) of this regulation apply to ships constructed on or after 1 February 1992)

1 In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 44.1 and 44.2.

2 The following requirements shall govern application of the tables:

.1 Tables 44.1 and 44.2 shall apply respectively to the bulkheads and decks separating adjacent spaces.

.2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire-extinguishing rooms, fire control rooms and fire-recording stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.10, excluding corridors.

(4) *Stairways*

Interior stairway, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

Table 44.1 – Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0[e]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	★	A-60
Corridors	(2)		C	B-0	B-0 A-0[e]	B-0	A-60	A-0	A-0	A-0	★	A-30
Accommodation spaces	(3)			C[a, b]	B-0 A-0[e]	B-0	A-60	A-0	A-0	A-0	★	A-30
Stairways	(4)				B-0 A-0[e]	B-0 A-0[e]	A-60	A-0	A-0	A-0	★ ★	A-30
Service spaces (low risk)	(5)					C	A-60	A-0	A-0	A-0	★	A-0
Machinery spaces of category A	(6)						★	A-0	A-0[g]	A-60	★	A-60[f]
Other machinery spaces	(7)							A-0[d]	A-0	A-0	★	A-0
Cargo spaces	(8)								★	A-0	★	A-0
Service spaces (high risk)	(9)									A-0[d]	★	A-30
Open decks	(10)										–	A-0
Ro–ro cargo spaces	(11)											★[h]

See notes under table 44.2.

Table 44.2 – Fire integrity of decks separating adjacent spaces

Space below ↓ / Space above →		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	★	A-60
Corridors	(2)	A-0	★	★	A-0	★	A-60	A-0	A-0	A-0	★	A-30
Accommodation spaces	(3)	A-60	A-0	★	A-0	★	A-60	A-0	A-0	A-0	★	A-30
Stairways	(4)	A-0	A-0	A-0	★	A-0	A-60	A-0	A-0	A-0	★	A-30
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	★	A-60	A-0	A-0	A-0	★	A-0
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	★	A-60[i]	A-30	A-60	★	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	★	A-0	A-0	★	A-0
Cargo spaces	(8)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	★	A-0	★	A-0
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0[d]	★	A-30
Open decks	(10)	★	★	★	★	★	★	★	★	★	–	★
Ro–ro cargo spaces	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	★	★[h]

Notes: To be applied to tables 44.1 and 44.2, as appropriate.

a No special requirements are imposed upon bulkheads in methods IIC and IIIC fire protection.

b In case of method IIIC "B" class bulkheads of "B-0" rating shall be provided between spaces or groups of spaces of 50 m^2 and over in area.

c For clarification as to which applies, see regulations 43 and 46.

d Where spaces are of the same numerical category and superscript d appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

e Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-0" rating.

f "A-0" rating may be used if no dangerous goods are intended to be carried or if such goods are stowed not less than 3 m horizontally from such bulkhead.

g For cargo spaces in which dangerous goods are intended to be carried, regulation 54.2.8 applies.

h Bulkheads and decks separating ro–ro cargo spaces shall be capable of being closed reasonably gastight and such divisions shall have "A" class integrity in so far as is reasonable and practicable in the opinion of the Administration.

i Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk.

★ Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.19.

(7) *Other machinery spaces*

Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

(8) *Cargo spaces*

All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deckhouses).

(11) *Ro–ro cargo spaces*

Spaces as defined in regulation 3.14. Cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4 External boundaries which are required in regulation 42.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in this part. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

Regulation 45
Means of escape

1 Stairways and ladders shall be so arranged as to provide, from all accommodation spaces and from spaces in which the crew is normally

employed, other than machinery spaces, ready means of escape to the open deck and thence to the lifeboats and liferafts. In particular the following general provisions shall be complied with:

.1 At all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces.

.2.1 Below the lowest open deck the main means of escape shall be a stairway and the second escape may be a trunk or a stairway.

.2.2 Above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof.

.3 Exceptionally the Administration may dispense with one of the means of escape, due regard being paid to the nature and location of spaces and to the numbers of persons who normally might be quartered or employed there.

.4 No dead-end corridors having a length of more than 7 m shall be accepted. A dead-end corridor is a corridor or part of a corridor from which there is only one escape route.

.5 The width and continuity of the means of escape shall be to the satisfaction of the Administration.

.6 If a radiotelegraph station has no direct access to the open deck, two means of access to or egress from such station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the Administration, to provide an emergency escape.

2 In all ro–ro cargo spaces where the crew is normally employed the number and locations of escape routes to the open deck shall be to the satisfaction of the Administration, but shall in no case be less than two and shall be widely separated.

3 Except as provided in paragraph 4, two means of escape shall be provided from each machinery space of category A. In particular, one of the following provisions shall be complied with:

.1 two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the open deck. In general, one of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space. However, the Administration may not require the shelter if, due to the special arrangement or dimensions of the machinery space, a safe escape route from the lower part of this space is provided. This shelter shall be of steel, insulated, where necessary, to the satisfaction of the Administration and be provided with a self-closing steel door at the lower end; or

.2 one steel ladder leading to a door in the upper part of the space from which access is provided to the open deck and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the open deck.

4 In a ship of less than 1,000 gross tonnage, the Administration may dispense with one of the means of escape required under paragraph 3, due regard being paid to the dimension and disposition of the upper part of the space.

5 From machinery spaces other than those of category A, escape routes shall be provided to the satisfaction of the Administration having regard to the nature and location of the space and whether persons are normally employed in that space.

6 Lifts shall not be considered as forming one of the required means of escape as required by this regulation.

Regulation 46
Protection of stairways and lift trunks in accommodation spaces, service spaces and control stations

1 Stairways which penetrate only a single deck shall be protected at least at one level by at least "B-0" class divisions and self-closing doors. Lifts which penetrate only a single deck shall be surrounded by "A-0" class divisions with steel doors at both levels. Stairways and lift trunks which penetrate more than a single deck shall be surrounded by at least "A-0" class divisions and be protected by self-closing doors at all levels.

2 On ships having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least two escape routes direct to the open deck at every accommodation level, consideration may be given by the Administration to reducing the "A-0" requirements of paragraph 1 to "B-0".

3 All stairways shall be of steel frame construction except where the Administration sanctions the use of other equivalent material.

Regulation 47
Doors in fire-resisting divisions

1 The fire resistance of doors shall, as far as practicable, be equivalent to that of the division in which they are fitted. Doors and door frames in "A" class divisions shall be constructed of steel. Doors in "B" class divisions shall be non-combustible. Doors fitted in boundary bulkheads of machinery

spaces of category A shall be reasonably gastight and self-closing. In ships constructed according to method IC, an Administration may permit the use of combustible materials in doors separating cabins from individual interior sanitary accommodation such as showers.

2 Doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release devices of the fail-safe type may be utilized.

3 In corridor bulkheads ventilation openings may be permitted only in and under the doors of cabins and public spaces. The openings shall be provided only in the lower half of a door. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 m^2. When such opening is cut in a door it shall be fitted with a grille made of non-combustible material.

4 Watertight doors need not be insulated.

Regulation 48

Ventilation systems

The ventilation systems of cargo ships shall be in compliance with the provisions of regulation 16, except paragraph 8.

Regulation 49

*Restricted use of combustible materials**

1 All exposed surfaces in corridors and stairway enclosures and surfaces including grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations shall have low flame-spread characteristics.† Exposed surfaces of ceilings in accommodation and service spaces and control stations shall have low flame-spread characteristics.

2 Paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

3 Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

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* Refer to MSC/Circ. 965, Unified interpretations of vague expressions and other vague wording of SOLAS chapter II-2.

† Refer to the Guidelines on the evaluation of fire hazard properties of materials adopted by the Organization by resolution A.166(ES.IV) and to the Recommendation on improved fire test procedures for surface flammability of bulkhead, ceiling and deck finish materials adopted by the Organization by resolution A.653(16).

Regulation 50
Details of construction

(Paragraphs 3.2 and 3.3 of this regulation apply to ships constructed on or after 1 February 1992)

1 **Method IC** – In accommodation and service spaces and control stations all linings, draught stops, ceilings and their associated grounds shall be of non-combustible materials.

2 **Methods IIC and IIIC** – In corridors and stairway enclosures serving accommodation and service spaces and control stations, ceilings, linings, draught stops and their associated grounds shall be of non-combustible materials.

3 **Methods IC, IIC and IIIC**

3.1 Except in cargo spaces or refrigerated compartments of service spaces, insulating materials shall be non-combustible. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings, for cold service systems, need not be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics.

3.2 Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer with a calorific value* not exceeding 45 MJ/m^2 of the area for the thickness used.

3.3 The total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space bounded by non-combustible bulkheads, ceilings and linings shall not exceed a volume equivalent to a 2.5 mm veneer on the combined area of the walls and ceilings.

3.4 Air spaces enclosed behind ceilings, panellings, or linings, shall be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such air spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

Regulation 51
Arrangements for gaseous fuel for domestic purposes

Where gaseous fuel is used for domestic purposes the arrangements for the storage, distribution and utilization of the fuel shall be such that, having regard to the hazards of fire and explosion which the use of such fuel may entail, the safety of the ship and the persons on board is preserved.

* The gross calorific value measured in accordance with ISO standard 1716, "Building Materials – Determination of Calorific Potential", should be quoted.

Regulation 52
Fixed fire detection and fire alarm systems and automatic sprinkler, fire detection and fire alarm systems

1 In ships in which method IC is adopted, a fixed fire detection and fire alarm system of an approved type complying with the requirements of regulation 13 shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

2 In ships in which method IIC is adopted, an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of regulation 12 shall be so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc. In addition, a fixed detection and fire alarm system of an approved type complying with the requirements of regulation 13 shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

3 In ships in which method IIIC is adopted, a fixed fire detection and fire alarm system of an approved type complying with the requirements of regulation 13 shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces, etc.

Regulation 53
Fire protection arrangements in cargo spaces

(Paragraphs 2.1 and 3 of this regulation apply to ships constructed on or after 1 February 1992)

1 General

1.1 Except for cargo spaces covered in paragraphs 2 and 3, cargo spaces of ships of 2,000 gross tonnage and upwards shall be protected by a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or by a fire-extinguishing system which gives equivalent protection.

1.2 Notwithstanding the provisions of paragraph 1.1, any cargo space in a ship engaged in the carriage of dangerous goods on deck or in cargo spaces shall be provided with a fixed gas fire-extinguishing system complying with the provisions of regulation 5 or with a fire-extinguishing system which, in

the opinion of the Administration, gives equivalent protection for the cargoes* carried.

1.3 The Administration may exempt from the requirements of paragraphs 1.1 and 1.2 cargo spaces of any ship if constructed and solely intended for the carriage of ore, coal, grain, unseasoned timber, non-combustible cargoes or cargoes which, in the opinion of the Administration, constitute a low fire risk.† Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.‡ When such exemptions are granted, the Administration shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned, in accordance with regulation I/12(a)(vi), and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

2 Ro–ro cargo spaces

2.1 *Fire detection*

There shall be provided a fixed fire detection and fire alarm system complying with the requirements of regulation 13. The fixed fire detection system shall be capable of rapidly detecting the onset of fire. The type of detectors and their spacing and location shall be to the satisfaction of the Administration taking into account the effects of ventilation and other relevant factors. After being installed the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Administration.

2.2 *Fire-extinguishing arrangements*

2.2.1 Ro–ro cargo spaces capable of being sealed shall be fitted with a fixed gas fire-extinguishing system which shall comply with the provisions of regulation 5, except that:

.1 if a carbon dioxide system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45% of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced during 10 min;

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* For cargoes for which a fixed gas fire-extinguishing system is ineffective, refer to the list of cargoes in table 2 of MSC/Circ.671.

† For cargoes considered to be non-combustible or which constitute a low fire risk, refer to the list of cargoes in table 1 of MSC/Circ.671.

‡ Refer to the Code of Safe Practice for Solid Bulk Cargoes, emergency schedule B14, entry for coal.

.2 a halogenated hydrocarbon system may be used only for spaces designated only for vehicles which are not carrying any cargo;

.3 any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided the Administration is satisfied that an equivalent protection is achieved;

.4 as an alternative, a system meeting the requirements of regulation 37.1.3 may be fitted. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.* Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

2.2.2 Ro–ro cargo spaces not capable of being sealed shall be fitted with a system meeting the requirements of regulation 37.1.3. However, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.* Such information shall be included in the stability information supplied to the master as required by regulation II-1/22.

2.2.3 There shall be provided for use in any ro–ro cargo space such number of portable fire extinguishers as the Administration may deem sufficient. At least one portable extinguisher shall be located at each access to such a cargo space.

2.2.4 Each ro–ro cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion shall be provided with:

.1 at least three water fog applicators;

.2 one portable foam applicator unit complying with the provisions of regulation 6.4 provided that at least two such units are available in the ship for use in such ro–ro cargo spaces.

2.3 *Ventilation system*

2.3.1 Closed ro–ro cargo spaces shall be provided with an effective power ventilation system sufficient to provide at least six air changes per hour based on an empty hold. Ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a

* Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces adopted by the Organization by resolution A.123(V).

reasonable period prior to discharge, after which period the ro–ro cargo 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 ventilating systems. Ventilation ducts serving ro–ro cargo spaces capable of being effectively sealed shall be separated for each cargo space. The Administration may require an increased number of air changes when vehicles are being loaded or unloaded. The system shall be capable of being controlled from a position outside such spaces.

2.3.2 The ventilation shall be so arranged as to prevent air stratification and the formation of air pockets.

2.3.3 Means shall be provided to indicate any loss of the required ventilating capacity on the navigation bridge.

2.3.4 Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

2.3.5 Ventilation ducts, including dampers, shall be made of steel and their arrangement shall be to the satisfaction of the Administration.

2.4 *Precautions against ignition of flammable vapours*

Closed ro–ro cargo spaces carrying motor vehicles with fuel in their tanks for their own propulsion shall comply with the following additional provisions:

.1 Except as provided in paragraph 2.4.2, electrical equipment and wiring shall be of a type suitable for use in explosive petrol and air mixtures.

.2 Above a height of 450 mm from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks shall be permitted as an alternative on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least ten air changes per hour whenever vehicles are on board.

.3 Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted.

.4 Electrical equipment and wiring in an exhaust ventilation duct shall be of a type approved for use in explosive petrol 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.

.5 Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

2.5 Permanent openings in the side plating, the ends or deckhead of open and closed ro–ro cargo spaces shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

3 Cargo spaces, other than ro–ro cargo spaces, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion

Cargo spaces, other than ro–ro spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, shall comply with the requirements of paragraph 2 except that in lieu of the requirements of paragraph 2.1 a sample extraction smoke detection system complying with the requirements of regulation 13-1 may be permitted and paragraph 2.2.4 need not be complied with.

Regulation 54
*Special requirements for ships carrying dangerous goods**

(Paragraph 2.3 of this regulation applies to ships constructed on or after 1 February 1992)

1 General

1.1 In addition to complying with the requirements of regulation 53 for cargo ships and with the requirements of regulations 37,† 38 and 39 for passenger ships as appropriate, ship types and cargo spaces, referred to in paragraph 1.2, intended for the carriage of dangerous goods shall comply with the requirements of this regulation, as appropriate, except when carrying dangerous goods in limited quantities‡ unless such requirements have already been met by compliance with the requirements elsewhere in this chapter. The types of ships and modes of carriage of dangerous goods are referred to in paragraph 1.2 and in table 54.1, where the numbers appearing in paragraph 1.2 are referred to in the top line. Cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 shall comply with this regulation, but Administrations may reduce the requirements and such reduced requirements shall be recorded in the document of compliance referred to in paragraph 3.

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* Refer to the International Maritime Dangerous Goods Code, as amended, the Code of Safe Practice for Solid Bulk Cargoes adopted by resolution A.434(XI), as amended, and MSC/Circ.608/Rev.1, Interim guidelines for open-top containerships.

† Refer to section 17 of the General Introduction to the International Maritime Dangerous Goods Code for operational measures in association with the requirements of this regulation.

‡ Refer to section 18 of the General Introduction to the International Maritime Dangerous Goods Code for a definition of the term *limited quantities*.

1.2 The following ship types and cargo spaces shall govern the application of tables 54.1 and 54.2:

.1 Ships and cargo spaces not specifically designed for the carriage of freight containers but intended for the carriage of dangerous goods in packaged form including goods in freight containers and portable tanks.

.2 Purpose-built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks.

.3 Ro–ro ships and ro–ro cargo spaces intended for the carriage of dangerous goods.

.4 Ships and cargo spaces intended for the carriage of solid dangerous goods in bulk.

.5 Ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

2 Special requirements

Unless otherwise specified the following requirements shall govern the application of tables 54.1, 54.2 and 54.3 to both "on-deck" and "under-deck" stowage of dangerous goods where the numbers of the following paragraphs are indicated in the first column.

2.1 *Water supplies*

2.1.1 Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurization or by suitably placed remote arrangements for the fire pumps.

2.1.2 The quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures as specified in regulation 4, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Administration.

2.1.3 Means of effectively cooling the designated under-deck cargo space by copious quantities of water, either by a fixed arrangement of spraying nozzles, or flooding the cargo space with water, shall be provided. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Administration. In any event the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.*

* Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces adopted by the Organization by resolution A.123(V).

Table 54.1 – Application of the requirements to different modes of carriage of dangerous goods in ships and cargo spaces

Wherever **X** *appears in table 54.1 it means that this requirement is applicable to all classes of dangerous goods as given in the appropriate line of table 54.3, except as indicated by the notes.*

Regulation 54.1.2 / **Regulation 54.2**	*Weather decks .1 to .5 inclusive*	**.1** *Not specifically designed*	**.2** *Container cargo spaces*	**.3** *Closed ro–ro cargo spaces*[5]	**.3** *Open ro–ro cargo spaces*	**.4** *Solid dangerous goods in bulk*	**.5** *Shipborne barges*
.1.1	X	X	X	X	X	For application of requirements of regulation 54 to different classes of dangerous goods, see table 54.2	X
.1.2	X	X	X	X	X		–
.1.3	–	X	X	X	X		X
.1.4	–	X	X	X	X		X
.2	–	X	X	X	X		X[4]
.3	–	X	X	X	–		X[4]
.4.1	–	X	X[1]	X	–		X[4]
.4.2	–	X	X[1]	X	–		X[4]
.5	–	X	X	X	–		–
.6.1	X	X	X	X	X		–
.6.2	X	X	X	X	X		–
.7	X	X	–	–	X		–
.8	X	X	X[2]	X	X		–
.9	–	–	–	X[3]	X		–

Notes

1 For classes 4 and 5.1 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. For the purpose of this requirement a portable tank is a closed freight container.

2 Applicable to decks only.

3 Applies only to closed ro–ro cargo spaces, not capable of being sealed.

4 In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Administration.

5 Special category spaces shall be treated as closed ro–ro cargo spaces when dangerous goods are carried.

Table 54.2 – Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk

Class / Regulation	4.1	4.2	4.3[6]	5.1	6.1	8	9
54.2.1.1	X	X	–	X	–	–	X
54.2.1.2	X	X	–	X	–	–	X
54.2.2	X	X[7]	X	X[8]	–	–	X[8]
54.2.4.1	–	X[7]	X	–	–	–	–
54.2.4.2	X[9]	X[7]	X	X[7, 9]	–	–	X[7, 9]
54.2.4.3	X	X	X	X	X	X	X
54.2.6	X	X	X	X	X	X	X
54.2.8	X	X	X	X[7]	–	–	X[10]

Notes

6 The hazards of substances in this class which may be carried in bulk are such that special consideration must be given by the Administration to the construction and equipment of the ship involved in addition to meeting the requirements enumerated in this table.

7 Only applicable to Seedcake containing solvent extractions, to Ammonium nitrate and to Ammonium nitrate fertilizers.

8 Only applicable to Ammonium nitrate and to Ammonium nitrate fertilizers. However, a degree of protection in accordance with standards contained in International Electrotechnical Commission publication 79, *Electrical Apparatus for Explosive Gas Atmospheres,* is sufficient.

9 Only suitable wire mesh guards are required.

10 The requirements of the Code of Safe Practice for Solid Bulk Cargoes adopted by resolution A.434(XI), as amended, are sufficient.

Table 54.3 – Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk

Class / Regulation	1.1-1.6	1.4S	2.1	2.2	2.3	3.1 3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1 liquids	6.1 liquids ⩽23°C	6.1 liquids >23°C ⩽61°C	6.1 solids	8 li-quids	8 liquids ⩽23°C	8 liquids >23°C ⩽61°C	8 solids	9
54.2.1.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54.2.1.2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	–
54.2.1.3	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
54.2.1.4	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
54.2.2	X	–	X	–	–	X	–	–	–	–	–	–	–	X	–	–	–	X	–	–	–
54.2.3	X	X	X	X	X	X	X	X	X	X	X	–	X	X	X	X	X	X	X	X	–
54.2.4.1	–	–	X	–	X	X	–	X[11]	X[11]	X	X[11]	–	–	X	X	X[11]	–	X	X	–	X[11]
54.2.4.2	–	–	X	–	–	X	–	–	–	–	–	–	–	X	X	–	–	X	X	–	–
54.2.5	–	–	–	–	–	X	–	–	–	–	–	–	X	X	X	–	–	X	–	–	–
54.2.6	–	–	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X[14]
54.2.7	–	–	–	–	–	X	X	X	X	X	X	–	–	X	X	–	–	X	X	–	–
54.2.8	X[12]	–	X	X	X	X	X	X	X	X	X[13]	–	–	X	X	–	–	X	X	–	–
54.2.9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes

11 When "mechanically-ventilated spaces" are required by the International Maritime Dangerous Goods Code, as amended.

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

13 Refer to the International Maritime Dangerous Goods Code.

14 As appropriate to the goods being carried.

2.1.4 Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in paragraph 2.1.3.

2.2 *Sources of ignition*

Electrical equipment and wiring shall not be fitted in enclosed cargo spaces, closed vehicle deck spaces, or open vehicle deck spaces unless it is essential for operational purposes in the opinion of the Administration. However, if electrical equipment is fitted in such spaces, it shall be of a certified safe type* for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system (by removal of links in the system, other than fuses). Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact. Any other equipment which may constitute a source of ignition of flammable vapour shall not be permitted.

2.3 *Detection system*

Ro–ro cargo spaces shall be fitted with a fixed fire detection and fire alarm system complying with the requirements of regulation 13. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system complying with the requirements of regulation 13 or a sample extraction smoke detection system complying with the requirements of regulation 13-1. If a sample extraction smoke detection system is fitted, particular attention shall be made to regulation 13-1.1.11 in order to prevent the leakage of toxic fumes into occupied areas.

2.4 *Ventilation*

2.4.1 Adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space based on an empty cargo space and for removal of vapours from the upper or lower parts of the cargo space, as appropriate.

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

2.4.3 Natural ventilation shall be provided in enclosed cargo spaces intended for the carriage of solid dangerous goods in bulk, where there is no provision for mechanical ventilation.

* Refer to the Recommendations published by the International Electrotechnical Commission and, in particular, Publication 92 – *Electrical Installations in Ships*.

2.5 *Bilge pumping*

Where it is intended to carry flammable or toxic liquids in enclosed cargo spaces, the bilge pumping system shall be designed to ensure against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces. These means shall be to the satisfaction of the Administration.

2.6 *Personnel protection*

2.6.1 Four sets of full protective clothing resistant to chemical attack shall be provided in addition to the fireman's outfits required by regulation 17. The protective clothing shall cover all skin, so that no part of the body is unprotected.

2.6.2 At least two self-contained breathing apparatuses additional to those required by regulation 17 shall be provided.

2.7 *Portable fire extinguishers*

Portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent shall be provided for the cargo spaces. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in this chapter.

2.8 *Insulation of machinery space boundaries*

Bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to "A-60" standard, unless the dangerous goods are stowed at least 3 m horizontally away from such bulkheads. Other boundaries between such spaces shall be insulated to "A-60" standard.

2.9 *Water spray system*

Each open ro–ro cargo space having a deck above it and each space deemed to be a closed ro–ro cargo space not capable of being sealed shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such space, except that the Administration may permit the use of any other fixed fire-extinguishing system that has been shown by full-scale test to be no less effective. In any event the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Administration in its approval of the stability information.*

* Refer to the Recommendation on fixed fire-extinguishing systems for special category spaces adopted by the Organization by resolution A.123(V).

2.10 In ships having ro–ro cargo spaces, a separation shall be provided between a closed ro–ro cargo space and an adjacent open ro–ro cargo space. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, such separation need not be provided if the ro–ro cargo space is considered to be a closed cargo space over its entire length and shall fully comply with the relevant special requirements of this regulation.

2.11 In ships having ro–ro cargo spaces, a separation shall be provided between a closed ro–ro cargo space and the adjacent weather deck. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. Alternatively, a separation need not be provided if the arrangements of the closed ro–ro cargo spaces are in accordance with those required for the dangerous goods carried on the adjacent weather deck.

3 Document of compliance*

The Administration shall provide the ship with an appropriate document as evidence of compliance of construction and equipment with the requirements of this regulation.†

* Refer to MSC/Circ.642, Carriage of dangerous goods – Document of compliance with the special requirements for ships carrying dangerous goods under the provisions of regulation II-2/54 of SOLAS, as amended.

† Refer to MSC/Circ. 858, Document of compliance with SOLAS regulation II-2/54.

Part D
Fire safety measures for tankers

(The requirements of this part are additional to those of part C except for regulations 53 and 54 which do not apply to tankers and except as provided otherwise in regulations 57 and 58)

Regulation 55
Application

1 Unless expressly provided otherwise, this part shall apply to tankers carrying crude oil and petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below atmospheric pressure and other liquid products having a similar fire hazard.

2 Where liquid cargoes other than those referred to in paragraph 1 or liquefied gases which introduce additional fire hazards are intended to be carried, additional safety measures shall be required to the satisfaction of the Administration, having due regard to the provisions of the International Bulk Chemical Code, the Bulk Chemical Code, the International Gas Carrier Code and the Gas Carrier Code, as appropriate.

3 This paragraph applies to all ships which are combination carriers. Such ships shall not carry solid cargoes unless all cargo tanks are empty of oil and gas-freed or unless the arrangements provided in each case are to the satisfaction of the Administration and in accordance with the relevant operational requirements contained in the Guidelines for Inert Gas Systems.*

4 Tankers carrying petroleum products having a flashpoint exceeding 60°C (closed cup test) as determined by an approved flashpoint apparatus shall comply with the provisions of part C, except that in lieu of the fixed fire-extinguishing system required in regulation 53 they shall be fitted with a fixed deck foam system which shall comply with the provisions of regulation 61.

* Refer to the Revised guidelines for inert gas systems adopted by the Maritime Safety Committee at its forty-eighth session in June 1983 (MSC/Circ.353).

5 The requirements for inert gas systems of regulation 60 need not be applied to:

.1 chemical tankers constructed before, on or after 1 July 1986 when carrying cargoes described in paragraph 1, provided that they comply with the requirements for inert gas systems on chemical tankers developed by the Organization;* or

.2 chemical tankers constructed before 1 July 1986, when carrying crude oil or petroleum products, provided that they comply with the requirements for inert gas systems on chemical tankers carrying petroleum products developed by the Organization;† or

.3 gas carriers constructed before, on or after 1 July 1986 when carrying cargoes described in paragraph 1, provided that they are fitted with cargo tank inerting arrangements equivalent to those specified in paragraph 5.1 or 5.2; or

.4 chemical tankers and gas carriers when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in chapters VI and VII of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk or chapters 17 and 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk:

.4.1 if constructed before 1 July 1986; or

.4.2 if constructed on or after 1 July 1986, 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.

6 Chemical tankers and gas carriers shall comply with the requirements of this part, except where alternative and supplementary arrangements are provided to the satisfaction of the Administration, having due regard to the provisions of the International Bulk Chemical Code, the Bulk Chemical Code, the International Gas Carrier Code and the Gas Carrier Code, as appropriate.

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

† Refer to the Interim regulation for inert gas systems on chemical tankers carrying petroleum products adopted by the Organization by resolution A.473(XII).

Regulation 56
Location and separation of spaces

(This regulation applies to ships constructed on or after 1 February 1992, except that paragraphs 7, 8.3 and 9 apply to ships constructed on or after 1 July 1998)

1 Machinery spaces shall be positioned aft of cargo tanks and slop tanks; they shall also be situated aft of cargo pump-rooms and cofferdams, but not necessarily aft of the oil fuel bunker tanks. Any machinery space shall be isolated from cargo tanks and slop tanks by cofferdams, cargo pump-rooms, oil fuel bunker tanks or ballast tanks. Pump-rooms containing pumps and their accessories for ballasting those spaces situated adjacent to cargo tanks and slop tanks and pumps for oil fuel transfer shall be considered as equivalent to a cargo pump-room within the context of this regulation, provided that such pump-rooms have the same safety standard as that required for cargo pump-rooms. However, the lower portion of the pump-room may be recessed into machinery spaces of category A to accommodate pumps, provided that the deck head of the recess is in general not more than one third of the moulded depth above the keel, except that in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Administration may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

2 Accommodation spaces, main cargo control stations, control stations and service spaces (excluding isolated cargo handling gear lockers) shall be positioned aft of all cargo tanks, slop tanks, and spaces which isolate cargo or slop tanks from machinery spaces but not necessarily aft of the oil fuel bunker tanks and ballast tanks, but shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into an accommodation space, main cargo control stations, control station, or service spaces. A recess provided in accordance with paragraph 1 need not be taken into account when the position of these spaces is being determined.

3 However, where deemed necessary, the Administration may permit accommodation spaces, main cargo control stations, control stations, and service spaces forward of the cargo tanks, slop tanks and spaces which isolate cargo and slop tanks from machinery spaces, but not necessarily forward of oil fuel bunker tanks or ballast tanks. Machinery spaces, other than those of category A, may be permitted forward of the cargo tanks and slop tanks provided they are isolated from the cargo tanks and slop tanks by cofferdams, cargo pump-rooms, oil fuel bunker tanks or ballast tanks. All of the above spaces shall be subject to an equivalent standard of safety and appropriate availability of fire-extinguishing arrangements being provided to the satisfaction of the Administration. Accommodation spaces, main cargo

control spaces, control stations and service spaces shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into such spaces. In addition, where deemed necessary for the safety or navigation of the ship, the Administration may permit machinery spaces containing internal combustion machinery not being main propulsion machinery having an output greater than 375 kW to be located forward of the cargo area provided the arrangements are in accordance with the provisions of this paragraph.

4 In combination carriers only:

.1 The slop tanks shall be surrounded by cofferdams except where the boundaries of the slop tanks where slop may be carried on dry cargo voyages are the hull, main cargo deck, cargo pump-room bulkhead or oil fuel bunker tank. These cofferdams shall not be open to a double bottom, pipe tunnel, pump-room or other enclosed space. Means shall be provided for filling the cofferdams with water and for draining them. Where the boundary of a slop tank is the cargo pump-room bulkhead, the pump-room shall not be open to the double bottom, pipe tunnel or other enclosed space; however, openings provided with gastight bolted covers may be permitted.

.2 Means shall be provided for isolating the piping connecting the pump-room with the slop tanks referred to in paragraph 4.1. The means of isolation shall consist of a valve followed by a spectacle flange or a spool piece with appropriate blank flanges. This arrangement shall be located adjacent to the slop tanks, but where this is unreasonable or impracticable, it may be located within the pump-room directly after the piping penetrates the bulkhead. A separate pumping and piping arrangement incorporating a manifold shall be provided for discharging the contents of the slop tanks directly to the open deck for disposal to shore reception facilities when the ship is in the dry cargo mode.

.3 Hatches and tank cleaning openings to slop tanks shall only be permitted on the open deck and shall be fitted with closing arrangements. Except where they consist of bolted plates with bolts at watertight spacing, these closing arrangements shall be provided with locking arrangements which shall be under the control of the responsible ship's officer.

.4 Where cargo wing tanks are provided, cargo oil lines below deck shall be installed inside these tanks. However, the Administration may permit cargo oil lines to be placed in special ducts which shall be capable of being adequately cleaned and ventilated and be to the satisfaction of the Administration.

Where cargo wing tanks are not provided, cargo oil lines below deck shall be placed in special ducts.

5 Where the fitting of a navigation position above the cargo area is shown to be necessary, it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 m. The fire protection of such a navigation position shall in addition be as required for control spaces in regulation 58.1 and 58.2 and other provisions, as applicable, of this part.

6 Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a suitable height extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

7 Exterior boundaries of superstructures and deckhouses enclosing accommodation and including any overhanging decks which support such accommodation, shall be constructed of steel and insulated to "A-60" standard for the whole of the portions which face the cargo area and on the outward sides for a distance of 3 m from the end boundary facing the cargo area. In the case of the sides of those superstructures and deckhouses, such insulation shall be carried as high as is deemed necessary by the Administration.

8.1 Except as permitted in paragraph 8.2 below, access doors, air inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces shall not face the cargo area. They shall be located on the transverse bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 4% of the length of the ship but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area. This distance need not exceed 5 m.

8.2 The Administration may permit access doors in boundary bulkheads facing the cargo area or within the 5 m limits specified in paragraph 8.1, to main cargo control stations and to such service spaces as provision rooms, store-rooms and lockers, provided they do not give access directly or indirectly to any other space containing or provided for accommodation, control stations or service spaces such as galleys, pantries or workshops, or similar spaces containing sources of vapour ignition. The boundary of such a space shall be insulated to "A-60" standard, with the exception of the boundary facing the cargo area. Bolted plates for the removal of machinery may be fitted within the limits specified in paragraph 8.1. Wheelhouse doors and wheelhouse windows may be located within the limits specified in paragraph 8.1 so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

8.3 Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph 8.1

shall be of the fixed (non-opening) type. Such windows and sidescuttles, except wheelhouse windows, shall be constructed to "A-60" class standard.

9 On every ship to which this regulation applies, where there is permanent access from a pipe tunnel to the main pump-room, a watertight door shall be fitted complying with the requirements of regulation II-1/25-9.2 and in addition with the following:

.1 in addition to bridge operation, the watertight door shall be capable of being manually closed from outside the main pump-room entrance; and

.2 the watertight door shall be kept closed during normal operations of the ship except when access to the pipe tunnel is required.

Regulation 57
Structure, bulkheads within accommodation and service spaces and details of construction

1 For the application of the requirements of regulations 42, 43 and 50 to tankers, only method IC as defined in regulation 42.5.1 shall be used.

2 Skylights to cargo pump-rooms shall be of steel, shall not contain any glass and shall be capable of being closed from outside the pump-room.

Regulation 58
Fire integrity of bulkheads and decks

(Paragraphs 2.2(5) and 2.2(9) of this regulation apply to ships constructed on or after 1 February 1992)

1 In lieu of regulation 44 and in addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 58.1 and 58.2.

2 The following requirements shall govern application of the tables:

.1 Tables 58.1 and 58.2 shall apply respectively to the bulkhead and decks separating adjacent spaces.

.2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (10) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the tables.

Table 58.1 – Fire integrity of bulkheads separating adjacent spaces

Spaces		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(1)	A-0[c]	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	⋆
Corridors	(2)		C	B-0	B-0 A-0[a]	B-0	A-60	A-0	A-60	A-0	⋆
Accommodation spaces	(3)			C	B-0 A-0[a]	B-0	A-60	A-0	A-60	A-0	⋆
Stairways	(4)				B-0 A-0[a]	B-0 A-0[a]	A-60	A-0	A-60	A-0	⋆
Service spaces (low risk)	(5)					C	A-60	A-0	A-60	A-0	⋆
Machinery spaces of category A	(6)						⋆	A-0	A-0[d]	A-60	⋆
Other machinery spaces	(7)							A-0[b]	A-0	A-0	⋆
Cargo pump-rooms	(8)								⋆	A-60	⋆
Service spaces (high risk)	(9)									A-0[b]	⋆
Open decks	(10)										—

See notes under table 58.2.

Table 58.2 – Fire integrity of decks separating adjacent spaces

Space below↓ / Space above→		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations	(1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	—	A-0	*
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	—	A-0	*
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	—	A-0	*
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	—	A-0	*
Service spaces (low risk)	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	—	A-0	*
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60[e]	A-0	A-60	*
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*
Cargo pump-rooms	(8)	—	—	—	—	—	A-0[d]	A-0	*	—	*
Service spaces (high risk)	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	—	A-0[b]	*
Open decks	(10)	*	*	*	*	*	*	*	*	*	—

Notes: To be applied to tables 58.1 and 58.2, as appropriate.

a For clarification as to which applies, see regulations 43 and 46 of this chapter.

b Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.

c Bulkheads separating the wheelhouse, chartroom and radio room from each other may be "B-0" rating.

d Bulkheads and decks between cargo pump-rooms and machinery spaces of category A may be penetrated by cargo pump shaft glands and similar glanded penetrations, provided that gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal are fitted in way of the bulkhead or deck.

e Fire insulation need not be fitted if the machinery space in category (7), in the opinion of the Administration, has little or no fire risk.

* Where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be of "A" class standard.

(1) *Control stations*

Spaces containing emergency sources of power and lighting.

Wheelhouse and chartroom.

Spaces containing the ship's radio equipment.

Fire-extinguishing rooms, fire control rooms and fire-recording stations.

Control room for propulsion machinery when located outside the machinery space.

Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation spaces*

Spaces as defined in regulation 3.10, excluding corridors.

(4) *Stairways*

Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.

In this connection, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) *Service spaces (low risk)*

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries.

(6) *Machinery spaces of category A*

Spaces as defined in regulation 3.19.

(7) *Other machinery spaces*

Spaces as defined in regulation 3.20 excluding machinery spaces of category A.

(8) *Cargo pump-rooms*

Spaces containing cargo pumps and entrances and trunks to such spaces.

(9) *Service spaces (high risk)*

Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery spaces.

(10) *Open decks*

Open deck spaces and enclosed promenades having no fire risk. Air spaces (the space outside superstructures and deckhouses).

3 Continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.

4 External boundaries which are required in regulation 57.1 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" class integrity elsewhere in this part. Similarly, in such boundaries which are not required to have "A" class integrity, doors may be of materials to the satisfaction of the Administration.

5 Permanent approved gastight lighting enclosures for illuminating cargo pump-rooms may be permitted in bulkheads and decks separating cargo pump-rooms and other spaces provided they are of adequate strength and the integrity and gastightness of the bulkhead or deck is maintained.

Regulation 59

Venting, purging, gas-freeing and ventilation

(Paragraph 2 of this regulation applies to ships constructed on or after 1 February 1992)

1 Cargo tank venting

1.1 The venting systems of cargo tanks are to be entirely distinct from the air pipes of the other compartments of the ship. The arrangements and position of openings in the cargo tank deck from which emission of flammable vapours can occur shall be such as to minimize the possibility of flammable vapours being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In accordance with this general principle the criteria in paragraphs 1.2 to 1.10 will apply.

1.2 The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and be such as to provide for:

.1 the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure/vacuum valves; and

.2 the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

.3 a secondary means of allowing full flow relief of vapour, air or inert gas mixtures to prevent over-pressure or under-pressure in the event of failure of the arrangements in 1.2.2. Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in 1.2.2, with a monitoring system in the ship's cargo control room or the position from which cargo operations are normally carried out. Such monitoring equipment shall also provide an alarm facility which is activated by detection of over-pressure or under-pressure conditions within a tank.

1.3.1 The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

1.3.2 Where the arrangements are combined with other cargo tanks, either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. There shall be a clear visual indication of the operational status of the valves or other acceptable means. Where tanks have been isolated, it shall be ensured that relevant isolating valves are opened before cargo loading or ballasting or discharging of those tanks is commenced. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with paragraph 1.2.1.

1.3.3 If cargo loading and ballasting or discharging of a cargo tank or cargo tank group is intended, which is isolated from a common venting system, that cargo tank or cargo tank group shall be fitted with a means for over-pressure or under-pressure protection as required in paragraph 1.2.3.

1.4 The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines, permanent arrangements shall be provided to drain the vent lines to a cargo tank.

1.5 The venting system shall be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these devices shall comply with the requirements established by the Administration which shall contain at least the standards adopted by the Organization.*

1.6 Provision shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high-level alarms or overflow control systems or

* Refer to MSC/Circ.677 on revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers and to MSC/Circ.450/Rev.1 on revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements.

other equivalent means, together with gauging devices and cargo tank filling procedures.

1.7 Openings for pressure release required by paragraph 1.2.1 shall:

.1 have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours but in no case less than 2 m above the cargo tank deck;

.2 be arranged at the furthest distance practicable but not less than 5 m from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard.

1.8 Pressure/vacuum valves required by paragraph 1.2.1 may be provided with a bypass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided there shall be suitable indicators to show whether the bypass is open or closed.

1.9 Vent outlets for cargo loading, discharging and ballasting required by paragraph 1.2.2 shall:

.1.1 permit the free flow of vapour mixtures; or

.1.2 permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/s;

.2 be so arranged that the vapour mixture is discharged vertically upwards;

.3 where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 m above the cargo tank deck or fore and aft gangway if situated within 4 m of the gangway and located not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard;

.4 where the method is by high-velocity discharge, be located at a height not less than 2 m above the cargo tank deck and not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type;

.5 be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master shall be provided with information regarding the maximum permissible loading rate for each cargo tank and in the case of combined venting systems, for each group of cargo tanks.

1.10 In combination carriers, the arrangement to isolate slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in regulation 55.1 are carried.

1.11 Ships constructed before 1 July 1998 shall comply with the requirements of paragraphs 1.2.3 and 1.3.3 by the date of the first scheduled dry-docking after 1 July 1998, but not later than 1 July 2001.

2 Cargo tank purging and/or gas-freeing*

Arrangements for purging and/or gas-freeing shall be such as to minimize the hazards due to the dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank. Accordingly:

.1 When the ship is provided with an inert gas system, the cargo tanks shall first be purged in accordance with the provisions of regulation 62.13 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2% by volume. Thereafter, gas-freeing may take place at the cargo tank deck level.

.2 When the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged initially:

.2.1 through the vent outlets as specified in paragraph 1.9; or

.2.2 through outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 30 m/s maintained during the gas-freeing operation; or

.2.3 through outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 20 m/s and which are protected by suitable devices to prevent the passage of flame.

When the flammable vapour concentration at the outlet has been reduced to 30% of the lower flammable limit, gas-freeing may thereafter be continued at cargo tank deck level.

3 Ventilation

3.1 Cargo pump-rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimize the possibility of accumulation of flammable vapours. The number of changes

* Refer to MSC/Circ.677 on revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers and to MSC/Circ.450/Rev.1 on revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements.

of air shall be at least 20 per hour, based upon the gross volume of the space. The air ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

3.2 The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of paragraph 1. Such vents, especially for machinery spaces, shall be situated as far aft as practicable. Due consideration in this regard should be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

3.3 In combination carriers all cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours shall be provided in cargo pump-rooms and pipe ducts and cofferdams referred to in regulation 56.4 adjacent to slop tanks. Suitable arrangements shall be made to facilitate measurement of flammable vapours in all other spaces within the cargo area. Such measurements shall be made possible from open deck or easily accessible positions.

4 Inerting, ventilation and gas measurement

4.1 This paragraph shall apply to oil tankers constructed on or after 1 October 1994.

4.2 Double hull and double bottom spaces shall be fitted with suitable connections for the supply of air.

4.3 On tankers required to be fitted with inert gas systems:

- **.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;
- **.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.

4.4.1 Suitable portable instruments for measuring oxygen and flammable vapour concentrations 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 4.4.2.

4.4.2 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 such line systems shall be adapted to the design of such spaces.

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

5 Combustible gas indicators

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

Regulation 60

Cargo tank protection

1 For tankers of 20,000 tonnes deadweight and upwards the protection of the cargo tanks deck area and cargo tanks shall be achieved by a fixed deck foam system and a fixed inert gas system in accordance with the requirements of regulations 61 and 62, except that, in lieu of the above installations, the Administration, after having given consideration to the ship's arrangement and equipment, may accept other combinations of fixed installations if they afford protection equivalent to the above, in accordance with regulation I/5.

2 To be considered equivalent, the system proposed in lieu of the deck foam system shall:

.1 be capable of extinguishing spill fires and also preclude ignition of spilled oil not yet ignited; and

.2 be capable of combating fires in ruptured tanks.

3 To be considered equivalent, the system proposed in lieu of the fixed inert gas system 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.

4 Tankers of 20,000 tonnes deadweight and upwards constructed before 1 September 1984 which are engaged in the trade of carrying crude oil shall be fitted with an inert gas system, complying with the requirements of paragraph 1, not later than:

.1 for a tanker of 70,000 tonnes deadweight and upwards 1 September 1984 or the date of delivery of the ship, whichever occurs later; and

.2 for a tanker of less than 70,000 tonnes deadweight 1 May 1985 or the date of delivery of the ship, whichever occurs later except that for tankers of less than 40,000 tonnes deadweight not fitted with tank washing machines having an individual throughput of greater than 60 m^3/h the Administration may exempt such tankers from the requirements of this paragraph, if it would be unreasonable and impracticable to apply these requirements, taking into account the ship's design characteristics.

5 Tankers of 40,000 tonnes deadweight and upwards constructed before 1 September 1984 which are engaged in the trade of carrying oil other than crude oil and any such tanker of 20,000 tonnes deadweight and upwards engaged in the trade of carrying oil other than crude oil fitted with tank washing machines having an individual throughput of greater than 60 m^3/h shall be fitted with an inert gas system, complying with the requirements of paragraph 1, not later than:

.1 for a tanker of 70,000 tonnes deadweight and upwards 1 September 1984 or the date of delivery of the ship, whichever occurs later; and

.2 for a tanker of less than 70,000 tonnes deadweight 1 May 1985 or the date of delivery of the ship, whichever occurs later.

6 All tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the requirements of regulation 62 and with fixed tank washing machines.

7 All tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

8 Tankers of less than 20,000 tonnes deadweight shall be provided with a deck foam system complying with the requirements of regulation 61.

Regulation 61

Fixed deck foam systems

1 The arrangements for providing foam shall be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank the deck of which has been ruptured.

2 The deck foam system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

3 The rate of supply of foam solution shall be not less than the greatest of the following:

.1 0.6 *l*/min per square metre of cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship multiplied by the total longitudinal extent of the cargo tank spaces;

.2 6 *l*/min per square metre of the horizontal sectional area of the single tank having the largest such area; or

.3 3 *l*/min per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 *l*/min.

4 Sufficient foam concentrate shall be supplied to ensure at least 20 min of foam generation in tankers fitted with an inert gas installation or 30 min of foam generation in tankers not fitted with an inert gas installation when using solution rates stipulated in paragraphs 3.1, 3.2 or 3.3, whichever is the greatest. The foam expansion ratio (i.e., the ratio of the volume of foam produced to the volume of the mixture of water and foam-making concentrate supplied) shall not generally exceed 12 to 1. Where systems essentially produce low-expansion foam but an expansion ratio slightly in excess of 12 to 1, the quantity of foam solution available shall be calculated as for 12 to 1 expansion ratio systems. When medium-expansion ratio foam (between 50 to 1 and 150 to 1 expansion ratio) is employed, the application rate of the foam and the capacity of a monitor installation shall be to the satisfaction of the Administration.

5 Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. At least 50% of the foam solution supply rate required in paragraphs 3.1 and 3.2 shall be delivered from each monitor. On tankers of less than 4,000 tonnes deadweight the Administration may not require installation of monitors but only applicators. However, in such a case the capacity of each applicator shall be at least 25% of the foam solution supply rate required in paragraphs 3.1 or 3.2.

6.1 The number and position of monitors shall be such as to comply with paragraph 1. The capacity of any monitor shall be at least 3 *l*/min of foam solution per square metre of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity shall be not less than 1,250 *l*/min.

6.2 The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall not be more than 75% of the monitor throw in still air conditions.

7 A monitor and hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck. On tankers of less than 4,000 tonnes

deadweight a hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck.

8 Applicators shall be provided to ensure flexibility of action during fire-fighting operations and to cover areas screened from the monitors. The capacity of any applicator shall be not less than 400 *l*/min and the applicator throw in still air conditions shall be not less than 15 m. The number of foam applicators provided shall be not less than four. The number and disposition of foam main outlets shall be such that foam from at least two applicators can be directed on to any part of the cargo tanks deck area.

9 Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

10 Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

Regulation 62
*Inert gas systems**

(Paragraphs 19.1 and 19.2 of this regulation apply to ships constructed on or after 1 February 1992)

1 The inert gas system referred to in regulation 60 shall be designed, constructed and tested to the satisfaction of the Administration. It shall be so designed* and operated as to render and maintain the atmosphere of the cargo tanks† non-flammable at all times, except when such tanks are required to be gas-free. In the event that the inert gas system is unable to meet the operational requirement set out above and it has been assessed that it is impracticable to effect a repair, then cargo discharge, deballasting and necessary tank cleaning shall only be resumed when the "emergency conditions" laid down in the Guidelines on Inert Gas Systems are complied with.

2 The system shall be capable of:

.1 inerting empty cargo tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;

* Refer to MSC/Circ.677 on revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers, MSC/Circ.485 on clarification of inert gas system requirements under SOLAS 1974, as amended, and MSC/Circ.387 on revised guidelines for inert gas systems.

† Throughout this regulation the term *cargo tank* includes also slop tanks.

.2 maintaining the atmosphere in any part of any cargo tank with an oxygen content not exceeding 8% by volume and at a positive pressure at all times in port and at sea except when it is necessary for such a tank to be gas-free;

.3 eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas-free;

.4 purging empty cargo tanks of a hydrocarbon gas, so that subsequent gas-freeing operations will at no time create a flammable atmosphere within the tank.

3.1 The system shall be capable of delivering inert gas to the cargo tanks at a rate of at least 125% of the maximum rate of discharge capacity of the ship expressed as a volume.

3.2 The system shall be capable of delivering inert gas with an oxygen content of not more than 5% by volume in the inert gas supply main to the cargo tanks at any required rate of flow.

4 The inert gas supply may be treated flue gas from main or auxiliary boilers. The Administration may accept systems using flue gases from one or more separate gas generators or other sources or any combination thereof, provided that an equivalent standard of safety is achieved. Such systems should, as far as practicable, comply with the requirements of this regulation. Systems using stored carbon dioxide shall not be permitted unless the Administration is satisfied that the risk of ignition from generation of static electricity by the system itself is minimized.

5 Flue gas isolating valves shall be fitted in the inert gas supply mains between the boiler uptakes and the flue gas scrubber. These valves shall be provided with indicators to show whether they are open or shut, and precautions shall be taken to maintain them gastight and keep the seatings clear of soot. Arrangements shall be made to ensure that boiler soot blowers cannot be operated when the corresponding flue gas valve is open.

6.1 A flue gas scrubber shall be fitted which will effectively cool the volume of gas specified in paragraph 3 and remove solids and sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.

6.2 Filters or equivalent devices shall be fitted to minimize the amount of water carried over to the inert gas blowers.

6.3 The scrubber shall be located aft of all cargo tanks, cargo pump-rooms and cofferdams separating these spaces from machinery spaces of category A.

7.1 At least two blowers shall be fitted which together shall be capable of delivering to the cargo tanks at least the volume of gas required by paragraph 3. In the system with gas generator the Administration may permit only one blower if that system is capable of delivering the total volume of gas required by paragraph 3 to the protected cargo tanks, provided that sufficient spares for the blower and its prime mover are carried on board to enable any failure of the blower and its prime mover to be rectified by the ship's crew.

7.2 Two fuel oil pumps shall be fitted to the inert gas generator. The Administration may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.

7.3 The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. Suitable shutoff arrangements shall be provided on the suction and discharge connections of each blower. Arrangements shall be provided to enable the functioning of the inert gas plant to be stabilized before commencing cargo discharge. If the blowers are to be used for gas-freeing, their air inlets shall be provided with blanking arrangements.

7.4 The blowers shall be located aft of all cargo tanks, cargo pump-rooms and cofferdams separating these spaces from machinery spaces of category A.

8.1 Special consideration shall be given to the design and location of scrubber and blowers with relevant piping and fittings in order to prevent flue gas leakages into enclosed spaces.

8.2 To permit safe maintenance, an additional water seal or other effective means of preventing flue gas leakage shall be fitted between the flue gas isolating valves and scrubber or incorporated in the gas entry to the scrubber.

9.1 A gas regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required in paragraphs 19.3 and 19.4. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless means are provided to automatically control the speed of the inert gas blowers required in paragraph 7.

9.2 The valve referred to in paragraph 9.1 shall be located at the forward bulkhead of the forwardmost gas-safe space* through which the inert gas supply main passes.

10.1 At least two nonreturn devices, one of which shall be a water seal, shall be fitted in the inert gas supply main, in order to prevent the return of hydrocarbon vapour to the machinery space uptakes or to any gas-safe spaces under all normal conditions of trim, list and motion of the ship. They

* A gas-safe space is a space in which the entry of hydrocarbon gases would produce hazards with regard to flammability or toxicity.

shall be located between the automatic valve required by paragraph 9.1 and the aftermost connection to any cargo tank or cargo pipeline.

10.2 The devices referred to in paragraph 10.1 shall be located in the cargo area on deck.

10.3 The water seal referred to in paragraph 10.1 shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times.

10.4 The arrangement of the seal and its associated fittings shall be such that it will prevent backflow of hydrocarbon vapours and will ensure the proper functioning of the seal under operating conditions.

10.5 Provision shall be made to ensure that the water seal is protected against freezing, in such a way that the integrity of seal is not impaired by overheating.

10.6 A water loop or other approved arrangement shall also be fitted to each associated water supply and drain pipe and each venting or pressure-sensing pipe leading to gas-safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.

10.7 The deck water seal and loop arrangements shall be capable of preventing return of hydrocarbon vapours at a pressure equal to the test pressure of the cargo tanks.

10.8 The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids and fitted forward of the deck water seal required in paragraph 10.1. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided forward of the non-return valve to isolate the deck water seal from the inert gas main to the cargo tanks.

10.9 As an additional safeguard against the possible leakage of hydrocarbon liquids or vapours back from the deck main, means shall be provided to permit this section of the line between the valve having positive means of closure referred to in paragraph 10.8 and the valve referred to in paragraph 9 to be vented in a safe manner when the first of these valves is closed.

11.1 The inert gas main may be divided into two or more branches forward of the nonreturn devices required by paragraph 10.

11.2.1 The inert gas supply main shall be fitted with branch piping leading to each cargo tank. Branch piping for inert gas shall be fitted with either stop valves or equivalent means of control for isolating each tank. Where stop valves are fitted, they shall be provided with locking arrangements, which shall be under the control of a responsible ship's officer. The control system operated shall provide positive indication of the operational status of such valves.

11.2.2 In combination carriers, the arrangement to isolate the slop tanks containing oil or oil residues from other tanks shall consist of blank flanges which will remain in position at all times when cargoes other than oil are being carried except as provided for in the relevant section of the Guidelines on Inert Gas Systems.

11.3 Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the cargo tanks are isolated from the inert gas mains.

11.4 Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.

11.5 Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.

12 The arrangements for the venting of all vapours displaced from the cargo tanks during loading and ballasting shall comply with regulation 59.1 and shall consist of either one or more mast risers, or a number of high-velocity vents. The inert gas supply main may be used for such venting.

13 The arrangements for inerting, purging or gas-freeing of empty tanks as required in paragraph 2 shall be to the satisfaction of the Administration and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimized and that:

.1 on individual cargo tanks the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with regulation 59.1. The inlet of such outlet pipes may be located either at deck level or at not more than 1 m above the bottom of the tank;

.2 the cross-sectional area of such gas outlet pipe referred to in paragraph 13.1 shall be such that an exit velocity of at least 20 m/s can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 m above deck level;

.3 each gas outlet referred to in paragraph 13.2 shall be fitted with suitable blanking arrangements;

.4.1 if a connection is fitted between the inert gas supply mains and the cargo piping system, arrangements shall be made to ensure an effective isolation having regard to the large pressure difference which may exist between the systems. This shall consist of two shutoff valves with an arrangement to vent the space between the valves in a safe manner or an arrangement consisting of a spool-piece with associated blanks;

.4.2 the valve separating the inert gas supply main from the cargo main and which is on the cargo main side shall be a non-return valve with a positive means of closure.

14.1 One or more pressure/vacuum-breaking devices shall be provided to prevent the cargo tanks from being subject to:

.1 a positive pressure in excess of the test pressure of the cargo tank if the cargo were to be loaded at the maximum rated capacity and all other outlets are left shut; and

.2 a negative pressure in excess of 700 mm water gauge if cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blowers were to fail.

Such devices shall be installed on the inert gas main unless they are installed in the venting system required by regulation 59.1.1 or on individual cargo tanks.

14.2 The location and design of the devices referred to in paragraph 14.1 shall be in accordance with regulation 59.1.

15 Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the gas blowers, whenever the gas blowers are operating.

16.1 Instrumentation shall be fitted for continuously indicating and permanently recording, when the inert gas is being supplied:

.1 the pressure of the inert gas supply mains forward of the nonreturn devices required by paragraph 10.1; and

.2 the oxygen content of the inert gas in the inert gas supply mains on the discharge side of the gas blowers.

16.2 The devices referred to in paragraph 16.1 shall be placed in the cargo control room where provided. But where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.

16.3 In addition, meters shall be fitted:

.1 in the navigation bridge to indicate at all times the pressure referred to in paragraph 16.1.1 and the pressure in the slop tanks of combination carriers, whenever those tanks are isolated from the inert gas supply main; and

.2 in the machinery control room or in the machinery space to indicate the oxygen content referred to in paragraph 16.1.2.

17 Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangement shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

18 Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs 16 and 17.

19.1 For inert gas systems of both the flue, gas type and the inert gas generator type, audible and visual alarms shall be provided to indicate:

.1 low water pressure or low water flow rate to the flue gas scrubber as referred to in paragraph 6.1;

.2 high water level in the flue gas scrubber as referred to in paragraph 6.1;

.3 high gas temperature as referred to in paragraph 15;

.4 failure of the inert gas blowers referred to in paragraph 7;

.5 oxygen content in excess of 8% by volume as referred to in paragraph 16.1.2;

.6 failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices as referred to in paragraphs 9 and 16.1;

.7 low water level in the water seal as referred to in paragraph 10.1;

.8 gas pressure less than 100 mm water gauge as referred to in paragraph 16.1.1. The alarm arrangement shall be such as to ensure that the pressure in slop tanks in combination carriers can be monitored at all times; and

.9 high gas pressure as referred to in paragraph 16.1.1.

19.2 For inert gas systems of the inert gas generator type, additional audible and visual alarms shall be provided to indicate:

.1 insufficient fuel oil supply;

.2 failure of the power supply to the generator;

.3 failure of the power supply to the automatic control system for the generator.

19.3 Automatic shutdown of the inert gas blowers and gas regulating valve shall be arranged on predetermined limits being reached in respect of paragraphs 19.1.1, 19.1.2 and 19.1.3.

19.4 Automatic shutdown of the gas regulating valve shall be arranged in respect of paragraph 19.1.4.

19.5 In respect of paragraph 19.1.5, when the oxygen content of the inert gas exceeds 8% by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the gas improves, all cargo tank operations shall be suspended so as to avoid air being drawn into the tanks and the isolation valve referred to in paragraph 10.8 shall be closed.

19.6 The alarms required in paragraphs 19.1.5, 19.1.6 and 19.1.8 shall be fitted in the machinery space and cargo control room, where provided, but in each case in such a position that they are immediately received by responsible members of the crew.

19.7 In respect of paragraph 19.1.7 the Administration shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.

19.8 An audible alarm system independent of that required in paragraph 19.1.8 or automatic shutdown of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas main being reached.

20 Tankers constructed before 1 September 1984 which are required to have an inert gas system shall at least comply with the requirements of regulation 62 of chapter II-2 of the International Convention for the Safety of Life at Sea, 1974.* In addition they shall comply with the requirements of this regulation, except that:

.1 inert gas systems fitted on board such tankers before 1 June 1981 need not comply with the following paragraphs: 3.2, 6.3, 7.4, 8, 9.2, 10.2, 10.7, 10.9, 11.3, 11.4, 12, 13.1, 13.2, 13.4.2, 14.2 and 19.8;

.2 inert gas systems fitted on board such tankers on or after 1 June 1981 need not comply with the following paragraphs: 3.2, 6.3, 7.4, 12, 13.1, 13.2 and 14.2.

21 Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system.† The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.

Regulation 63

Cargo pump-rooms

1 Each cargo pump-room shall be provided with one of the following fixed fire-extinguishing systems operated from a readily accessible position outside the pump-room. Cargo pump-rooms should be provided with a system suitable for machinery spaces of category A.

* The text as adopted by the International Conference on Safety of Life at Sea, 1974.

† Refer to the Revised guidelines for inert gas systems adopted by the Maritime Safety Committee at its forty-eighth session in June 1983 (MSC/Circ.353).

1.1 Either a carbon dioxide or a halogenated hydrocarbon system complying with the provisions of regulation 5* and with the following:

.1 the alarms referred to in regulation 5.1.6 shall be safe for use in a flammable cargo vapour/air mixture;

.2 a notice shall be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes.

1.2 A high-expansion foam system complying with the provisions of regulation 9, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried.

1.3 A fixed pressure water-spraying system complying with the provisions of regulation 10.

2 Where the extinguishing medium used in the cargo pump-room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

* Refer to the Revised Guidelines for the approval of equivalent fixed gas fire-extinguishing systems, as referred to in SOLAS chapter II-2, for machinery spaces and cargo pump-rooms, adopted by the Maritime Safety Committee at its sixty-seventh session in December 1996 (MSC/Circ. 848).

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Life-saving appliances and arrangements

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Part A
General

Regulation 1
Application

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 July 1998.

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 1% of the estimated mass of all structural material, whichever is less.

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 July 1998; the expressions *all passenger ships* and *all cargo ships* shall be construed accordingly;

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

.1 ensure that, subject to the provisions of paragraph 4.2, the requirements which are applicable under chapter III of the International Convention for the Safety of Life at Sea, 1974, in force prior to 1 July 1998 to new or existing ships as prescribed by that chapter are complied with; and

.2 ensure that when life-saving appliances or arrangements on such ships are replaced or such ships undergo repairs, alterations or modifications of a major character which involve replacement of, or any addition to, their existing life-saving appliances or arrangements, such life-saving appliances or arrangements, in so far as is reasonable and practicable, comply with the require-

ments of this chapter. However, if a survival craft other than an inflatable liferaft is replaced without replacing its launching appliance, or vice versa, the survival craft or launching appliance may be of the same type as that replaced.

Regulation 2
Exemptions

1 The Administration 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 which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

2 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, if satisfied that it is impracticable to enforce compliance with the requirements of this chapter, may exempt such ships from those requirements, provided that such ships 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 3
Definitions

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

1 *Anti-exposure suit* is a protective suit designed for use by rescue boat crews and marine evacuation system parties.

2 *Certificated person* is a person who holds a certificate of proficiency in survival craft issued under the authority of, or recognized as valid by, the Administration in accordance with the requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, in force; or a person who holds a certificate issued or recognized by the Administration of a State not a Party to that Convention for the same purpose as the convention certificate.

3 *Detection* is the determination of the location of survivors or survival craft.

4 *Embarkation ladder* is the ladder provided at survival craft embarkation stations to permit safe access to survival craft after launching.

5 *Float-free launching* is that method of launching a survival craft whereby the craft is automatically released from a sinking ship and is ready for use.

6 *Free-fall launching* is that method of launching a survival craft whereby the craft with its complement of persons and equipment on board is released and allowed to fall into the sea without any restraining apparatus.

7 *Immersion suit* is a protective suit which reduces the body heat loss of a person wearing it in cold water.

8 *Inflatable appliance* is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is normally kept uninflated until ready for use.

9 *Inflated appliance* is an appliance which depends upon non-rigid, gas-filled chambers for buoyancy and which is kept inflated and ready for use at all times.

10 *International Life-Saving Appliance (LSA) Code* (referred to as "the Code" in this chapter) means the International Life-Saving Appliance (LSA) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.48(66), as it 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.

11 *Launching appliance or arrangement* is a means of transferring a survival craft or rescue boat from its stowed position safely to the water.

12 *Length* is 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel, or the length from the fore-side of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with a rake of keel the waterline on which this is measured shall be parallel to the designed waterline.

13 *Lightest seagoing condition* is the loading condition with the ship on even keel, without cargo, with 10% stores and fuel remaining and in the case of a passenger ship with the full number of passengers and crew and their luggage.

14 *Marine evacuation system* is an appliance for the rapid transfer of persons from the embarkation deck of a ship to a floating survival craft.

15 *Moulded depth*

.1 The *moulded depth* is the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side. In wood and composite ships the distance is measured from the lower edge of the keel rabbet. Where 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 inwards cuts the side of the keel.

.2 In ships having rounded gunwales, the *moulded depth* shall be measured to the point of intersection of the moulded lines of the deck and side shell plating, the lines extending as though the gunwale were of angular design.

.3 Where the freeboard deck is stepped and the raised part of the deck extends over the point at which the moulded depth is to be determined, the *moulded depth* shall be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part.

16 *Novel life-saving appliance or arrangement* is a life-saving appliance or arrangement which embodies new features not fully covered by the provisions of this chapter or the Code but which provides an equal or higher standard of safety.

17 *Positive stability* is the ability of a craft to return to its original position after the removal of a heeling moment.

18 *Recovery time* for a rescue boat is the time required to raise the boat to a position where persons on board can disembark to the deck of the ship. Recovery time includes the time required to make preparations for recovery on board the rescue boat such as passing and securing a painter, connecting the rescue boat to the launching appliance, and the time to raise the rescue boat. Recovery time does not include the time needed to lower the launching appliance into position to recover the rescue boat.

19 *Rescue boat* is a boat designed to rescue persons in distress and to marshal survival craft.

20 *Retrieval* is the safe recovery of survivors.

21 *Ro–ro passenger ship* means a passenger ship with ro–ro cargo spaces or special category spaces as defined in regulation II-2/3.

22 *Short international voyage* is an international voyage in the course of which a ship is not more than 200 miles from a port or place in which the passengers and crew could be placed in safety. Neither the distance between the last port of call in the country in which the voyage begins and the final port of destination nor the return voyage shall exceed 600 miles. The final port of destination is the last port of call in the scheduled voyage at which the ship commences its return voyage to the country in which the voyage began.

23 *Survival craft* is a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship.

24 *Thermal protective aid* is a bag or suit made of waterproof material with low thermal conductance.

Regulation 4
Evaluation, testing and approval of life-saving appliances and arrangements

1 Except as provided in paragraphs 5 and 6, life-saving appliances and arrangements required by this chapter shall be approved by the Administration.

2 Before giving approval to life-saving appliances and arrangements, the Administration shall ensure that such life-saving appliances and arrangements:

.1 are tested, to confirm that they comply with the requirements of this chapter and the Code, in accordance with the recommendations of the Organization;* or

.2 have successfully undergone, to the satisfaction of the Administration, tests which are substantially equivalent to those specified in those recommendations.

3 Before giving approval to novel life-saving appliances or arrangements, the Administration shall ensure that such appliances or arrangements:

.1 provide safety standards at least equivalent to the requirements of this chapter and the Code and have been evaluated and tested in accordance with the recommendations of the Organization;† or

.2 have successfully undergone, to the satisfaction of the Administration, evaluation and tests which are substantially equivalent to those recommendations.

4 Procedures adopted by the Administration for approval shall also include the conditions whereby approval would continue or would be withdrawn.

5 Before accepting life-saving appliances and arrangements that have not been previously approved by the Administration, the Administration shall be satisfied that life-saving appliances and arrangements comply with the requirements of this chapter and the Code.

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* Refer to the Recommendation on testing of life-saving appliances 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 adopted by the Maritime Safety Committee of the Organization by resolution MSC.81(70).

† Refer to the Code of Practice for the Evaluation, Testing and Acceptance of Prototype Novel Life-Saving Appliances and Arrangements adopted by the Organization by resolution A.520(13).

6 Life-saving appliances required by this chapter for which detailed specifications are not included in the Code shall be to the satisfaction of the Administration.

Regulation 5

Production tests

The Administration shall require life-saving appliances to be subjected to such production tests as are necessary to ensure that the life-saving appliances are manufactured to the same standard as the approved prototype.

Part B
Requirements for ships and life-saving appliances
SECTION I – PASSENGER SHIPS AND CARGO SHIPS

Regulation 6
Communications

1 Paragraph 2 applies to all passenger ships and to all cargo ships of 300 gross tonnage and upwards.

2 Radio life-saving appliances

2.1 *Two-way VHF radiotelephone apparatus*

2.1.1 At least 3 two-way VHF radiotelephone apparatus shall be provided on every passenger ship and on every cargo ship of 500 gross tonnage and upwards. At least 2 two-way VHF radiotelephone apparatus shall be provided on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such apparatus shall conform to performance standards not inferior to those adopted by the Organization.* If a fixed two-way VHF radiotelephone apparatus is fitted in a survival craft it shall conform to performance standards not inferior to those adopted by the Organization.*

2.1.2 Two-way VHF radiotelephone apparatus provided on board ships prior to 1 February 1992 and not complying fully with the performance standards adopted by the Organization may be accepted by the Administration until 1 February 1999 provided the Administration is satisfied that they are compatible with approved two-way VHF radiotelephone apparatus.

2.2 *Radar transponders*

At least one radar transponder shall be carried on each side of every passenger ship and of every cargo ship of 500 gross tonnage and upwards. At least one radar transponder shall be carried on every cargo ship of 300 gross tonnage and upwards but less than 500 gross tonnage. Such radar transponders shall conform to performance standards not inferior to those

* Refer to the Performance standards for survival craft two-way VHF radiotelephone apparatus adopted by the Organization by resolution A.809(19), as it may be amended, annex 1 or annex 2 as applicable.

adopted by the Organization.* The radar transponders† shall be stowed in such locations that they can be rapidly placed in any survival craft other than the liferaft or liferafts required by regulation 31.1.4. Alternatively one radar transponder shall be stowed in each survival craft other than those required by regulation 31.1.4. On ships carrying at least two radar transponders and equipped with free-fall lifeboats one of the radar transponders shall be stowed in a free-fall lifeboat and the other located in the immediate vicinity of the navigation bridge so that it can be utilized on board and ready for transfer to any of the other survival craft.

3 Distress flares

Not less than 12 rocket parachute flares, complying with the requirements of section 3.1 of the Code, shall be carried and be stowed on or near the navigation bridge.

4 On-board communications and alarm systems

4.1 An emergency means comprised of either fixed or portable equipment or both shall be provided for two-way communications between emergency control stations, muster and embarkation stations and strategic positions on board.

4.2 A general emergency alarm system complying with the requirements of paragraph 7.2.1 of the Code shall be provided and shall be used for summoning passengers and crew to muster stations and to initiate the actions included in the muster list. The system shall be supplemented by either a public address system complying with the requirements of paragraph 7.2.2 of the Code or other suitable means of communication. Entertainment sound systems shall automatically be turned off when the general emergency alarm system is activated.

4.3 On passenger ships the general emergency alarm system shall be audible on all open decks.

4.4 On ships fitted with a marine evacuation system communication between the embarkation station and the platform or the survival craft shall be ensured.

5 Public address systems on passenger ships

5.1 In addition to the requirements of regulation II-2/40.5 or regulation II-2/41-2, as appropriate, and of paragraph 4.2, all passenger ships shall be fitted with a public address system. With respect to passenger ships

* Refer to the Performance standards for survival craft radar transponders for use in search and rescue operations adopted by the Organization by resolution A.802(19), as it may be amended.

† One of these radar transponders may be the radar transponder required by regulation IV/7.1.3.

constructed before 1 July 1997 the requirements of paragraphs 5.2 and 5.4, subject to the provisions of paragraph 5.5, shall apply not later than the date of the first periodical survey after 1 July 1997.

5.2 The public address system shall be clearly audible above the ambient noise in all spaces, prescribed by paragraph 7.2.2.1 of the Code, and shall be provided with an override function controlled from one location on the navigation bridge and such other places on board as the Administration deems necessary, so that all emergency messages will be broadcast if any loudspeaker in the spaces concerned has been switched off, its volume has been turned down or the public address system is used for other purposes.

5.3 On passenger ships constructed on or after 1 July 1997:

.1 the public address system shall have at least two loops which shall be sufficiently separated throughout their length and have two separate and independent amplifiers; and

.2 the public address system and its performance standards shall be approved by the Administration having regard to the recommendations adopted by the Organization.*

5.4 The public address system shall be connected to the emergency source of electrical power required by regulation II-1/42.2.2.

5.5 Ships constructed before 1 July 1997 which are already fitted with the public address system approved by the Administration which complies substantially with those required by sections 5.2 and 5.4 and paragraph 7.2.2.1 of the Code are not required to change their system.

Regulation 7
Personal life-saving appliances

1 Lifebuoys

1.1 Lifebuoys complying with the requirements of paragraph 2.1.1 of the Code shall be:

.1 so distributed as to be readily available on both sides of the ship and as far as practicable on all open decks extending to the ship's side; at least one shall be placed in the vicinity of the stern; and

.2 so stowed as to be capable of being rapidly cast loose, and not permanently secured in any way.

1.2 At least one lifebuoy on each side of the ship shall be fitted with a buoyant lifeline complying with the requirements of paragraph 2.1.4 of the

* Refer to MSC/Circ.808, Recommendation on performance standards for public address systems on passenger ships, including cabling.

Code equal in length to not less than twice the height at which it is stowed above the waterline in the lightest seagoing condition, or 30 m, whichever is the greater.

1.3 Not less than one half of the total number of lifebuoys shall be provided with lifebuoy self-igniting lights complying with the requirements of paragraph 2.1.2 of the Code; not less than two of these shall also be provided with lifebuoy self-activating smoke signals complying with the requirements of paragraph 2.1.3 of the Code and be capable of quick release from the navigation bridge; lifebuoys with lights and those with lights and smoke signals shall be equally distributed on both sides of the ship and shall not be the lifebuoys provided with lifelines in compliance with the requirements of paragraph 1.2.

1.4 Each lifebuoy shall be marked in block capitals of the Roman alphabet with the name and port of registry of the ship on which it is carried.

2 Lifejackets

2.1 A lifejacket complying with the requirements of paragraph 2.2.1 or 2.2.2 of the Code shall be provided for every person on board the ship and, in addition:

.1 a number of lifejackets suitable for children equal to at least 10% of the number of passengers on board shall be provided or such greater number as may be required to provide a lifejacket for each child; and

.2 a sufficient number of lifejackets shall be carried for persons on watch and for use at remotely located survival craft stations. The lifejackets carried for persons on watch should be stowed on the bridge, in the engine control room and at any other manned watch station.

2.2 Lifejackets shall be so placed as to be readily accessible and their position shall be plainly indicated. Where, due to the particular arrangements of the ship, the lifejackets provided in compliance with the requirements of paragraph 2.1 may become inaccessible, alternative provisions shall be made to the satisfaction of the Administration which may include an increase in the number of lifejackets to be carried.

2.3 The lifejackets used in totally enclosed lifeboats, except free-fall lifeboats, shall not impede entry into the lifeboat or seating, including operation of the seat belts in the lifeboat.

2.4 Lifejackets selected for free-fall lifeboats, and the manner in which they are carried or worn, shall not interfere with entry into the lifeboat, occupant safety or operation of the lifeboat.

3 Immersion suits and anti-exposure suits

An immersion suit, complying with the requirements of section 2.3 of the Code or an anti-exposure suit complying with section 2.4 of the Code, of an appropriate size, shall be provided for every person assigned to crew the rescue boat or assigned to the marine evacuation system party. If the ship is constantly engaged in warm climates where, in the opinion of the Administration thermal protection is unnecessary, this protective clothing need not be carried.

Regulation 8
Muster list and emergency instructions

1 This regulation applies to all ships.

2 Clear instructions to be followed in the event of an emergency shall be provided for every person on board. In the case of passenger ships these instructions shall be drawn up in the language or languages required by the ship's flag State and in the English language.

3 Muster lists and emergency instructions complying with the requirements of regulation 37 shall be exhibited in conspicuous places throughout the ship including the navigation bridge, engine-room and crew accommodation spaces.

4 Illustrations and instructions in appropriate languages shall be posted in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces to inform passengers of:

.1 their muster station;

.2 the essential actions they must take in an emergency; and

.3 the method of donning lifejackets.

Regulation 9
Operating instructions

1 This regulation applies to all ships.

2 Posters or signs shall be provided on or in the vicinity of survival craft and their launching controls and shall:

.1 illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings;

.2 be easily seen under emergency lighting conditions; and

.3 use symbols in accordance with the recommendations of the Organization.*

Regulation 10
Manning of survival craft and supervision

1 This regulation applies to all ships.

2 There shall be a sufficient number of trained persons on board for mustering and assisting untrained persons.

3 There shall be a sufficient number of crew members, who may be deck officers or certificated persons, on board for operating the survival craft and launching arrangements required for abandonment by the total number of persons on board.

4 A deck officer or certificated person shall be placed in charge of each survival craft to be used. However, the Administration, having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, may permit persons practised in the handling and operation of liferafts to be placed in charge of liferafts in lieu of persons qualified as above. A second-in-command shall also be nominated in the case of lifeboats.

5 The person in charge of the survival craft shall have a list of the survival craft crew and shall see that the crew under his command are acquainted with their duties. In lifeboats the second-in-command shall also have a list of the lifeboat crew.

6 Every motorized survival craft shall have a person assigned who is capable of operating the engine and carrying out minor adjustments.

7 The master shall ensure the equitable distribution of persons referred to in paragraphs 2, 3 and 4 among the ship's survival craft.

Regulation 11
Survival craft muster and embarkation arrangements

1 Lifeboats and liferafts for which approved launching appliances are required shall be stowed as close to accommodation and service spaces as possible.

2 Muster stations shall be provided close to the embarkation stations. Each muster station shall have sufficient clear deck space to accommodate all persons assigned to muster at that station, but at least 0.35 m^2 per person.

* Refer to the Symbols related to life-saving appliances and arrangements adopted by the Organization by resolution A.760(18), as amended by resolution MSC.82(70).

3 Muster and embarkation stations shall be readily accessible from accommodation and work areas.

4 Muster and embarkation stations shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate.

5 Alleyways, stairways and exits giving access to the muster and embarkation stations shall be lighted. Such lighting shall be capable of being supplied by the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate. In addition to and as part of the markings required under regulation II-2/28.1.10, routes to muster stations shall be indicated with the muster station symbol, intended for that purpose, in accordance with the recommendations of the Organization.*

6 Davit-launched and free-fall launched survival craft muster and embarkation stations shall be so arranged as to enable stretcher cases to be placed in survival craft.

7 An embarkation ladder complying with the requirements of paragraph 6.1.6 of the Code extending, in a single length, from the deck to the waterline in the lightest seagoing condition under unfavourable conditions of trim of up to 10 and a list of up to 20 either way shall be provided at each embarkation station or at every two adjacent embarkation stations for survival craft launched down the side of the ship. However, the Administration may permit such ladders to be replaced by approved devices to afford access to the survival craft when waterborne, provided that there shall be at least one embarkation ladder on each side of the ship. Other means of embarkation enabling descent to the water in a controlled manner may be permitted for the liferafts required by regulation 31.1.4.

8 Where necessary, means shall be provided for bringing the davit-launched survival craft against the ship's side and holding them alongside so that persons can be safely embarked.

Regulation 12
Launching stations

Launching stations shall be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging portions of the hull and so that, as far as possible, survival craft, except survival craft specially designed for free-fall launching, can be launched down the straight side of the ship. If positioned forward, they shall

* Refer to the Symbols related to life-saving appliances and arrangements adopted by the Organization by resolution A.760(18), as amended by resolution MSC.82(70), and to the Guidelines for the evaluation, testing and application of low-location lighting on passenger ships adopted by the Organization by resolutions A.760(18) and A.752(18) respectively.

be located abaft the collision bulkhead in a sheltered position and, in this respect, the Administration shall give special consideration to the strength of the launching appliance.

Regulation 13

Stowage of survival craft

1 Each survival craft shall be stowed:

.1 so that neither the survival craft nor its stowage arrangements will interfere with the operation of any other survival craft or rescue boat at any other launching station;

.2 as near the water surface as is safe and practicable and, in the case of a survival craft other than a liferaft intended for throw over board launching, in such a position that the survival craft in the embarkation position is not less than 2 m above the waterline with the ship in the fully loaded condition under unfavourable conditions of trim of up to 10° and listed up to 20° either way, or to the angle at which the ship's weather deck edge becomes submerged, whichever is less;

.3 in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 min;

.4 fully equipped as required by this chapter and the Code; and

.5 as far as practicable, in a secure and sheltered position and protected from damage by fire and explosion. In particular, survival craft on tankers, other than the liferafts required by regulation 31.1.4, shall not be stowed on or above a cargo tank, slop tank, or other tank containing explosive or hazardous cargoes.

2 Lifeboats for lowering down the ship's side shall be stowed as far forward of the propeller as practicable. On cargo ships of 80 m in length and upwards but less than 120 m in length, each lifeboat shall be so stowed that the after end of the lifeboat is not less than the length of the lifeboat forward of the propeller. On cargo ships of 120 m in length and upwards and passenger ships of 80 m in length and upwards, each lifeboat shall be so stowed that the after end of the lifeboat is not less than 1.5 times the length of the lifeboat forward of the propeller. Where appropriate, the ship shall be so arranged that lifeboats, in their stowed positions, are protected from damage by heavy seas.

3 Lifeboats shall be stowed attached to launching appliances.

4.1 Every liferaft shall be stowed with its painter permanently attached to the ship.

4.2 Each liferaft or group of liferafts shall be stowed with a float-free arrangement complying with the requirements of paragraph 4.1.6 of the Code so that each floats free and, if inflatable, inflates automatically when the ship sinks.

4.3 Liferafts shall be so stowed as to permit manual release of one raft or container at a time from their securing arrangements.

4.4 Paragraphs 4.1 and 4.2 do not apply to liferafts required by regulation 31.1.4.

5 Davit-launched liferafts shall be stowed within reach of the lifting hooks, unless some means of transfer is provided which is not rendered inoperable within the limits of trim and list prescribed in paragraph 1.2 or by ship motion or power failure.

6 Liferafts intended for throw-overboard launching shall be so stowed as to be readily transferable for launching on either side of the ship unless liferafts, of the aggregate capacity required by regulation 31.1 to be capable of being launched on either side, are stowed on each side of the ship.

Regulation 14

Stowage of rescue boats

Rescue boats shall be stowed:

.1 in a state of continuous readiness for launching in not more than 5 min;

.2 in a position suitable for launching and recovery;

.3 so that neither the rescue boat nor its stowage arrangements will interfere with the operation of any survival craft at any other launching station; and

.4 if it is also a lifeboat, in compliance with the requirements of regulation 13.

Regulation 15

Stowage of marine evacuation systems

1 The ship's side shall not have any openings between the embarkation station of the marine evacuation system and the waterline in the lightest seagoing condition and means shall be provided to protect the system from any projections.

2 Marine evacuation systems shall be in such positions as to ensure safe launching having particular regard to clearance from the propeller and steeply overhanging positions of the hull and so that, as far as practicable, the system can be launched down the straight side of the ship.

3 Each marine evacuation system shall be stowed so that neither the passage nor platform nor its stowage or operational arrangements will interfere with the operation of any other life-saving appliance at any other launching station.

4 Where appropriate, the ship shall be so arranged that the marine evacuation systems in their stowed positions are protected from damage by heavy seas.

Regulation 16

Survival craft launching and recovery arrangements

1 Unless expressly provided otherwise, launching and embarkation appliances complying with the requirements of section 6.1 of the Code shall be provided for all survival craft except those which are:

.1 boarded from a position on deck less than 4.5 m above the waterline in the lightest seagoing condition and which have a mass of not more than 185 kg; or

.2 boarded from a position on deck less than 4.5 m above the waterline in the lightest seagoing condition and which are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way; or

.3 carried in excess of the survival craft for 200% of the total number of persons on board the ship and which have a mass of not more than 185 kg; or

.4 carried in excess of the survival craft for 200% of the total number of persons on board the ship, are stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way; or

.5 provided for use in conjunction with a marine evacuation system, complying with the requirements of section 6.2 of the Code and stowed for launching directly from the stowed position under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

2 Each lifeboat shall be provided with an appliance which is capable of launching and recovering the lifeboat. In addition there shall be provision for hanging-off the lifeboat to free the release gear for maintenance.

3 Launching and recovery arrangements shall be such that the appliance operator on the ship is able to observe the survival craft at all times during launching and for lifeboats during recovery.

4 Only one type of release mechanism shall be used for similar survival craft carried on board the ship.

5 Preparation and handling of survival craft at any one launching station shall not interfere with the prompt preparation and handling of any other survival craft or rescue boat at any other station.

6 Falls, where used, shall be long enough for the survival craft to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up to 20° either way.

7 During preparation and launching, the survival craft, its launching appliance, and the area of water into which it is to be launched shall be adequately illuminated by lighting supplied from the emergency source of electrical power required by regulation II-1/42 or II-1/43, as appropriate.

8 Means shall be available to prevent any discharge of water onto survival craft during abandonment.

9 If there is a danger of the survival craft being damaged by the ship's stabilizer wings, means shall be available, powered by an emergency source of energy, to bring the stabilizer wings inboard; indicators operated by an emergency source of energy shall be available on the navigating bridge to show the position of the stabilizer wings.

10 If partially enclosed lifeboats complying with the requirements of section 4.5 of the Code are carried, a davit span shall be provided, fitted with not less than two lifelines of sufficient length to reach the water with the ship in its lightest seagoing condition, under unfavourable conditions of trim of up to 10° and list of up 20° either way.

Regulation 17
Rescue boat embarkation, launching and recovery arrangements

1 The rescue boat embarkation and launching arrangements shall be such that the rescue boat can be boarded and launched in the shortest possible time.

2 If the rescue boat is one of the ship's survival craft, the embarkation arrangements and launching station shall comply with the requirements of regulations 11 and 12.

3 Launching arrangements shall comply with the requirements of regulation 16. However, all rescue boats shall be capable of being launched, where necessary utilizing painters, with the ship making headway at speeds up to 5 knots in calm water.

4 Recovery time of the rescue boat shall be not more than 5 min in moderate sea conditions when loaded with its full complement of persons and equipment. If the rescue boat is also a lifeboat, this recovery time shall

be possible when loaded with its lifeboat equipment and the approved rescue boat complement of at least six persons.

5 Rescue boat embarkation and recovery arrangements shall allow for safe and efficient handling of a stretcher case. Foul weather recovery strops shall be provided for safety if heavy fall blocks constitute a danger.

Regulation 18

Line-throwing appliances

A line-throwing appliance complying with the requirements of section 7.1 of the Code shall be provided.

Regulation 19

Emergency training and drills

1 This regulation applies to all ships.

2 Familiarity with safety installations and practice musters

2.1 Every crew member with assigned emergency duties shall be familiar with these duties before the voyage begins.

2.2 On a ship engaged on a voyage where passengers are scheduled to be on board for more than 24 h, musters of the passengers shall take place within 24 h after their embarkation. Passengers shall be instructed in the use of the lifejackets and the action to take in an emergency.

2.3 Whenever new passengers embark, a passenger safety briefing shall be given immediately before sailing, or immediately after sailing. The briefing shall include the instructions required by regulations 8.2 and 8.4, and shall be made by means of an announcement, in one or more languages likely to be understood by the passengers. The announcement shall be made on the ship's public address system, or by other equivalent means likely to be heard at least by the passengers who have not yet heard it during the voyage. The briefing may be included in the muster required by paragraph 2.2 if the muster is held immediately upon departure. Information cards or posters or video programmes displayed on ships video displays may be used to supplement the briefing, but may not be used to replace the announcement.

3 Drills

3.1 Drills shall, as far as practicable, be conducted as if there were an actual emergency.

3.2 Every crew member shall participate in at least one abandon ship drill and one fire drill every month. The drills of the crew shall take place within

24 h of the ship leaving a port if more than 25% of the crew have not participated in abandon ship and fire drills on board that particular ship in the previous month. When a ship enters service for the first time, after modification of a major character or when a new crew is engaged, these drills shall be held before sailing. The Administration may accept other arrangements that are at least equivalent for those classes of ships for which this is impracticable.

3.3 *Abandon ship drill*

3.3.1 Each abandon ship drill shall include:

- **.1** summoning of passengers and crew to muster stations with the alarm required by regulation 6.4.2 followed by drill announcement on the public address or other communication system and ensuring that they are made aware of the order to abandon ship;
- **.2** reporting to stations and preparing for the duties described in the muster list;
- **.3** checking that passengers and crew are suitably dressed;
- **.4** checking that lifejackets are correctly donned;
- **.5** lowering of at least one lifeboat after any necessary preparation for launching;
- **.6** starting and operating the lifeboat engine;
- **.7** operation of davits used for launching liferafts;
- **.8** a mock search and rescue of passengers trapped in their staterooms; and
- **.9** instruction in the use of radio life-saving appliances.

3.3.2 Different lifeboats shall, as far as practicable, be lowered in compliance with the requirements of paragraph 3.3.1.5 at successive drills.

3.3.3 Except as provided in paragraphs 3.3.4 and 3.3.5, each lifeboat shall be launched with its assigned operating crew aboard and manoeuvred in the water at least once every three months during an abandon ship drill.

3.3.4 Lowering into the water, rather than launching of a lifeboat arranged for free-fall launching, is acceptable where free-fall launching is impracticable provided the lifeboat is free-fall launched with its assigned operating crew aboard and manoeuvred in the water at least once every six months. However, in cases where it is impracticable, the Administration may extend this period to 12 months provided that arrangements are made for simulated launching which will take place at intervals of not more than six months.

3.3.5 The Administration may allow ships operating on short international voyages not to launch the lifeboats on one side if their berthing arrangements in port and their trading patterns do not permit launching

of lifeboats on that side. However, all such lifeboats shall be lowered at least once every three months and launched at least annually.

3.3.6 As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water. In all cases this requirement shall be complied with at least once every three months.

3.3.7 If lifeboat and rescue boat launching drills are carried out with the ship making headway, such drills shall, because of the dangers involved, be practised in sheltered waters only and under the supervision of an officer experienced in such drills.*

3.3.8 If a ship is fitted with marine evacuation systems, drills shall include exercising of the procedures required for the deployment of such a system up to the point immediately preceding actual deployment of the system. This aspect of drills should be augmented by regular instruction using the on-board training aids required by regulation 35.4. Additionally every system party member shall, as far as practicable, be further trained by participation in a full deployment of a similar system into water, either on board a ship or ashore, at intervals of not longer than two years, but in no case longer than three years. This training can be associated with the deployments required by regulation 20.8.2.

3.3.9 Emergency lighting for mustering and abandonment shall be tested at each abandon ship drill.

3.4 *Fire drills*

3.4.1 Fire drills should be planned in such a way that due consideration is given to regular practice in the various emergencies that may occur depending on the type of ships and the cargo.

3.4.2 Each fire drill shall include:

- **.1** reporting to stations and preparing for the duties described in the muster list required by regulation 8;
- **.2** starting of a fire pump, using at least the two required jets of water to show that the system is in proper working order;
- **.3** checking of fireman's outfit and other personal rescue equipment;
- **.4** checking of relevant communication equipment;

* Refer to the Guidelines on training for the purpose of launching lifeboats and rescue boats from ships making headway through the water adopted by the Organization by resolution A.624(15).

.5 checking the operation of watertight doors, fire doors, fire dampers and main inlets and outlets of ventilation systems in the drill area; and

.6 checking the necessary arrangements for subsequent abandoning of the ship.

3.4.3 The equipment used during drills shall immediately be brought back to its fully operational condition and any faults and defects discovered during the drills shall be remedied as soon as possible.

4 On-board training and instructions

4.1 On-board training in the use of the ship's life-saving appliances, including survival craft equipment, and in the use of the ship's fire-extinguishing appliances shall be given as soon as possible but not later than two weeks after a crew member joins the ship. However, if the crew member is on a regularly scheduled rotating assignment to the ship, such training shall be given not later than two weeks after the time of first joining the ship. Instructions in the use of the ship's fire-extinguishing appliances, life-saving appliances, and in survival at sea shall be given at the same interval as the drills. Individual instruction may cover different parts of the ship's life-saving and fire-extinguishing appliances, but all the ship's life-saving and fire-extinguishing appliances shall be covered within any period of two months.

4.2 Every crew member shall be given instructions which shall include but not necessarily be limited to:

.1 operation and use of the ship's inflatable liferafts;

.2 problems of hypothermia, first-aid treatment for hypothermia and other appropriate first-aid procedures;

.3 special instructions necessary for use of the ship's life-saving appliances in severe weather and severe sea conditions; and

.4 operation and use of fire-extinguishing appliances.

4.3 On-board training in the use of davit-launched liferafts shall take place at intervals of not more than four months on every ship fitted with such appliances. Whenever practicable this shall include the inflation and lowering of a liferaft. This liferaft may be a special liferaft intended for training purposes only, which is not part of the ship's life-saving equipment; such a special liferaft shall be conspicuously marked.

5 Records

The date when musters are held, details of abandon ship drills and fire drills, drills of other life-saving appliances and on board training shall be recorded in such log-book as may be prescribed by the Administration. If a full

muster, drill or training session is not held at the appointed time, an entry shall be made in the log-book stating the circumstances and the extent of the muster, drill or training session held.

Regulation 20

Operational readiness, maintenance and inspections

1 This regulation applies to all ships. The requirements of paragraphs 3 and 6.2 shall be complied with, as far as is practicable, on ships constructed before 1 July 1986.

2 Operational readiness

Before the ship leaves port and at all times during the voyage, all life-saving appliances shall be in working order and ready for immediate use.

3 Maintenance

3.1 Instructions for on-board maintenance of life-saving appliances complying with the requirements of regulation 36 shall be provided and maintenance shall be carried out accordingly.

3.2 The Administration may accept, in lieu of the instructions required by paragraph 3.1, a shipboard planned maintenance programme which includes the requirements of regulation 36.

4 Maintenance of falls

4.1 Falls used in launching shall be turned end for end at intervals of not more than 30 months and be renewed when necessary due to deterioration of the falls or at intervals of not more than five years, whichever is the earlier.

4.2 The Administration may accept in lieu of the "end for ending" required in paragraph 4.1, periodic inspection of the falls and their renewal whenever necessary due to deterioration or at intervals of not more than four years, whichever one is earlier.

5 Spares and repair equipment

Spares and repair equipment shall be provided for life-saving appliances and their components which are subject to excessive wear or consumption and need to be replaced regularly.

6 Weekly inspection

The following tests and inspections shall be carried out weekly:

.1 all survival craft, rescue boats and launching appliances shall be visually inspected to ensure that they are ready for use;

.2 all engines in lifeboats and rescue boats shall be run for a total period of not less than 3 min provided the ambient temperature is above the minimum temperature required for starting and running the engine. During this period of time, it should be demonstrated that the gear box and gear box train are engaging satisfactorily. If the special characteristics of an outboard motor fitted to a rescue boat would not allow it to be run other than with its propeller submerged for a period of 3 min, it should be run for such period as prescribed in the manufacturer's handbook. In special cases the Administration may waive this requirement for ships constructed before 1 July 1986; and

.3 the general emergency alarm system shall be tested.

7 Monthly inspections

Inspection of the life-saving appliances, including lifeboat equipment, shall be carried out monthly using the checklist required by regulation 36.1 to ensure that they are complete and in good order. A report of the inspection shall be entered in the log-book.

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

8.1 Every inflatable liferaft, inflatable lifejacket, and marine evacuation system shall be serviced:

.1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months; and

.2 at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.*

8.2 *Rotational deployment of marine evacuation systems*

In addition to or in conjunction with the servicing intervals of marine evacuation systems required by paragraph 8.1, each marine evacuation system should be deployed from the ship on a rotational basis at intervals to be agreed by the Administration provided that each system is to be deployed at least once every six years.

* Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts adopted by the Organization by resolution A.761(18).

8.3 An Administration which approves new and novel inflatable liferaft arrangements pursuant to regulation 4 may allow for extended service intervals on the following conditions:

8.3.1 The new and novel liferaft arrangement has proved to maintain the same standard, as required by testing procedure, during extended service intervals.

8.3.2 The liferaft system shall be checked on board by certified personnel according to paragraph 8.1.1.

8.3.3 Service at intervals not exceeding five years shall be carried out in accordance with the recommendations of the Organization.*

8.4 All repairs and maintenance of inflated rescue boats shall be carried out in accordance with the manufacturer's instructions. Emergency repairs may be carried out on board the ship; however, permanent repairs shall be effected at an approved servicing station.

8.5 An Administration which permits extension of liferaft service intervals in accordance with paragraph 8.3 shall notify the Organization of such action in accordance with regulation I/5(b).

9 Periodic servicing of hydrostatic release units

Hydrostatic release units, other than disposable hydrostatic release units, shall be serviced:

.1 at intervals not exceeding 12 months, provided where in any case this is impracticable, the Administration may extend this period to 17 months;† and

.2 at a servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel.

10 Marking of stowage locations

Containers, brackets, racks, and other similar stowage locations for life-saving equipment shall be marked with symbols in accordance with the recommendations of the Organization,‡ indicating the devices stowed in that location for that purpose. If more than one device is stowed in that location, the number of devices shall also be indicated.

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* Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts adopted by the Organization by resolution A.761(18).

† Refer to MSC/Circ. 955, Servicing of life-saving appliances and radiocommunication equipment under the harmonized system of survey and certification (HSSC).

‡ Refer to the Symbols related to life-saving appliances and arrangements adopted by the Organization by resolution A.760(18).

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

11.1 Launching appliances:

.1 shall be serviced at recommended intervals in accordance with instructions for on-board maintenance as required by regulation 36;

.2 shall be subjected to a thorough examination at intervals not exceeding 5 years; and

.3 shall upon completion of the examination in .2 be subjected to a dynamic test of the winch brake in accordance with paragraph 6.1.2.5.2 of the Code.

11.2 Lifeboat on-load release gear shall be:

.1 serviced at recommended intervals in accordance with instructions for on board maintenance as required by regulation 36;

.2 subjected to a thorough examination and test during the surveys required by regulation 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 lifeboat when loaded with its full complement of persons and equipment whenever the release gear is overhauled. Such overhauling and test shall be carried out at least once every five years.*

SECTION II – PASSENGER SHIPS
(Additional requirements)

Regulation 21
Survival craft and rescue boats

1 Survival craft

1.1 Passenger ships engaged on international voyages which are not short international voyages shall carry:

.1 partially or totally enclosed lifeboats complying with the requirements of section 4.5 or 4.6 of the Code on each side of such aggregate capacity as will accommodate not less than 50% of the total number of persons on board. The Adminis-

* Refer to the Recommendation on testing of life-saving appliances 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 adopted by the Maritime Safety Committee of the Organization by resolution MSC.81(70).

tration may permit the substitution of lifeboats by liferafts of equivalent total capacity provided that there shall never be less than sufficient lifeboats on each side of the ship to accommodate 37.5% of the total number of persons on board. The inflatable or rigid liferafts shall comply with the requirements of section 4.2 or 4.3 of the Code and shall be served by launching appliances equally distributed on each side of the ship; and

.2 in addition, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code of such aggregate capacity as will accommodate at least 25% of the total number of persons on board. These liferafts shall be served by at least one launching appliance on each side which may be those provided in compliance with the requirements of paragraph 1.1.1 or equivalent approved appliances capable of being used on both sides. However, stowage of these liferafts need not comply with the requirements of regulation 13.5.

1.2 Passenger ships engaged on short international voyages and complying with the special standards of subdivision prescribed by regulation II-1/6.5 shall carry:

.1 partially or totally enclosed lifeboats complying with the requirements of section 4.5 or 4.6 of the Code of such aggregate capacity as will accommodate at least 30% of the total number of persons on board. The lifeboats shall, as far as practicable, be equally distributed on each side of the ship. In addition inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code shall be carried of such aggregate capacity that, together with the lifeboat capacity, the survival craft will accommodate the total number of persons on board. The liferafts shall be served by launching appliances equally distributed on each side of the ship; and

.2 in addition, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code of such aggregate capacity as will accommodate at least 25% of the total number of persons on board. These liferafts shall be served by at least one launching appliance on each side which may be those provided in compliance with the requirements of paragraph 1.2.1 or equivalent approved appliances capable of being used on both sides. However, stowage of these liferafts need not comply with the requirements of regulation 13.5.

1.3 Passenger ships engaged on short international voyages and not complying with the special standards of subdivision prescribed by regulation II-1/6.5, shall carry survival craft complying with the requirements of paragraph 1.1.

1.4 All survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 30 min from the time the abandon ship signal is given.

1.5 In lieu of meeting the requirements of paragraph 1.1, 1.2 or 1.3, passenger ships of less than 500 gross tonnage where the total number of persons on board is less than 200, may comply with the following:

.1 they shall carry on each side of the ship, inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code and of such aggregate capacity as will accommodate the total number of persons on board;

.2 unless the liferafts required by paragraph 1.5.1 are 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;

.3 if the rescue boat required by paragraph 2.2 is also a partially or totally enclosed lifeboat complying with the requirements of section 4.5 or 4.6 of the Code, it may be included in the aggregate capacity required by paragraph 1.5.1, provided that the total capacity available on either side of the ship is at least 150% of the total number of persons on board; and

.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 those which are 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.

1.6 A marine evacuation system or systems complying with section 6.2 of the Code may be substituted for the equivalent capacity of liferafts and launching appliances required by paragraph 1.1.1 or 1.2.1.

2 Rescue boats

2.1 Passenger ships of 500 gross tonnage and over shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code on each side of the ship.

2.2 Passenger ships of less than 500 gross tonnage shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code.

2.3 A lifeboat may be accepted as a rescue boat provided it also complies with the requirements for a rescue boat.

3 Marshalling of liferafts

3.1 The number of lifeboats and rescue boats that are carried on passenger ships shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than six liferafts need be marshalled by each lifeboat or rescue boat.

3.2 The number of lifeboats and rescue boats that are carried on passenger ships engaged on short international voyages and complying with the special standards of subdivision prescribed by regulation II-1/6.5 shall be sufficient to ensure that in providing for abandonment by the total number of persons on board not more than nine liferafts need be marshalled by each lifeboat or rescue boat.

Regulation 22
Personal life-saving appliances

1 Lifebuoys

1.1 A passenger ship shall carry not less than the number of lifebuoys complying with the requirements of regulation 7.1 and section 2.1 of the Code prescribed in the following table:

Length of ship in metres	Minimum number of lifebuoys
Under 60	8
60 and under 120	12
120 and under 180	18
180 and under 240	24
240 and over	30

1.2 Notwithstanding regulation 7.1.3, passenger ships of under 60 m in length shall carry not less than six lifebuoys provided with self-igniting lights.

2 Lifejackets

2.1 In addition to the lifejackets required by regulation 7.2, every passenger ship shall carry lifejackets for not less than 5% of the total number of persons on board. These lifejackets shall be stowed in conspicuous places on deck or at muster stations.

2.2 Where lifejackets for passengers are stowed in staterooms which are located remotely from direct routes between public spaces and muster stations, the additional lifejackets for these passengers required under regulation 7.2.2, shall be stowed either in the public spaces, the muster

stations, or on direct routes between them. The lifejackets shall be stowed so that their distribution and donning does not impede orderly movement to muster stations and survival craft embarkation stations.

3 Lifejacket lights

3.1 On all passenger ships each lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

3.2 Lights fitted on lifejackets on board passenger ships prior to 1 July 1998 and not complying fully with paragraph 2.2.3 of the Code may be accepted by the Administration until the lifejacket light would normally be replaced or until the first periodical survey after 1 July 2002, whichever is the earliest.

4 Immersion suits and thermal protective aids

4.1 All passenger ships shall carry for each lifeboat on the ship at least three immersion suits complying with the requirements of section 2.3 of the Code and, in addition, a thermal protective aid complying with the requirements of section 2.5 of the Code for every person to be accommodated in the lifeboat and not provided with an immersion suit. These immersion suits and thermal protective aids need not be carried:

.1 for persons to be accommodated in totally or partially enclosed lifeboats; or

.2 if the ship is constantly engaged on voyages in warm climates where, in the opinion of the Administration, they are unnecessary.

4.2 The provisions of paragraph 4.1.1 also apply to partially or totally enclosed lifeboats not complying with the requirements of section 4.5 or 4.6 of the Code, provided they are carried on ships constructed before 1 July 1986.

Regulation 23

Survival craft and rescue boat embarkation arrangements

1 On passenger ships, survival craft embarkation arrangements shall be designed for:

.1 all lifeboats to be boarded and launched either directly from the stowed position or from an embarkation deck but not both; and

.2 davit-launched liferafts to be boarded and launched from a position immediately adjacent to the stowed position or from a

position to which, in compliance with the requirements of regulation 13.5, the liferaft is transferred prior to launching.

2 Rescue boat arrangements shall be such that the rescue boat can be boarded and launched directly from the stowed position with the number of persons assigned to crew the rescue boat on board. Notwithstanding the requirements of paragraph 1.1, if the rescue boat is also a lifeboat and the other lifeboats are boarded and launched from an embarkation deck, the arrangements shall be such that the rescue boat can also be boarded and launched from the embarkation deck.

Regulation 24

Stowage of survival craft

The stowage height of a survival craft on a passenger ship shall take into account the requirements of regulation 13.1.2, the escape provisions of regulation II-2/28, the size of the ship, and the weather conditions likely to be encountered in its intended area of operation. For a davit-launched survival craft, the height of the davit head with the survival craft in embarkation position, shall, as far as practicable, not exceed 15 m to the waterline when the ship is in its lightest seagoing condition.

Regulation 25

Muster stations

Every passenger ship shall, in addition to complying with the requirements of regulation 11, have passenger muster stations which shall:

.1 be in the vicinity of, and permit ready access for the passengers to, the embarkation stations unless in the same location; and

.2 have ample room for marshalling and instruction of the passengers, but at least 0.35 m^2 per passenger.

Regulation 26

Additional requirements for ro–ro passenger ships

1 This regulation applies to all ro–ro passenger ships. Ro–ro passenger ships constructed:

.1 on or after 1 July 1998 shall comply with the requirements of paragraphs 2.3, 2.4, 3.1, 3.2, 3.3, 4 and 5;

.2 on or after 1 July 1986 and before 1 July 1998 shall comply with the requirements of paragraph 5 not later than the first periodical survey after 1 July 1998 and with the requirements of paragraphs 2.3, 2.4, 3 and 4 not later than the first periodical survey after 1 July 2000; and

.3 before 1 July 1986 shall comply with the requirements of paragraph 5 not later than the first periodical survey after 1 July 1998 and with the requirements of paragraphs 2.1, 2.2, 2.3, 2.4, 3 and 4 not later than the first periodical survey after 1 July 2000.

2 Liferafts

2.1 The ro–ro passenger ship's liferafts shall be served by marine evacuation systems complying with the requirements of section 6.2 of the Code or launching appliances complying with the requirements of paragraph 6.1.5 of the Code, equally distributed on each side of the ship.

2.2 Every liferaft on ro–ro passenger ships shall be provided with float-free stowage arrangements complying with the requirements of regulation 13.4.

2.3 Every liferaft on ro–ro passenger ships shall be of a type fitted with a boarding ramp complying with the requirements of paragraph 4.2.4.1 or 4.3.4.1 of the Code, as appropriate.

2.4 Every liferaft on ro–ro passenger ships shall either be automatically self-righting or be a canopied reversible liferaft which is stable in a seaway and is capable of operating safely whichever way up it is floating. Alternatively, the ship shall carry automatically self-righting liferafts or canopied reversible liferafts, in addition to its normal complement of liferafts, of such aggregate capacity as will accommodate at least 50% of the persons not accommodated in lifeboats. This additional liferaft capacity shall be determined on the basis of the difference between the total number of persons on board and the number of persons accommodated in lifeboats. Every such liferaft shall be approved by the Administration having regard to the recommendations adopted by the Organization.*

3 Fast rescue boats

3.1 At least one of the rescue boats on a ro–ro passenger ship shall be a fast rescue boat approved by the Administration having regard to the recommendations adopted by the Organization.*

3.2 Each fast rescue boat shall be served by a suitable launching appliance approved by the Administration. When approving such launching appliances, the Administration shall take into account that the fast rescue boat is intended to be launched and retrieved even under severe adverse weather conditions, and also shall have regard to the recommendations adopted by the Organization.*

* Refer to MSC/Circ.809, Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including testing, on ro-ro passenger ships.

3.3 At least two crews of each fast rescue boat shall be trained and drilled regularly having regard to the Seafarers Training, Certification and Watchkeeping (STCW) Code and recommendations adopted by the Organization,* including all aspects of rescue, handling, manoeuvring, operating these craft in various conditions, and righting them after capsize.

3.4 In the case where the arrangement or size of a ro–ro passenger ship, constructed before 1 July 1997, is such as to prevent the installation of the fast rescue boat required by paragraph 3.1, the fast rescue boat may be installed in place of an existing lifeboat which is accepted as a rescue boat or, in the case of ships constructed prior to 1 July 1986, boats for use in an emergency, provided that all of the following conditions are met:

.1 the fast rescue boat installed is served by a launching appliance complying with the provisions of paragraph 3.2;

.2 the capacity of the survival craft lost by the above substitution is compensated by the installation of liferafts capable of carrying at least an equal number of persons served by the lifeboat replaced; and

.3 such liferafts are served by the existing launching appliances or marine evacuation systems.

4 Means of rescue†

4.1 Each ro–ro passenger ship shall be equipped with efficient means for rapidly recovering survivors from the water and transferring survivors from rescue units or survival craft to the ship.

4.2 The means of transfer of survivors to the ship may be part of a marine evacuation system, or may be part of a system designed for rescue purposes.

4.3 If the slide of a marine evacuation system is intended to provide the means of transfer of survivors to the deck of the ship, the slide shall be equipped with handlines or ladders to aid in climbing up the slide.

5 Lifejackets

5.1 Notwithstanding the requirements of regulations 7.2 and 22.2, a sufficient number of lifejackets shall be stowed in the vicinity of the muster stations so that passengers do not have to return to their cabins to collect their lifejackets.

5.2 In ro–ro passenger ships, each lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 of the Code.

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* Refer to the Recommendation on training requirements for crews of fast rescue boats adopted by the Organization by resolution A.771(18) and to section A-VI/2, table A-VI/2-2, "Specification of the minimum standard of competence in fast rescue boats", of the STCW Code.

† Refer to MSC/Circ. 810, Recommendation on means of rescue on ro–ro passenger ships.

Regulation 27
Information on passengers

1 All persons on board all passenger ships shall be counted prior to departure.

2 Details of persons who have declared a need for special care or assistance in emergency situations shall be recorded and communicated to the master prior to departure.

3 In addition, not later than 1 January 1999, the names and gender of all persons on board, distinguishing between adults, children and infants shall be recorded for search and rescue purposes.

4 The information required by paragraphs 1, 2 and 3 shall be kept ashore and made readily available to search and rescue services when needed.

5 Administrations may exempt passenger ships from the requirements of paragraph 3, if the scheduled voyages of such ships render it impracticable for them to prepare such records.

Regulation 28
Helicopter landing and pick-up areas

1 All ro–ro passenger ships shall be provided with a helicopter pick-up area approved by the Administration having regard to the recommendations adopted by the Organization.*

2 [Ro–ro]† passenger ships of 130 m in length and upwards, constructed on or after 1 July 1999, shall be fitted with a helicopter landing area approved by the Administration having regard to the recommendations adopted by the Organization.‡

Regulation 29
Decision support system for masters of passenger ships

1 This regulation applies to all passenger ships. Passenger ships constructed before 1 July 1997 shall comply with the requirements of this regulation not later than the date of the first periodical survey after 1 July 1999.

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* Refer to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual).

† Refer to MSC/Circ. 907, Application of SOLAS regulation III/28.2 concerning helicopter landing areas on non-ro–ro passenger ships and to resolution MSC.91(72), which is expected to enter into force on 1 January 2002.

‡ Refer to MSC/Circ.895, Recommendation on helicopter landing areas on ro-ro passenger ships.

2 In all passenger ships, a decision support system for emergency management shall be provided on the navigation bridge.

3 The system shall, as a minimum, consist of a printed emergency plan or plans.* All foreseeable emergency situations shall be identified in the emergency plan or plans, including, but not limited to, the following main groups of emergencies:

.1 fire;

.2 damage to ship;

.3 pollution;

.4 unlawful acts threatening the safety of the ship and the security of its passengers and crew;

.5 personnel accidents;

.6 cargo-related accidents; and

.7 emergency assistance to other ships.

4 The emergency procedures established in the emergency plan or plans shall provide decision support to masters for handling any combination of emergency situations.

5 The emergency plan or plans shall have a uniform structure and be easy to use. Where applicable, the actual loading condition as calculated for the passenger ship's voyage stability shall be used for damage control purposes.

6 In addition to the printed emergency plan or plans, the Administration may also accept the use of a computer-based decision support system on the navigation bridge which provides all the information contained in the emergency plan or plans, procedures, checklists, etc., which is able to present a list of recommended actions to be carried out in foreseeable emergencies.

Regulation 30
Drills

1 This regulation applies to all passenger ships.

2 On passenger ships, an abandon ship drill and fire drill shall take place weekly. The entire crew need not be involved in every drill, but each crew member must participate in an abandon ship drill and a fire drill each month as required in regulation 19.3.2. Passengers shall be strongly encouraged to attend these drills.

* Refer to the Guidelines for a structure of an integrated system of contingency planning for shipboard emergencies adopted by the Organization by resolution A.852(20).

SECTION III – CARGO SHIPS
(Additional requirements)

Regulation 31
Survival craft and rescue boats

1 Survival craft

1.1 Cargo ships shall carry:

.1 one or more totally enclosed lifeboats complying with the requirements of section 4.6 of the Code of such aggregate capacity on each side of the ship as will accommodate the total number of persons on board; and

.2 in addition, one or more inflatable or rigid liferafts, complying with the requirements of section 4.2 or 4.3 of the Code, 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 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.

1.2 In lieu of meeting the requirements of paragraph 1.1, cargo ships may carry:

.1 one or more free-fall lifeboats, complying with the requirements of section 4.7 of the Code, capable of being free-fall launched over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board; and

.2 in addition, one or more inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code, on each side of the ship, of such aggregate capacity as will accommodate the total number of persons on board. The liferafts on at least one side of the ship shall be served by launching appliances.

1.3 In lieu of meeting the requirements of paragraph 1.1 or 1.2, cargo ships of less than 85 m in length other than oil tankers, chemical tankers and gas carriers, may comply with the following:

.1 they shall carry on each side of the ship, one or more inflatable or rigid liferafts complying with the requirements of section 4.2 or 4.3 of the Code and of such aggregate capacity as will accommodate the total number of persons on board;

.2 unless the liferafts required by paragraph 1.3.1 are 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;

.3 if the rescue boat required by paragraph 2 is also a totally enclosed lifeboat complying with the requirements of section 4.6 of the Code, it may be included in the aggregate capacity required by paragraph 1.3.1, provided that the total capacity available on either side of the ship is at least 150% of the total number of persons on board; and

.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 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.

1.4 Cargo ships where the horizontal distance from the extreme end of the stem or stern of the ship to the nearest end of the closest survival craft is more than 100 m shall carry, in addition to the liferafts required by paragraphs 1.1.2 and 1.2.2, a liferaft stowed as far forward or aft, or one as far forward and another as far aft, as is reasonable and practicable. Such liferaft or liferafts may be securely fastened so as to permit manual release and need not be of the type which can be launched from an approved launching device.

1.5 With the exception of the survival craft referred to in regulation 16.1.1, all survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 10 min from the time the abandon ship signal is given.

1.6 Chemical tankers and gas carriers carrying cargoes emitting toxic vapours or gases* shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the Code, lifeboats with a self-contained air support system complying with the requirements of section 4.8 of the Code.

1.7 Oil tankers, chemical tankers and gas carriers carrying cargoes having a flashpoint not exceeding 60°C (closed-cup test) shall carry, in lieu of totally enclosed lifeboats complying with the requirements of section 4.6 of the

* Refer to the products for which emergency escape respiratory protection is required in chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code), adopted by the Maritime Safety Committee by resolution MSC.4(48), as amended, and in chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), adopted by the Maritime Safety Committee by resolution MSC.5(48), as amended.

Code, fire-protected lifeboats complying with the requirements of section 4.9 of the Code.

2 Rescue boats

Cargo ships shall carry at least one rescue boat complying with the requirements of section 5.1 of the Code. A lifeboat may be accepted as a rescue boat, provided that it also complies with the requirements for a rescue boat.

3 In addition to their lifeboats, all cargo ships constructed before 1 July 1986 shall carry:

.1 one or more liferafts capable of being launched on either side of the ship and of such aggregate capacity as will accommodate the total number of persons on board. The liferaft or liferafts shall be equipped with a lashing or an equivalent means of securing the liferaft which will automatically release it from a sinking ship; and

.2 where the horizontal distance from the extreme end of the stem or stern of the ship to the nearest end of the closest survival craft is more than 100 m, in addition to the liferafts required by paragraph 3.1, a liferaft stowed as far forward or aft, or one as far forward and another as far aft, as is reasonable and practicable. Notwithstanding the requirements of paragraph 3.1, such liferaft or liferafts may be securely fastened so as to permit manual release.

Regulation 32
Personal life-saving appliances

1 Lifebuoys

1.1 Cargo ships shall carry not less than the number of lifebuoys complying with the requirements of regulation 7.1 and section 2.1 of the Code prescribed in the following table:

Length of ship in metres	Minimum number of lifebuoys
Under 100	8
100 and under 150	10
150 and under 200	12
200 and over	14

1.2 Self-igniting lights for lifebuoys on tankers required by regulation 7.1.3 shall be of an electric battery type.

2 Lifejacket lights

2.1 This paragraph applies to all cargo ships.

2.2 On cargo ships, each lifejacket shall be fitted with a lifejacket light complying with the requirements of paragraph 2.2.3 of the Code.

2.3 Lights fitted on lifejackets on board cargo ships prior to 1 July 1998 and not complying fully with paragraph 2.2.3 of the Code may be accepted by the Administration until the lifejacket light would normally be replaced or until the first periodical survey after 1 July 2001, whichever is the earliest.

3 Immersion suits and thermal protective aids

3.1 This paragraph applies to all cargo ships.

3.2 Cargo ships shall carry for each lifeboat on the ship at least three immersion suits complying with the requirements of section 2.3 of the Code or, if the Administration considers it necessary and practicable, one immersion suit complying with the requirements of section 2.3 of the Code for every person on board the ship; however, the ship shall carry in addition to the thermal protective aids required by paragraphs 4.1.5.1.24, 4.4.8.31 and 5.1.2.2.13 of the Code, thermal protective aids complying with the requirements of section 2.5 of the Code for persons on board not provided with immersion suits. These immersion suits and thermal protective aids need not be required if the ship:

.1 has totally enclosed lifeboats on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or

.2 has totally enclosed lifeboats capable of being launched by free-fall over the stern of the ship of such aggregate capacity as will accommodate the total number of persons on board and which are boarded and launched directly from the stowed position, together with liferafts on each side of the ship of such aggregate capacity as will accommodate the total number of persons on board; or

.3 is constantly engaged on voyages in warm climates where, in the opinion of the Administration, immersion suits are unnecessary.

3.3 Cargo ships complying with the requirements of regulation 31.1.3 shall carry immersion suits complying with the requirements of section 2.3 of the Code for every person on board unless the ship:

.1 has davit-launched liferafts; or

.2 has liferafts served by equivalent approved appliances capable of being used on both sides of the ship and which do not require entry into the water to board the liferaft; or

.3 is constantly engaged on voyages in warm climates where, in the opinion of the Administration, immersion suits are unnecessary.

3.4 The immersion suits required by this regulation may be used to comply with the requirements of regulation 7.3.

3.5 The totally enclosed lifeboats referred to in paragraphs 3.2.1 and 3.2.2 carried on cargo ships constructed before 1 July 1986 need not comply with the requirements of section 4.6 of the Code.

Regulation 33
Survival craft embarkation and launching arrangements

1 Cargo ship survival craft embarkation arrangements shall be so designed that lifeboats can be boarded and launched directly from the stowed position and davit-launched liferafts can be boarded and launched from a position immediately adjacent to the stowed position or from a position to which the liferaft is transferred prior to launching in compliance with the requirements of regulation 13.5.

2 On cargo ships of 20,000 gross tonnage and upwards, lifeboats shall be capable of being launched, where necessary utilizing painters, with the ship making headway at speeds up to 5 knots in calm water.

SECTION IV – LIFE-SAVING APPLIANCES AND ARRANGEMENTS REQUIREMENTS

Regulation 34

All life-saving appliances and arrangements shall comply with the applicable requirements of the Code.

SECTION V – MISCELLANEOUS

Regulation 35
Training manual and on-board training aids

1 This regulation applies to all ships.

2 A training manual complying with the requirements of paragraph 3 shall be provided in each crew mess room and recreation room or in each crew cabin.

3 The training manual, which may comprise several volumes, shall contain instructions and information, in easily understood terms illustrated wherever possible, on the life-saving appliances provided in the ship and on

the best methods of survival. Any part of such information may be provided in the form of audio-visual aids in lieu of the manual. The following shall be explained in detail:

.1 donning of lifejackets, immersion suits and anti-exposure suits, as appropriate;

.2 muster at the assigned stations;

.3 boarding, launching, and clearing the survival craft and rescue boats, including, where applicable, use of marine evacuation systems;

.4 method of launching from within the survival craft;

.5 release from launching appliances;

.6 methods and use of devices for protection in launching areas, where appropriate;

.7 illumination in launching areas;

.8 use of all survival equipment;

.9 use of all detection equipment;

.10 with the assistance of illustrations, the use of radio life-saving appliances;

.11 use of drogues;

.12 use of engine and accessories;

.13 recovery of survival craft and rescue boats including stowage and securing;

.14 hazards of exposure and the need for warm clothing;

.15 best use of the survival craft facilities in order to survive;

.16 methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus;

.17 all other functions contained in the muster list and emergency instructions; and

.18 instructions for emergency repair of the life-saving appliances.

4 Every ship fitted with a marine evacuation system shall be provided with on-board training aids in the use of the system.

Regulation 36

Instructions for on-board maintenance

Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

.1 a checklist for use when carrying out the inspections required by regulation 20.7;

.2 maintenance and repair instructions;

.3 schedule of periodic maintenance;

.4 diagram of lubrication points with the recommended lubricants;

.5 list of replaceable parts;

.6 list of sources of spare parts; and

.7 log for records of inspections and maintenance.

Regulation 37

Muster list and emergency instructions

1 The muster list shall specify details of the general emergency alarm and public address system prescribed by section 7.2 of the Code and also action to be taken by crew and passengers when this alarm is sounded. The muster list shall also specify how the order to abandon ship will be given.

2 Each passenger ship shall have procedures in place for locating and rescuing passengers trapped in their staterooms.

3 The muster list shall show the duties assigned to the different members of the crew including:

.1 closing of the watertight doors, fire doors, valves, scuppers, sidescuttles, skylights, portholes and other similar openings in the ship;

.2 equipping of the survival craft and other life-saving appliances;

.3 preparation and launching of survival craft;

.4 general preparations of other life-saving appliances;

.5 muster of passengers;

.6 use of communication equipment;

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

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

4 The muster list shall specify which officers are assigned to ensure that life-saving and fire appliances are maintained in good condition and are ready for immediate use.

5 The muster list shall specify substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions.

6 The muster list shall show the duties assigned to members of the crew in relation to passengers in case of emergency. These duties shall include:

.1 warning the passengers;

.2 seeing that they are suitably clad and have donned their lifejackets correctly;

.3 assembling passengers at muster stations;

.4 keeping order in the passageways and on the stairways and generally controlling the movements of the passengers; and

.5 ensuring that a supply of blankets is taken to the survival craft.

7 The muster list shall be prepared before the ship proceeds to sea. After the muster list has been prepared, if any change takes place in the crew which necessitates an alteration in the muster list, the master shall either revise the list or prepare a new list.

8 The format of the muster list used on passenger ships shall be approved.

CHAPTER IV
Radiocommunications

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Part A
General

Regulation 1
Application

1 This chapter applies to all ships to which the present regulations apply and to cargo ships of 300 gross tonnage and upwards.

2 This chapter does not apply to ships to which the present regulations would otherwise apply while such ships are being navigated within the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St Lambert Lock at Montreal in the Province of Quebec, Canada.*

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 a similar stage of construction means the stage at which:

.2.1 construction identifiable with a specific ship begins; and

.2.2 assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less.

4 Every ship shall comply with regulations 7.1.4 (NAVTEX) and 7.1.6 (satellite EPIRB) not later than 1 August 1993.

5 Subject to the provisions of paragraphs 4 and 7, the Administration shall ensure that every ship constructed before 1 February 1995:

.1 during the period between 1 February 1992 and 1 February 1999:

.1.1 either complies with all applicable requirements of this chapter; or

.1.2 complies with all applicable requirements of chapter IV of the International Convention for the Safety of Life at Sea, 1974, in

* Such ships are subject to special requirements relative to radio for safety purposes, as contained in the relevant agreement between Canada and the United States of America.

force prior to 1 February 1992; however, passenger ships irrespective of size shall not be granted any exemption from the requirements of regulation 3 of chapter IV of that Convention; and

.2 after 1 February 1999, complies with all the applicable requirements of this chapter.

6 Every ship constructed on or after 1 February 1995 shall comply with all the applicable requirements of this chapter.

7 Passenger ships constructed before 1 July 1997 shall, as appropriate, comply with the requirements of regulations 6.4, 6.5, 6.6 and 7.5 not later than the date of the first periodical survey after 1 July 1997.

8 No provision in this chapter shall prevent the use by any ship, survival craft or person in distress, of any means at their disposal to attract attention, make known their position and obtain help.

Regulation 2
Terms and definitions

1 For the purpose of this chapter, the following terms shall have the meanings defined below:

.1 *Bridge-to-bridge communications* means safety communications between ships from the position from which the ships are normally navigated.

.2 *Continuous watch* means that the radio watch concerned shall not be interrupted other than for brief intervals when the ship's receiving capability is impaired or blocked by its own communications or when the facilities are under periodical maintenance or checks.

.3 *Digital selective calling (DSC)* means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radio Consultative Committee (CCIR).*

.4 *Direct-printing telegraphy* means automated telegraphy techniques which comply with the relevant recommendations of the International Radio Consultative Committee (CCIR).*

* The name of the Committee was changed to "ITU Radiocommunication Sector" (ITU-R) due to Article 1 of the International Telecommunication Constitution, Geneva, 1992.

.5 *General radiocommunications* means operational and public correspondence traffic, other than distress, urgency and safety messages, conducted by radio.

.6 *INMARSAT*[*] means the Organization established by the Convention on the International Maritime Satellite Organization adopted on 3 September 1976.

.7 *International NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language.[†]

.8 *Locating* means the finding of ships, aircraft, units or persons in distress.

.9 *Maritime safety information* means navigational and meteorological warnings, meteorological forecasts and other urgent safety related messages broadcast to ships.

.10 *Polar orbiting satellite* service means a service which is based on polar orbiting satellites which receive and relay distress alerts from satellite EPIRBs and which provides their position.

.11 *Radio Regulations* means the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force at any time.

.12 *Sea area A1* means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.[‡]

.13 *Sea area A2* means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continous DSC alerting is available, as may be defined by a Contracting Government.[§]

.14 *Sea area A3* means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available.

.15 *Sea area A4* means an area outside sea areas A1, A2 and A3.

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[*] The name of the Organization was changed to "International Mobile Satellite Organization" (Inmarsat) by virtue of amendments to its Convention and Operating Agreement adopted by the 10th (extraordinary) Assembly (5–9 December 1994).

[†] Refer to the NAVTEX Manual approved by the Organization (publication IMO-951E).

[‡] Refer to resolution A.801(19) concerning provision of radio services for the global maritime distress and safety system (GMDSS).

2 All other terms and abbreviations which are used in this chapter and which are defined in the Radio Regulations shall have the meanings as defined in those Regulations.

Regulation 3
Exemptions

1 The Contracting Governments consider it highly desirable not to deviate from the requirements of this chapter; nevertheless the Administration may grant partial or conditional exemptions to individual ships from the requirements of regulations 7 to 11 provided:

.1 such ships comply with the functional requirements of regulation 4; and

.2 the Administration has taken into account the effect such exemptions may have upon the general efficiency of the service for the safety of all ships.

2 An exemption may be granted under paragraph 1 only:

.1 if the conditions affecting safety are such as to render the full application of regulations 7 to 11 unreasonable or unnecessary;

.2 in exceptional circumstances, for a single voyage outside the sea area or sea areas for which the ship is equipped; or

.3 prior to 1 February 1999, when the ship will be taken permanently out of service within two years of a date prescribed by regulation 1 for the application of a requirement of this chapter.

3 Each Administration shall submit to the Organization, as soon as possible after the first of January in each year, a report showing all exemptions granted under paragraphs 1 and 2 during the previous calender year and giving the reasons for granting such exemptions.

Regulation 4
*Functional requirements**

1 Every ship, while at sea, shall be capable:

.1 except as provided in regulations 8.1.1 and 10.1.4.3, of transmitting ship-to-shore distress alerts by at least two separate and independent means, each using a different radiocommunication service;

.2 of receiving shore-to-ship distress alerts;

* It should be noted that ships performing GMDSS functions should use the Guidance for avoidance of false distress alerts adopted by the Organization by resolution A.814(19).

.3 of transmitting and receiving ship-to-ship distress alerts;

.4 of transmitting and receiving search and rescue co-ordinating communications;

.5 of transmitting and receiving on-scene communications;

.6 of transmitting and, as required by regulation V/12(g) and (h), receiving signals for locating;*

.7 of transmitting and receiving† maritime safety information;

.8 of transmitting and receiving general radiocommunications to and from shore-based radio systems or networks subject to regulation 15.8; and

.9 of transmitting and receiving bridge-to-bridge communications.

* Refer to resolution A.614(15) concerning carriage of radar operating in the frequency band 9,300–9,500 MHz.

† It should be noted that ships may have a need for reception of certain maritime safety information while in port.

Part B
*Undertakings by Contracting Governments**

Regulation 5
Provision of radiocommunication services

1 Each Contracting Government undertakes to make available, as it deems practical and necessary either individually or in co-operation with other Contracting Governments, appropriate shore-based facilities for space and terrestrial radiocommunication services having due regard to the recommendations of the Organization.† These services are:

.1 a radiocommunication service utilizing geostationary satellites in the Maritime Mobile-Satellite Service;

.2 a radiocommunication service utilizing polar orbiting satellites in the mobile-satellite service;

.3 the maritime mobile service in the bands between 156 MHz and 174 MHz;

.4 the maritime mobile service in the bands between 4,000 kHz and 27,500 kHz; and

.5 the maritime mobile service in the bands between 415 kHz and 535 kHz‡ and between 1,605 kHz and 4,000 kHz.

2 Each Contracting Government undertakes to provide the Organization with pertinent information concerning the shore-based facilities in the maritime mobile service, mobile-satellite service and Maritime Mobile-Satellite Service, established for sea areas which it has designated off its coasts.§

* 1 Each Contracting Government is not required to provide all radiocommunication services.
2 The requirements should be specified for shore-based facilities to cover the various sea areas.

† Refer to resolution A.801(19) concerning provision of radio services for the global maritime distress and safety system (GMDSS).

‡ Refer to resolution A.617(15) concerning implementation of the NAVTEX system as a component of the World-Wide Navigational Warning Service.

§ The Master Plan of shore-based facilities for the GMDSS based on information provided by Contracting Governments is circulated to all concerned by means of GMDSS circulars.

Part C
Ship requirements

Regulation 6
Radio installations

1 Every ship shall be provided with radio installations capable of complying with the functional requirements prescribed by regulation 4 throughout its intended voyage and, unless exempted under regulation 3, complying with the requirements of regulation 7 and, as appropriate for the sea area or areas through which it will pass during its intended voyage, the requirements of either regulation 8, 9, 10 or 11.

2 Every radio installation shall:

.1 be so located that no harmful interference of mechanical, electrical or other origin affects its proper use, and so as to ensure electromagnetic compatibility and avoidance of harmful interaction with other equipment and systems;

.2 be so located as to ensure the greatest possible degree of safety and operational availability;

.3 be protected against harmful effects of water, extremes of temperature and other adverse environmental conditions;

.4 be provided with reliable, permanently arranged electrical lighting, independent of the main and emergency sources of electrical power, for the adequate illumination of the radio controls for operating the radio installation; and

.5 be clearly marked with the call sign, the ship station identity and other codes as applicable for the use of the radio installation.

3 Control of the VHF radiotelephone channels, required for navigational safety, shall be immediately available on the navigation bridge convenient to the conning position and, where necessary, facilities should be available to permit radiocommunications from the wings of the navigation bridge. Portable VHF equipment may be used to meet the latter provision.

4 In passenger ships, a distress panel shall be installed at the conning position. This panel shall contain either one single button which, when pressed, initiates a distress alert using all radiocommunication installations required on board for that purpose or one button for each individual installation. The panel shall clearly and visually indicate whenever any button or buttons have been pressed. Means shall be provided to prevent

inadvertent activation of the button or buttons. If the satellite EPIRB is used as the secondary means of distress alerting and is not remotely activated, it shall be acceptable to have an additional EPIRB installed in the wheelhouse near the conning position.

5 In passenger ships, information on the ship's position shall be continuously and automatically provided to all relevant radiocommunication equipment to be included in the initial distress alert when the button or buttons on the distress panel is pressed.

6 In passenger ships, a distress alarm panel shall be installed at the conning position. The distress alarm panel shall provide visual and aural indication of any distress alert or alerts received on board and shall also indicate through which radiocommunication service the distress alerts have been received.

Regulation 7

Radio equipment: General

1 Every ship shall be provided with:

.1 a VHF radio installation capable of transmitting and receiving:

.1.1 DSC on the frequency 156.525 MHz (channel 70). It shall be possible to initiate the transmission of distress alerts on channel 70 from the position from which the ship is normally navigated;* and

.1.2 radiotelephony on the frequencies 156.300 MHz (channel 6), 156.650 MHz (channel 13) and 156.800 MHz (channel 16);

.2 a radio installation capable of maintaining a continuous DSC watch on VHF channel 70 which may be separate from, or combined with, that required by subparagraph 1.1;*

.3 a radar transponder capable of operating in the 9 GHz band, which:

.3.1 shall be so stowed that it can be easily utilized; and

.3.2 may be one of those required by regulation III/6.2.2 for a survival craft;

.4 a receiver capable of receiving international NAVTEX service broadcasts if the ship is engaged on voyages in any area in which an international NAVTEX service is provided;

.5 a radio facility for reception of maritime safety information by the INMARSAT enhanced group calling system† if the ship is

* Certain ships may be exempted from this requirement (see regulation 9.4).

† Refer to resolution A.701(17) concerning carriage of INMARSAT enhanced group call SafetyNET receivers under the GMDSS.

engaged on voyages in any area of INMARSAT coverage but in which an international NAVTEX service is not provided. However, ships engaged exclusively on voyages in areas where an HF direct-printing telegraphy maritime safety information service is provided and fitted with equipment capable of receiving such service, may be exempt from this requirement.*

.6 subject to the provisions of regulation 8.3, a satellite emergency position-indicating radio beacon (satellite EPIRB)† which shall be:

.6.1 capable of transmitting a distress alert either through the polar orbiting satellite service operating in the 406 MHz band or, if the ship is engaged only on voyages within INMARSAT coverage, through the INMARSAT geostationary satellite service operating in the 1.6 GHz band;‡

.6.2 installed in an easily accessible position;

.6.3 ready to be manually released and capable of being carried by one person into a survival craft;

.6.4 capable of floating free if the ship sinks and of being automatically activated when afloat; and

.6.5 capable of being activated manually.

2 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee, every ship shall, in addition, be fitted with a radio installation consisting of a radiotelephone distress frequency watch receiver capable of operating on 2,182 kHz.§

3 Until 1 February 1999, every ship shall, unless the ship is engaged on voyages in sea area A1 only, be fitted with a device for generating the radiotelephone alarm signal on the frequency 2,182 kHz. ¶

4 The Administration may exempt ships constructed on or after 1 February 1997 from the requirements prescribed by paragraphs 2 and 3.

5 Every passenger ship shall be provided with means for two-way on-scene radiocommunications for search and rescue purposes using the aeronautical frequencies 121.5 MHz and 123.1 MHz from the position from which the ship is normally navigated.

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

† Refer to resolution A.616(15) concerning search and rescue homing capability.

‡ Subject to the availability of appropriate receiving and processing ground facilities for each ocean region covered by Inmarsat satellites.

§ The Maritime Safety Committee, at its sixty-eighth session (28 May to 6 June 1997), decided that watchkeeping by GMDSS ships on the frequency 2182 kHz should cease from 1 February 1999.

¶ Refer to resolution A.421(XI) concerning operational standards for radiotelephone alarm signal generators adopted by the Organization.

Regulation 8
Radio equipment: Sea area A1

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages exclusively in sea area A1 shall be provided with a radio installation capable of initiating the transmission of ship-to-shore distress alerts from the position from which the ship is normally navigated, operating either:

.1 on VHF using DSC; this requirement may be fulfilled by the EPIRB prescribed by paragraph 3, either by installing the EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.2 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3 if the ship is engaged on voyages within coverage of MF coast stations equipped with DSC, on MF using DSC; or

.4 on HF using DSC; or

.5 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.5.1 an INMARSAT ship earth station;* or

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

2 The VHF radio installation, required by regulation 7.1.1, shall also be capable of transmitting and receiving general radiocommunications using radiotelephony.

3 Ships engaged on voyages exclusively in sea area A1 may carry, in lieu of the satellite EPIRB required by regulation 7.1.6, an EPIRB which shall be:

.1 capable of transmitting a distress alert using DSC on VHF channel 70 and providing for locating by means of a radar transponder operating in the 9 GHz band;

.2 installed in an easily accessible position;

.3 ready to be manually released and capable of being carried by one person into a survival craft;

* This requirement can be met by Inmarsat ship earth stations capable of two-way communications, such as Inmarsat-A, Inmarsat-B (resolution A.808(19)) or Inmarsat-C (resolution A.807(19)) ship earth stations. Unless otherwise specified, this footnote applies to all requirements for an Inmarsat ship earth station prescribed by this chapter.

.4 capable of floating free if the ship sinks and being automatically activated when afloat; and

.5 capable of being activated manually.

Regulation 9
Radio equipment: Sea areas A1 and A2

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea area A1, but remaining within sea area A2, shall be provided with:

.1 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:

.1.1 2,187.5 kHz using DSC; and

.1.2 2,182 kHz using radiotelephony;

.2 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from, or combined with, that required by subparagraph .1.1; and

.3 means of initiating the transmission of ship-to-shore distress alerts by a radio service other than MF operating either:

.3.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3.2 on HF using DSC; or

.3.3 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.3.3.1 the equipment specified in paragraph 3.2; or

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

2 It shall be possible to initiate transmission of distress alerts by the radio installations specified in paragraphs 1.1 and 1.3 from the position from which the ship is normally navigated.

3 The ship shall, in addition, be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by either:

.1 a radio installation operating on working frequencies in the bands between 1,605 kHz and 4,000 kHz or between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the

addition of this capability in the equipment required by paragraph 1.1; or

.2 an INMARSAT ship earth station.

4 The Administration may exempt ships constructed before 1 February 1997, which are engaged exclusively on voyages within sea area A2, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 10

Radio equipment: Sea areas A1, A2 and A3

1 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of paragraph 2, be provided with:

.1 an INMARSAT ship earth station capable of:

.1.1 transmitting and receiving distress and safety communications using direct-printing telegraphy;

.1.2 initiating and receiving distress priority calls;

.1.3 maintaining watch for shore-to-ship distress alerts, including those directed to specifically defined geographical areas;

.1.4 transmitting and receiving general radiocommunications, using either radiotelephony or direct-printing telegraphy; and

.2 an MF radio installation capable of transmitting and receiving, for distress and safety purposes, on the frequencies:

.2.1 2,187.5 kHz using DSC; and

.2.2 2,182 kHz using radiotelephony; and

.3 a radio installation capable of maintaining a continuous DSC watch on the frequency 2,187.5 kHz which may be separate from or combined with that required by subparagraph .2.1; and

.4 means of initiating the transmission of ship-to-shore distress alerts by a radio service operating either:

.4.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.4.2 on HF using DSC; or

.4.3 through the INMARSAT geostationary satellite service, by an additional ship earth station or by the satellite EPIRB required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated;

2 In addition to meeting the requirements of regulation 7, every ship engaged on voyages beyond sea areas A1 and A2, but remaining within sea area A3, shall, if it does not comply with the requirements of paragraph 1, be provided with:

.1 an MF/HF radio installation capable of transmitting and receiving, for distress and safety purposes, on all distress and safety frequencies in the bands between 1,605 kHz and 4,000 kHz and between 4,000 kHz and 27,500 kHz:

.1.1 using DSC;

.1.2 using radiotelephony; and

.1.3 using direct-printing telegraphy; and

.2 equipment capable of maintaining DSC watch on 2,187.5 kHz, 8,414.5 kHz and on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz; at any time, it shall be possible to select any of these DSC distress and safety frequencies. This equipment may be separate from, or combined with, the equipment required by subparagraph .1; and

.3 means of initiating the transmission of ship-to-shore distress alerts by a radiocommunication service other than HF operating either:

.3.1 through the polar orbiting satellite service on 406 MHz; this requirement may be fulfilled by the satellite EPIRB, required by regulation 7.1.6, either by installing the satellite EPIRB close to, or by remote activation from, the position from which the ship is normally navigated; or

.3.2 through the INMARSAT geostationary satellite service; this requirement may be fulfilled by:

.3.2.1 an INMARSAT ship earth station; or

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

.4 in addition, ships shall be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by an MF/HF radio installation operating on working frequencies in the bands between 1,605 kHz and

4,000 kHz and between 4,000 kHz and 27,500 kHz. This requirement may be fulfilled by the addition of this capability in the equipment required by subparagraph .1.

3 It shall be possible to initiate transmission of distress alerts by the radio installations specified in paragraphs 1.1, 1.2, 1.4, 2.1 and 2.3 from the position from which the ship is normally navigated.

4 The Administration may exempt ships constructed before 1 February 1997, and engaged exclusively on voyages within sea areas A2 and A3, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 11
Radio equipment: Sea areas A1, A2, A3 and A4

1 In addition to meeting the requirements of regulation 7, ships engaged on voyages in all sea areas shall be provided with the radio installations and equipment required by regulation 10.2, except that the equipment required by regulation 10.2.3.2 shall not be accepted as an alternative to that required by regulation 10.2.3.1, which shall always be provided. In addition, ships engaged on voyages in all sea areas shall comply with the requirements of regulation 10.3.

2 The Administration may exempt ships constructed before 1 February 1997, and engaged exclusively on voyages within sea areas A2, A3 and A4, from the requirements of regulations 7.1.1.1 and 7.1.2 provided such ships maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 12
Watches

1 Every ship, while at sea, shall maintain a continuous watch:

.1 on VHF DSC channel 70, if the ship, in accordance with the requirements of regulation 7.1.2, is fitted with a VHF radio installation;

.2 on the distress and safety DSC frequency 2,187.5 kHz, if the ship, in accordance with the requirements of regulation 9.1.2 or 10.1.3, is fitted with an MF radio installation;

.3 on the distress and safety DSC frequencies 2,187.5 kHz and 8,414.5 kHz and also on at least one of the distress and safety

DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz, appropriate to the time of day and the geographical position of the ship, if the ship, in accordance with the requirements of regulation 10.2.2 or 11.1, is fitted with an MF/HF radio installation. This watch may be kept by means of a scanning receiver;

.4 for satellite shore-to-ship distress alerts, if the ship, in accordance with the requirements of regulation 10.1.1, is fitted with an INMARSAT ship earth station.

2 Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating.

3 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee,* every ship while at sea shall maintain, when practicable, a continuous listening watch on VHF channel 16. This watch shall be kept at the position from which the ship is normally navigated.

4 Until 1 February 1999 or until such other date as may be determined by the Maritime Safety Committee,† every ship required to carry a radiotelephone watch receiver shall maintain, while at sea, a continuous watch on the radiotelephone distress frequency 2,182 kHz. This watch shall be kept at the position from which the ship is normally navigated.

Regulation 13
Sources of energy

1 There shall be available at all times, while the ship is at sea, a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installations.

2 A reserve source or sources of energy shall be provided on every ship, to supply radio installations, for the purpose of conducting distress and safety radiocommunications, in the event of failure of the ship's main and emergency sources of electrical power. The reserve source or sources of energy shall be capable of simultaneously operating the VHF radio installation required by regulation 7.1.1 and, as appropriate for the sea area or sea areas for which the ship is equipped, either the MF radio installation

* The Maritime Safety Committee decided (resolution MSC.77(69)) that all GMDSS ships, while at sea, shall continue to maintain, when practicable, continuous listening watch on VHF channel 16 until 1 February 2005.

† The Maritime Safety Committee, at its sixty-eighth session (28 May to 6 June 1997), decided that watchkeeping by GMDSS ships on the frequency 2182 kHz should cease from 1 February 1999.

required by regulation 9.1.1, the MF/HF radio installation required by regulation 10.2.1 or 11.1, or the INMARSAT ship earth station required by regulation 10.1.1 and any of the additional loads mentioned in paragraphs 4, 5 and 8 for a period of at least:

.1 1 h on ships provided with an emergency source of electrical power, if such source of power complies fully with all relevant provisions of regulation II-1/42 or 43, including the supply of such power to the radio installations; and

.2 6 h on ships not provided with an emergency source of electrical power complying fully with all relevant provisions of regulation II-1/42 or 43, including the supply of such power to the radio installations.*

The reserve source or sources of energy need not supply independent HF and MF radio installations at the same time.

3 The reserve source or sources of energy shall be independent of the propelling power of the ship and the ship's electrical system.

4 Where, in addition to the VHF radio installation, two or more of the other radio installations, referred to in paragraph 2, can be connected to the reserve source or sources of energy, they shall be capable of simultaneously supplying, for the period specified, as appropriate, in paragraph 2.1 or 2.2, the VHF radio installation and:

.1 all other radio installations which can be connected to the reserve source or sources of energy at the same time; or

.2 whichever of the other radio installations will consume the most power, if only one of the other radio installations can be connected to the reserve source or sources of energy at the same time as the VHF radio installation.

5 The reserve source or sources of energy may be used to supply the electrical lighting required by regulation 6.2.4.

6 Where a reserve source of energy consists of a rechargeable accumulator battery or batteries:

.1 a means of automatically charging such batteries shall be provided which shall be capable of recharging them to minimum capacity requirements within 10 h; and

* For guidance, the following formula is recommended for determining the electrical load to be supplied by the reserve source of energy for each radio installation required for distress conditions: 1/2 of the current consumption necessary for transmission + the current consumption necessary for reception + the current consumption of any additional loads.

.2 the capacity of the battery or batteries shall be checked, using an appropriate method,* at intervals not exceeding 12 months, when the ship is not at sea.

7 The siting and installation of accumulator batteries which provide a reserve source of energy shall be such as to ensure:

.1 the highest degree of service;

.2 a reasonable lifetime;

.3 reasonable safety;

.4 that battery temperatures remain within the manufacturer's specifications whether under charge or idle; and

.5 that when fully charged, the batteries will provide at least the minimum required hours of operation under all weather conditions.

8 If an uninterrupted input of information from the ship's navigational or other equipment to a radio installation required by this chapter is needed to ensure its proper performance, means shall be provided to ensure the continuous supply of such information in the event of failure of the ship's main or emergency source of electrical power.

Regulation 14
Performance standards

1 All equipment to which this chapter applies shall be of a type approved by the Administration. Subject to paragraph 2, such equipment shall conform to appropriate performance standards not inferior to those adopted by the Organization.†

* One method of checking the capacity of an accumulator battery is to fully discharge and recharge the battery, using normal operating current and period (e.g. 10 h). Assessment of the charge condition can be made at any time, but it should be done without significant discharge of the battery when the ship is at sea.

† Refer to the following resolutions adopted by the Assembly of the Organization:

.1 Resolution A.525(13): Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships.

.2 Resolution A.694(17): General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids.

.3 Resolution A.808(19): Performance standards for ship earth stations capable of two-way communications and resolution A.570(14): Type approval of ship earth stations.

.4 Resolution A.803(19): Performance standards for shipborne VHF radio installations capable of voice communication and digital selective calling, as amended, and resolution MSC.68(68), annex 1 (valid for equipment installed on or after 1 January 2000). *(continued on following page)*

2 Equipment installed prior to the dates of application prescribed by regulation 1 may be exempted from full compliance with the appropriate performance standards at the discretion of the Administration, provided that the equipment is compatible with equipment complying with the performance standards, having due regard to the criteria which the Organization may adopt in connection with such standards.

Regulation 15

Maintenance requirements

1 Equipment shall be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

2 Where applicable, equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

.5 Resolution A.804(19): Performance standards for shipborne MF radio installations capable of voice communication and digital selective calling, as amended, and resolution MSC.68(68), annex 2 (valid for equipment installed on or after 1 January 2000).

.6 Resolution A.806(19): Performance standards for shipborne MF/HF radio installations capable of voice communication, narrow-band direct-printing and digital selective calling, as amended, and resolution MSC.68(68), annex 3 (valid for equipment installed on or after 1 January 2000).

.7 Resolution A.810(19): Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz (see also Assembly resolution A.696(17): Type approval of satellite emergency position-indicating radio beacons (EPIRBs) operating in the COSPAS–SARSAT system).

.8 Resolution A.802(19): Performance standards for survival craft radar transponders for use in search and rescue operations.

.9 Resolution A.805(19): Performance standards for float-free VHF emergency position-indicating radio beacons.

.10 Resolution A.807(19): Performance standards for Inmarsat-C ship earth stations capable of transmitting and receiving direct-printing communications, as amended, and resolution MSC.68(68), annex 3 (valid for equipment installed on or after 1 January 2000), and resolution A.570(14): Type approval of ship earth stations.

.11 Resolution A.664(16): Performance standards for enhanced group call equipment.

.12 Resolution A.812(19): Performance standards for float-free satellite emergency position-indicating radio beacons operating through the geostationary Inmarsat satellite system on 1.6 GHz.

.13 Resolution A.662(16): Performance standards for float-free release and activation arrangements for emergency radio equipment.

.14 Resolution A.699(17): System performance standard for the promulgation and co-ordination of maritime safety information using high-frequency narrow-band direct printing.

.15 Resolution A.700(17): Performance standards for narrow-band direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (MSI) by HF.

.16 Resolution A.811(19): Performance standards for a shipborne integrated radiocommunication system (IRCS) when used in the GMDSS.

.17 Resolution MSC.80(70), annex 1: Performance standards for on-scene (aeronautical) two-way portable VHF radiotelephone apparatus.

2 Where applicable, equipment shall be so constructed and installed that it is readily accessible for inspection and on-board maintenance purposes.

3 Adequate information shall be provided to enable the equipment to be properly operated and maintained, taking into account the recommendations of the Organization.*

4 Adequate tools and spares shall be provided to enable the equipment to be maintained.

5 The Administration shall ensure that radio equipment required by this chapter is maintained to provide the availability of the functional requirements specified in regulation 4 and to meet the recommended performance standards of such equipment.

6 On ships engaged on voyages in sea areas A1 and A2, the availability shall be ensured by using such methods as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, or a combination of these, as may be approved by the Administration.

7 On ships engaged on voyages in sea areas A3 and A4, the availability shall be ensured by using a combination of at least two methods such as duplication of equipment, shore-based maintenance or at-sea electronic maintenance capability, as may be approved by the Administration, taking into account the recommendations of the Organization.†

8 While all reasonable steps shall be taken to maintain the equipment in efficient working order to ensure compliance with all the functional requirements specified in regulation 4, malfunction of the equipment for providing the general radiocommunications required by regulation 4.8 shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available, provided the ship is capable of performing all distress and safety functions.

Regulation 16
Radio personnel

1 Every ship shall carry personnel qualified for distress and safety radiocommunication purposes to the satisfaction of the Administration.‡ The personnel shall be holders of certificates specified in the Radio

* Refer to the Recommendation on general requirements for shipborne radio equipment forming part of the global maritime distress and safety system and for electronic navigational aids adopted by the Organization by resolution A.694(17) and to resolution A.813(19) on general requirements for electromagnetic compatibility (EMC) for all electrical and electronic ship's equipment.

† Refer to resolution A.702(17) concerning radio maintenance guidelines for the global maritime distress and safety system related to sea areas A3 and A4.

‡ Refer to the STCW Code, chapter IV, section B-IV/2.

Regulations as appropriate, any one of whom shall be designated to have primary responsibility for radiocommunications during distress incidents.

2 In passenger ships, at least one person qualified in accordance with paragraph 1 shall be assigned to perform only radiocommunication duties during distress incidents.

Regulation 17
Radio records

A record shall be kept, to the satisfaction of the Administration and as required by the Radio Regulations, of all incidents connected with the radiocommunication service which appear to be of importance to safety of life at sea.

CHAPTER V
Safety of navigation

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Regulation 1
Application

This chapter, unless otherwise expressly provided in this chapter, applies to all ships on all voyages, except ships of war and ships solely navigating the Great Lakes of North America and their connecting and tributary waters as far east as the lower exit of the St Lambert Lock at Montreal in the Province of Quebec, Canada.

Regulation 2
Danger messages

(a) The master of every ship which meets with dangerous ice, a dangerous derelict, or any other direct danger to navigation, or a tropical storm, or encounters sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures, or winds of force 10 or above on the Beaufort scale for which no storm warning has been received, is bound to communicate the information by all the means at his disposal to ships in the vicinity, and also to the competent authorities at the first point on the coast with which he can communicate. The form in which the information is sent is not obligatory. It may be transmitted either in plain language (preferably English) or by means of the International Code of Signals. It should be broadcast to all ships in the vicinity and sent to the first point on the coast to which communication can be made, with a request that it be transmitted to the appropriate authorities.

(b) Each Contracting Government will take all steps necessary to ensure that when intelligence of any of the dangers specified in paragraph (a) of this regulation is received, it will be promptly brought to the knowledge of those concerned and communicated to other interested Governments.

(c) The transmission of messages respecting the dangers specified is free of cost to the ships concerned.

(d) All radio messages issued under paragraph (a) of this regulation shall be preceded by the safety signal, using the procedure as prescribed by the Radio Regulations as defined in regulation 2 of chapter IV.

Regulation 3
Information required in danger messages

The following information is required in danger messages:

(a) *Ice, derelicts and other direct dangers to navigation*

- **(i)** The kind of ice, derelict or danger observed.
- **(ii)** The position of the ice, derelict or danger when last observed.

(iii) The time and date (Universal Co-ordinated Time) when danger last observed.

(b) *Tropical storms*[*]

(i) A statement that a tropical storm has been encountered. This obligation should be interpretated in a broad spirit, and information transmitted whenever the master has good reason to believe that a tropical storm is developing or exists in the neighbourhood.

(ii) Time, date (Universal Co-ordinated Time) and position of ship when the observation was taken.

(iii) As much of the following information as is practicable should be included in the message:

- barometric pressure,[†] preferably corrected (stating millibars, millimetres, or inches, and whether corrected or uncorrected);
- barometric tendency (the change in barometric pressure during the past three hours);
- true wind direction;
- wind force (Beaufort scale);
- state of the sea (smooth, moderate, rough, high);
- swell (slight, moderate, heavy) and the true direction from which it comes. Period or length of swell (short, average, long) would also be of value;
- true course and speed of ship.

(c) *Subsequent observations*

When a master has reported a tropical or other dangerous storm, it is desirable but not obligatory, that further observations be made and transmitted hourly, if practicable, but in any case at intervals of not more than three hours, so long as the ship remains under the influence of the storm.

(d) *Winds of force 10 or above on the Beaufort scale for which no storm warning has been received*

This is intended to deal with storms other than the tropical storms referred to in paragraph (b) of this regulation; when such a storm is encountered, the message should contain similar information to that listed under the paragraph but excluding the details concerning sea and swell.

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[*] *Tropical cyclone* is the most common generic term used by national meteorological services. The terms *hurricane, typhoon, severe cyclonic storm*, etc. are also used, depending on the geographical location, with particular reference to the most severe storms.

[†] The standard international unit for barometric pressure is the hectopascal (hPa), which is numerically equivalent to the millibar (mbar).

(e) *Sub-freezing air temperatures associated with gale force winds causing severe ice accretion on superstructures*

(i) Time and date (Universal Co-ordinated Time).

(ii) Air temperature.

(iii) Sea temperature (if practicable).

(iv) Wind force and direction.

Examples

Ice

TTT ICE. LARGE BERG SIGHTED IN 4506 N, 4410 W, AT 0800 UTC. MAY 15.

Derelicts

TTT DERELICT. OBSERVED DERELICT ALMOST SUBMERGED IN 4006 N, 1243 W, AT 1630 UTC. APRIL 21.

Danger to navigation

TTT NAVIGATION. ALPHA LIGHTSHIP NOT ON STATION. 1800 UTC. JANUARY 3.

Tropical storm

TTT STORM. 0030 UTC. AUGUST 18. 2004 N, 11354 E. BAROMETER CORRECTED 994 MILLIBARS, TENDENCY DOWN 6 MILLIBARS. WIND NW, FORCE 9, HEAVY SQUALLS. HEAVY EASTERLY SWELL. COURSE 067, 5 KNOTS.

TTT STORM. APPEARANCES INDICATE APPROACH OF HURRICANE. 1300 UTC. SEPTEMBER 14. 2200 N, 7236 W. BAROMETER CORRECTED 29.64 INCHES, TENDENCY DOWN .015 INCHES. WIND NE, FORCE 8, FREQUENT RAIN SQUALLS. COURSE 035, 9 KNOTS.

TTT STORM. CONDITIONS INDICATE INTENSE CYCLONE HAS FORMED. 0200 UTC. MAY 4. 1620 N, 9203 E. BAROMETER UNCORRECTED 753 MILLIMETRES, TENDENCY DOWN 5 MILLIMETRES. WIND S BY W, FORCE 5. COURSE 300, 8 KNOTS.

TTT STORM. TYPHOON TO SOUTHEAST. 0300 UTC. JUNE 12. 1812 N, 12605 E. BAROMETER FALLING RAPIDLY. WIND INCREASING FROM N. TTT STORM. WIND FORCE 11, NO STORM WARNING RECEIVED. 0300 UTC. MAY 4. 4830 N, 30 W. BAROMETER CORRECTED 983 MILLIBARS, TENDENCY DOWN 4 MILLIBARS. WIND SW, FORCE 11 VEERING. COURSE 260, 6 KNOTS.

Icing

TTT EXPERIENCING SEVERE ICING. 1400 UTC. MARCH 2. 69 N, 10 W. AIR TEMPERATURE 18. SEA TEMPERATURE 29. WIND NE, FORCE 8.

Regulation 4
Meteorological services

(a) The Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation.* Administrations shall encourage the use of instruments of a high degree of accuracy, and shall facilitate the checking of such instruments upon request.

(b) In particular, the Contracting Governments undertake to co-operate in carrying out, as far as practicable, the following meteorological arrangements.

(i) To warn ships of gales, storms and tropical storms, both by the issue of radio messages and by the display of appropriate signals at coastal points.

(ii) To issue twice daily, by radio,† weather bulletins suitable for shipping, containing data of existing weather, waves and ice, forecasts and, when practicable, sufficient additional information to enable simple weather charts to be prepared at sea and also to encourage the transmission of suitable facsimile weather charts.

(iii) To prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea and to arrange, if practicable, for the publication and making available of daily weather charts for the information of departing ships.

(iv) To arrange for selected ships to be equipped with tested instruments (such as a barometer, a barograph, a psychrometer, and suitable apparatus for measuring sea temperature) for use in this service, and to take meteorological observations at main standard times for surface synoptic observations (at least four times daily, whenever circumstances permit) and to encourage other ships to take observations in a modified form, particularly when in areas where shipping is sparse; these ships to transmit their observations by radio for the benefit of the various official meteorological services, repeating the information for the benefit of ships in the vicinity. When in the vicinity of a tropical storm, or of a suspected tropical storm, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions.

* Refer to resolution A.528(13), Recommendation on weather routeing.

† Refer to regulations IV/7.1.4 and IV/7.1.5 of the 1988 amendments to the 1974 SOLAS Convention concerning radiocommunications for the Global Maritime Distress and Safety System.

(v) To arrange for the reception and transmission by coast radio stations of weather messages from and to ships. Ships which are unable to communicate direct with shore shall be encouraged to relay their weather messages through ocean weather ships or through other ships which are in contact with shore.

(vi) To encourage all masters to inform ships in the vicinity and also shore stations whenever they experience a wind speed of 50 knots or more (force 10 on the Beaufort scale).

(vii) To endeavour to obtain a uniform procedure in regard to the international meteorological services already specified, and, as far as is practicable, to conform to the technical regulations and recommendations made by the World Meteorological Organization, to which the Contracting Governments may refer for study and advice any meteorological question which may arise in carrying out the present Convention.

(c) The information provided for in this regulation shall be furnished in form for transmission and transmitted in the order of priority prescribed by the Radio Regulations, and during transmission "to all stations" of meteorologicial information, forecasts and warnings, all ship stations must conform to the provisions of the Radio Regulations.

(d) Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the Contracting Governments concerned.

Regulation 5

Ice patrol service

(a) The Contracting Governments undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season the south-eastern, southern and south-western limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

(b) Ships and aircraft used for the ice patrol service and the study and observation of ice conditions may be assigned other duties by the managing Government, provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

Regulation 6
Ice patrol: management and cost

(a) The Government of the United States of America agrees to continue the management of the ice patrol service and the study and observation of ice conditions, including the dissemination of information received therefrom. The Contracting Governments specially interested in these services undertake to contribute to the expense of maintaining and operating these services; each contribution to be based upon the total gross tonnage of the vessels of each contributing Government passing through the regions of icebergs guarded by the ice patrol; in particular, each Contracting Government specially interested undertakes to contribute annually to the expense of maintaining and operating these services a sum determined by the ratio which the total gross tonnage of that Contracting Government's vessels passing during the ice season through the regions of icebergs guarded by the ice patrol bears to the combined total gross tonnage of the vessels of all contributing Governments passing during the ice season through the regions of icebergs guarded by the ice patrol. Non-contracting Governments specially interested may contribute to the expense of maintaining and operating these services on the same basis. The managing Government will furnish annually to each contributing Government a statement of the total cost of maintaining and operating the ice patrol and of the proportionate share of each contributing Government.

(b) Each of the contributing Governments has the right to alter or discontinue its contribution, and other interested Governments may undertake to contribute to the expense. The contributing Government which avails itself of this right will continue to be responsible for its current contribution up to 1 September following the date of giving notice of intention to alter or discontinue its contribution. To take advantage of the said right it must give notice to the managing Government at least six months before the said 1 September.

(c) If, at any time, the United States Government should desire to discontinue these services, or if one of the contributing Governments should express a wish to relinquish responsibility for its pecuniary contribution, or to have its contribution altered, or another Contracting Government should desire to undertake to contribute to the expense, the contributing Governments shall settle the question in accordance with their mutual interests.

(d) The contributing Governments shall have the right by common consent to make from time to time such alterations in the provisions of this regulation and of regulation 5 of this chapter as appear desirable.

(e) Where this regulation provides that a measure may be taken after agreement among the contributing Governments, proposals made by any Contracting Government for effecting such a measure shall be commu-

nicated to the managing Government which shall approach the other contributing Governments with a view to ascertaining whether they accept such proposals, and the results of the enquiries thus made shall be sent to the other contributing Governments and the Contracting Government making the proposals. In particular, the arrangements relating to contributions to the cost of the services shall be reviewed by the contributing Governments at intervals not exceeding three years. The managing Government shall initiate the action necessary to this end.

Regulation 7
Speed near ice

When ice is reported on or near his course the master of every ship at night is bound to proceed at a moderate speed or to alter his course so as to go well clear of the danger zone.

Regulation 8
Ships' routeing

(a) Ships' routeing systems contribute to safety of life at sea, safety and efficiency of navigation, and/or protection of the marine environment. Ships' routeing systems are recommended for use by, and may be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization.*

(b) The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ships' routeing systems. Contracting Governments shall refer proposals for the adoption of ships' routeing systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ships' routeing systems.

(c) This regulation, and its associated guidelines and criteria, does 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, such ships are encouraged to participate in ships' routeing systems adopted in accordance with this regulation.

* Refer to the General provisions on ships' routeing adopted by the Organization by resolution A.572(14), as amended.

(d) The initiation of action for establishing a ships' routeing system is the responsibility of the Government or Governments concerned. In developing such systems for adoption by the Organization, the guidelines and criteria developed by the Organization* shall be taken into account.

(e) Ships' routeing systems should be submitted to the Organization for adoption. However, a Government or Governments implementing ships' routeing systems not intended to be submitted to the Organization for adoption or which have not been adopted by the Organization are encouraged to follow, wherever possible, the guidelines and criteria developed by the Organization.*

(f) Where two or more Governments have a common interest in a particular area, they should formulate joint proposals for the delineation and use of a routeing system therein on the basis of an agreement between them. Upon receipt of such proposal and before proceeding with the consideration of it for adoption, the Organization shall ensure details of the proposal are disseminated to the Governments which have a common interest in the area, including countries in the vicinity of the proposed ships' routeing system.

(g) Contracting Governments shall adhere to the measures adopted by the Organization concerning ships' routeing. They shall promulgate all information necessary for the safe and effective use of adopted ships' routeing systems. A Government or Governments concerned may monitor traffic in those systems. Contracting Governments will do everything in their power to secure the appropriate use of ships' routeing systems adopted by the Organization.

(h) A ship shall use a mandatory ships' routeing system adopted by the Organization as required for its category or cargo carried and in accordance with the relevant provisions in force unless there are compelling reasons not to use a particular ships' routeing system. Any such reason shall be recorded in the ship's log.

(i) Mandatory ships' routeing systems shall be reviewed by the Contracting Government or Governments concerned in accordance with the guidelines and criteria developed by the Organization.*

(j) All adopted ships' routeing systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the 1982 United Nations Convention on the Law of the Sea.

(k) Nothing in this regulation nor its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regime of international straits.

* Refer to the General provisions on ships' routeing adopted by the Organization by resolution A.572(14), as amended.

Regulation 8-1
Ship reporting systems

(a) Ship reporting systems contribute to safety of life at sea, safety and efficiency of navigation, and protection of the marine environment. A ship reporting system, when adopted and implemented in accordance with the guidelines and criteria developed by the Organization* pursuant to this regulation, shall be used by all ships, or certain categories of ships or ships carrying certain cargoes in accordance with the provisions of each system so adopted.

(b) The Organization is recognized as the only international body for developing guidelines, criteria and regulations on an international level for ship reporting systems. Contracting Governments shall refer proposals for the adoption of ship reporting systems to the Organization. The Organization will collate and disseminate to Contracting Governments all relevant information with regard to any adopted ship reporting system.

(c) This regulation and its associated guidelines and criteria do not apply to any warship, naval auxiliary or other vessel owned or operated by a Contracting Government and used, for the time being, only on government non-commercial service; however, such ships are encouraged to participate in ship reporting systems that have been adopted in accordance with this regulation.

(d) The initiation of action for establishing a ship reporting system is the responsibility of the Government or Governments concerned. In developing such systems, provisions of the guidelines and criteria developed by the Organization* shall be taken into account.

(e) Ship reporting systems not submitted to the Organization for adoption do not necessarily need to comply with this regulation. However, Governments implementing such systems are encouraged to follow, wherever possible, the guidelines and criteria developed by the Organization.* Contracting Governments may submit such systems to the Organization for recognition.

(f) Where two or more Governments have a common interest in a particular area, they should formulate proposals for a co-ordinated ship reporting system on the basis of agreement between them. Before proceeding with a proposal for adoption of a ship reporting system, the Organization shall disseminate details of the proposal to those Governments

* Refer to the Guidelines and criteria for ship reporting systems adopted by the Maritime Safety Committee of the Organization by resolution MSC.43(64). Refer also to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants adopted by the Organization by resolution A.851(20).

which have a common interest in the area covered by the proposed system. Where a co-ordinated ship reporting system is adopted and established, it shall have uniform procedures and operations.

(g) After adoption of a ship reporting system in accordance with this regulation, the Government or Governments concerned shall take all measures necessary for the promulgation of any information needed for the efficient and effective use of the system. Any adopted ship reporting system shall have the capability of interaction and the ability to assist ships with information when necessary. Such systems shall be operated in accordance with the guidelines and criteria developed by the Organization* pursuant to this regulation.

(h) The master of a ship shall comply with the requirements of adopted ship reporting systems and report to the appropriate authority all information required in accordance with the provisions of each system.

(i) All adopted ship reporting systems and actions taken to enforce compliance with those systems shall be consistent with international law, including the relevant provisions of the United Nations Convention on the Law of the Sea.

(j) Nothing in this regulation or its associated guidelines and criteria shall prejudice the rights and duties of Governments under international law or the legal regime of international straits.

(k) The participation of ships in accordance with the provisions of adopted ship reporting systems shall be free of charge to the ships concerned.

(l) The Organization shall ensure that adopted ship reporting systems are reviewed under the guidelines and criteria developed by the Organization.

Regulation 8-2
Vessel traffic services

1 Vessel traffic services (VTS) contribute to the safety of life at sea, safety and efficiency of navigation and the protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.

2 Contracting Governments undertake to arrange for the establishment of VTSs where, in their opinion, the volume of traffic or the degree of risk justifies such services.

* Refer to the Guidelines and criteria for ship reporting systems adopted by the Maritime Safety Committee of the Organization by resolution MSC.43(64). Refer also to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants adopted by the Organization by resolution A.851(20).

3 Contracting Governments planning and implementing VTSs shall, wherever possible, follow the guidelines developed by the Organization.* The use of a VTS may only be made mandatory in sea areas within the territorial seas of a coastal State.

4 Contracting Governments shall endeavour to secure participation in, and compliance with the provisions of, VTSs by ships entitled to fly their flags.

5 Nothing in this regulation or the guidelines adopted by the Organization shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes.

Regulation 9
Misuse of distress signals

The use of an international distress signal, except for the purpose of indicating that a ship, aircraft or person is in distress, and the use of any signal which may be confused with an international distress signal, are prohibited.

Regulation 10
Distress messages: obligations and procedures

(a) The master of a ship at sea which is in a position to be able to provide assistance, on receiving a signal from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service, that the ship is doing so. If the ship receiving the distress alert is unable or, in the special circumstances of the case, considers it unreasonable or unnecessary to proceed to their assistance, the master must enter in the log-book the reason for failing to proceed to the assistance of the persons in distress and, taking into account the recommendations of the Organization,† inform the appropriate search and rescue service accordingly.

(b) The master of a ship in distress or the search and rescue service concerned, after consultation, so far as may be possible, with the masters of ships which answer the distress alert, has the right to requisition one or more of those ships such as the master of the ship in distress or the search and rescue service considers best able to render assistance, and it shall be the duty of the master or masters of the ship or ships so requisitioned to comply with the requisition by continuing to proceed with all speed to the assistance of persons in distress.

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* Refer to the Guidelines for vessel traffic services adopted by the Organization by resolution A.857(20).

† Refer to the immediate action to be taken by each ship on receipt of a distress message in the IAMSAR Manual, as it may be amended.

(c) Masters of ships shall be released from the obligation imposed by paragraph (a) of this regulation on learning that their ships have not been requisitioned and that one or more other ships have been requisitioned and are complying with the requisition. This decision shall, if possible, be communicated to the other requisitioned ships and to the search and rescue service.

(d) The master of a ship shall be released from the obligation imposed by paragraph (a) of this regulation, and, if the ship has been requisitioned, from the obligation imposed by paragraph (b) of this regulation, on being informed by the persons in distress or by the search and rescue service or by the master of another ship which has reached such persons that assistance is no longer necessary.

(e) The provisions of this regulation do not prejudice the Convention for the Unification of Certain Rules of Law relating to Assistance and Salvage at Sea, signed at Brussels on 23 September 1910, particularly the obligation to render assistance imposed by article 11 of that Convention.

Regulation 10-1
Master's discretion for safe navigation

The master shall not be constrained by the shipowner, charterer or any other person from taking any decision which, in the professional judgement of the master, is necessary for safe navigation, in particular in severe weather and in heavy seas.

Regulation 11
*Signalling lamps**

All ships of over 150 gross tonnage, when engaged on international voyages, shall have on board an efficient daylight signalling lamp which shall not be solely dependent upon the ship's main source of electrical power.

Regulation 12
Shipborne navigational equipment†

(a) For the purpose of this regulation *constructed* in respect of a ship means a stage of construction where:

(i) the keel is laid; or

(ii) construction identifiable with a specific ship begins; or

* Refer to resolution MSC.95(72), Performance standards for daylight signalling lamps.

† See resolution A.156(ES.IV), Recommendation on the carriage of electronic position-fixing equipment, and resolution A.815(19), World-wide radionavigation system.

(iii) assembly of that ship has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material whichever is less.

(b) **(i)** Ships of 150 gross tonnage and upwards shall be fitted with:

(1) a standard magnetic compass, except as provided in subparagraph (iv);

(2) a steering magnetic compass, unless heading information provided by the standard compass required under (1) is made available and is clearly readable by the helmsman at the main steering position;

(3) adequate means of communication between the standard compass position and the normal navigation control position to the satisfaction of the Administration; and

(4) means for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(ii) Each magnetic compass referred to in subparagraph (i) shall be properly adjusted and its table or curve of residual deviations shall be available at all times.

(iii) A spare magnetic compass, interchangeable with the standard compass, shall be carried, unless the steering compass mentioned in subparagraph (i)(2) or a gyro-compass is fitted.

(iv) The Administration, if it considers it unreasonable or unnecessary to require a standard magnetic compass, may exempt individual ships or classes of ships from these requirements if the nature of the voyage, the ship's proximity to land or the type of ship does not warrant a standard compass, provided that a suitable steering compass is in all cases carried.

(c) Ships of less than 150 gross tonnage shall, as far as the Administration considers it reasonable and practicable, be fitted with a steering compass and have means for taking bearings.

(d) Ships of 500 gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a gyro-compass complying with the following requirements:

(i) the master gyro-compass or a gyro repeater shall be clearly readable by the helmsman at the main steering position;

(ii) on ships of 1,600 gross tonnage and upwards a gyro repeater or gyro repeaters shall be provided and shall be suitably placed for taking bearings as nearly as practicable over an arc of the horizon of 360°.

(e) Ships of 1,600 gross tonnage and upwards, constructed before 1 September 1984, when engaged on international voyages, shall be fitted with a gyro-compass complying with the requirements of paragraph (d).

(f) Ships with emergency steering positions shall at least be provided with a telephone or other means of communication for relaying heading information to such positions. In addition, ships of 500 gross tonnage and upwards constructed on or after 1 February 1992 shall be provided with arrangements for supplying visual compass readings to the emergency steering position.

(g) Ships of 500 gross tonnage and upwards constructed on or after 1 September 1984 and ships of 1,600 gross tonnage and upwards constructed before 1 September 1984 shall be fitted with a radar installation. From 1 February 1995, the radar installation shall be capable of operating in the 9 GHz frequency band. In addition, after 1 February 1995, passenger ships irrespective of size and cargo ships of 300 gross tonnage and upwards when engaged on international voyages shall be fitted with a radar installation capable of operating in the 9 GHz frequency band. Passenger ships of less than 500 gross tonnage and cargo ships of 300 gross tonnage and upwards but less than 500 gross tonnage may be exempted from compliance with the requirements of paragraph (r) at the discretion of the Administration, provided that the equipment is fully compatible with the radar transponder for search and rescue.

(h) Ships of 10,000 gross tonnage and upwards shall be fitted with two radar installations, each capable of being operated independently* of the other. From 1 February 1995, at least one of the radar installations shall be capable of operating in the 9 GHz frequency band.

(i) Facilities for plotting radar readings shall be provided on the navigation bridge of ships required by paragraph (g) or (h) to be fitted with a radar installation. In ships of 1,600 gross tonnage and upwards constructed on or after 1 September 1984 the plotting facilities shall be at least as effective as a reflection plotter.

(j) **(i)** An automatic radar plotting aid shall be fitted on;

(1) ships of 10,000 gross tonnage and upwards, constructed on or after 1 September 1984;

(2) tankers constructed before 1 September 1984 as follows:

(aa) if of 40,000 gross tonnage and upwards by 1 January 1985;

(bb) if of 10,000 gross tonnage and upwards but less than 40,000 gross tonnage, by 1 January 1986;

(3) ships constructed before 1 September 1984, that are not tankers, as follows:

* Refer to section 4 of the Recommendation on performance standards for radar equipment adopted by the Organization by resolution A.477(XII) and resolution MSC.64(67), Recommendations on new and amended performance standards (annex 4).

(aa) if of 40,000 gross tonnage and upwards by 1 September 1986;

(bb) if of 20,000 gross tonnage and upwards, but less than 40,000 gross tonnage, by 1 September 1987;

(cc) if of 15,000 gross tonnage and upwards, but less than 20,000 gross tonnage, by 1 September 1988.

(ii) Automatic radar plotting aids fitted prior to 1 September 1984 which do not fully conform to the performance standards adopted by the Organization* may, at the discretion of the Administration, be retained until 1 January 1991.

(iii) The Administration may exempt ships from the requirements of this paragraph, in cases where it considers it unreasonable or unnecessary for such equipment to be carried, or when the ships will be taken permanently out of service within two years of the appropriate implementation date.

(k) When engaged on international voyages ships of 1,600 gross tonnage and upwards constructed before 25 May 1980 and ships of 500 gross tonnage and upwards constructed on or after 25 May 1980 shall be fitted with an echo-sounding device.

(l) When engaged on international voyages ships of 500 gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a device to indicate speed and distance. Ships required by paragraph (j) to be fitted with an automatic radar plotting aid shall be fitted with a device to indicate speed and distance through the water.

(m) Ships of 1,600 gross tonnage and upwards constructed before 1 September 1984 and all ships of 500 gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with indicators showing the rudder angle, the rate of revolution of each propeller and in addition, if fitted with variable pitch propellers or lateral thrust propellers, the pitch and operational mode of such propellers. All these indicators shall be readable from the conning position.

(n) Ships of 100,000 gross tonnage and upwards constructed on or after 1 September 1984 shall be fitted with a rate-of-turn indicator.

(o) Except as provided in regulations I/7(b)(ii), I/8 and I/9, while all reasonable steps shall be taken to maintain the apparatus referred to in paragraphs (d) to (n) in efficient working order, malfunctions of the equipment shall not be considered as making a ship unseaworthy or as a reason for delaying the ship in ports where repair facilities are not readily available.†

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* Refer to the Performance standards for automatic radar plotting aids adopted by the Organization by resolution A.823(19).

† Refer to the Recommendation on the use and testing of shipborne navigational equipment adopted by the Organization by resolution A.157(ES.IV).

(p) When engaged on international voyages, ships of 1,600 gross tonnage and upwards shall be fitted with a radio direction-finding apparatus. The Administration may exempt a ship from this requirement if it considers it unreasonable or unnecessary for such apparatus to be carried or if the ship is provided with other radionavigation equipment suitable for use throughout its intended voyages.

(q) Until 1 February 1999, ships of 1,600 gross tonnage and upwards constructed on or after 25 May 1980 and before 1 February 1995, when engaged on international voyages, shall be fitted with radio equipment for homing on the radiotelephone distress frequency.

(r) All equipment fitted in compliance with this regulation shall be of a type approved by the Administration. Equipment installed on board ships on or after 1 September 1984 shall conform to appropriate performance standards not inferior to those adopted by the Organization.* Equipment

* Refer to the following recommendations adopted by the Organization by the resolutions indicated:

Recommendation on general requirements for shipborne radio equipment forming part of the GMDSS and for electronic navigational aids (resolution A.694(17));

Recommendation on performance standards for magnetic compasses (resolution A.382(X));

Recommendation on performance standards for gyro-compasses (resolution A.424(XI));

Recommendation on performance standards for radar equipment (resolutions A.477(XII) as amended by resolution MSC.64(67), annex 4, A.222(VII) and A.278(VIII));

Performance standards for automatic radar plotting aids (resolution A.823(19));

Recommendation on performance standards for echo-sounding equipment (resolution A.224(VII) as amended by resolution MSC.74(69), annex 2);

Recommendation on performance standards for devices to indicate speed and distance (resolution A.824(19) as amended (resolution MSC.96(72));

Performance standards for rate-of-turn indicators (resolution A.526(13));

Recommendation on unification of performance standards for navigational equipment (resolution A.575(14));

Performance standards for radio direction-finding systems (resolution A.665(16));

Recommendation on performance standards for shipborne receivers for use with differential OMEGA (resolution A.479(XII));

General requirements for electromagnetic compatibility for all electrical and electronic ship's equipment (resolution A.813(19)).

Recommendation on performance standards for shipborne Loran-C and Chayka receivers (resolution A.818(19)).

Recommendation on performance standards for shipborne global positioning system receiver equipment (resolution A.819(19));

Recommendation on performance standards for shipborne GLONASS receiver equipment (resolution MSC.53(66));

Recommendation on performance standards for shipborne DGPS and DGLONASS maritime radio beacon receiver equipment (resolution MSC.64(67), annex 2);

Recommendation on performance standards for combined GPS/GLONASS receiver equipment (resolution MSC.74(69), annex 1);

Recommendation on performance standards for daylight signalling lamps (resolution MSC.95(72)).

Recommendation on methods of measuring noise levels at listening posts (resolution A.343(IX)).

Regarding unification of ARPA signals, see MSC/Circ.563 and IEC Publication 872.

fitted prior to the adoption of related performance standards may be exempted from full compliance with those standards at the discretion of the Administration, having due regard to the recommended criteria which the Organization might adopt in connection with the standards concerned.

(s) A rigidly connected composite unit of a pushing vessel and associated pushed vessel, when designed as a dedicated and integrated tug and barge combination, shall be regarded as a single ship for the purpose of this regulation.

(t) If the application of the requirements of this regulation necessitates structural alterations to a ship constructed before 1 September 1984, the Administration may allow extension of the time limit for fitting the required equipment not later than 1 September 1989, taking into account the first scheduled dry-docking of such a ship required by the present regulations.

(u) Except as provided elsewhere in this regulation, the Administration may grant to individual ships exemptions of a partial or conditional nature, when any such ship is engaged on a voyage where the maximum distance of the ship from the shore, the length and nature of the voyage, the absence of general navigation hazards, and other conditions affecting safety are such as to render the full application of this regulation unreasonable or unnecessary. When deciding whether or not to grant exemptions to an individual ship, the Administration shall have regard to the effect that an exemption may have upon the safety of all other ships.

Regulation 13
Manning

(a) The Contracting Governments undertake, each for its national ships, to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that, from the point of view of safety of life at sea, all ships shall be sufficiently and efficiently manned.*

(b) Every ship to which chapter I of this Convention applies shall be provided with an appropriate safe manning document or equivalent issued by the Administration as evidence of the minimum safe manning considered necessary to comply with the provisions of paragraph (a).

(c) On every passenger ship to which chapter I applies, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's log-book. The company† or the master, as appropriate, shall determine the appropriate working language. Each seafarer

* Refer to the Principles of safe manning adopted by the Organization by resolution A.890(21) and to MSC/Circ.242 on single-handed voyages.

† *Company* means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all the duties and responsibilities imposed by the International Safety Management (ISM) Code.

shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language.

Regulation 14

Aids to navigation

The Contracting Governments undertake to arrange for the establishment and maintenance of such aids to navigation as, in their opinion, the volume of traffic justifies and the degree of risk required, and to arrange for information relating to these aids to be made available to all concerned.*

Regulation 15

Search and rescue

(a) Each Contracting Government undertakes to ensure that any necessary arrangements are made for coast watching and for the rescue of persons in distress at sea round its coasts. These arrangements should include the establishment, operation and maintenance of such maritime safety facilities as are deemed practicable and necessary having regard to the density of the seagoing traffic and the navigational dangers and should, so far as possible, afford adequate means of locating and rescuing such persons.†

(b) Each Contracting Government undertakes to make available information concerning its existing rescue facilities and the plans for changes therein, if any.

(c) Passenger ships to which chapter I applies, trading on fixed routes, shall have on board a plan for co-operation with appropriate search and rescue services in event of an emergency. The plan shall be developed in co-operation between the ship and the search and rescue services and be approved by the Administration. The plan shall include provisions for periodic exercises to be undertaken as agreed by the passenger ship and the search and rescue services concerned to test its effectiveness.

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* Refer to the following resolutions adopted by the Organization:
Accuracy standards for navigation (resolution A.529(13));
Radar beacons and transponders (resolution A.615(15));
Performance standards for differential omega correction transmitting stations (resolution A.425(XI);
Collecting and forwarding of hydrographic data (resolution A.532(13)).

† Refer to the following resolutions adopted by the Organization:
Homing capability of search and rescue aircraft (resolution A.225(VII));
International aeronautical and maritime search and rescue (IAMSAR) manual (resolution A.894(21));
Use of radar transponders for search and rescue purposes (resolution A.530(13)).

Regulation 16
Life-saving signals

Life-saving signals* shall be used by life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations when communicating with ships or persons in distress or to direct ships, and by ships or persons in distress when communicating with life-saving stations, maritime rescue units and aircraft engaged in search and rescue operations. An illustrated table describing the life-saving signals shall be readily available to the officer of the watch of every ship to which this chapter applies.

Regulation 17
Pilot transfer arrangements

(a) *Application*

(i) Ships engaged on voyages in the course of which pilots are likely to be employed shall be provided with pilot transfer arrangements.

(ii) Equipment and arrangements for pilot transfer which are installed on or after 1 January 1994 shall comply with the requirements of this regulation and due regard shall be paid to the standards adopted by the Organization.†

(iii) Equipment and arrangements for pilot transfer which are provided on ships before 1 January 1994 shall at least comply with the requirements of regulation 17 in force prior to that date and due regard shall be paid to the standards adopted by the Organization prior to that date.‡

(iv) Equipment and arrangements which are replaced after 1 January 1994 shall, in so far as is reasonable and practicable, comply with the requirements of this regulation.

(b) *General*

(i) 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

* Such life-saving signals are described in volume III of the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* and illustrated in the *International Code of Signals*, as amended pursuant to resolution A.80(IV).

† Refer to the Recommendation on pilot transfer arrangements adopted by the Organization by resolution A.889(21).

‡ Refer to the Recommendation on performance standards for mechanical pilot hoists adopted by the Organization by resolution A.275(VIII) and to the Recommendation on arrangements for embarking and disembarking pilots in very large ships adopted by the Organization by resolution A.426(XI).

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.

(ii) The rigging of the pilot transfer arrangements and the embarkation and disembarkation of a pilot shall be supervised by a responsible officer having means of communication with the navigation bridge 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.

(c) *Transfer arrangements*

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

(ii) 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, or by means of mechanical pilot hoists or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.

(iii) 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:

(aa) it is clear of any possible discharges from the ship;

(bb) 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;

(cc) 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;

(dd) 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 strongpoints, shackles and

securing ropes shall be at least as strong as the side ropes;

(2) an accommodation ladder in conjunction with the pilot ladder, 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, the lower end of the accommodation ladder shall rest 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; or

(3) a mechanical pilot hoist so located that 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 and clear of all discharges.

(d) *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:

(i) a gateway in the rails or bulwark, adequate handholds shall be provided;

(ii) 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.

(e) *Shipside doors*

Shipside doors used for pilot transfer shall not open outwards.

(f) *Mechanical pilot hoists*

(i) The mechanical pilot hoist and its ancillary equipment shall be of a type approved by the Administration. The pilot hoist shall be designed to operate as a moving ladder to lift and lower one person on the side of the ship, or as a platform to lift and lower one or more persons on the side of the ship. It shall be of such design and construction as to ensure that the pilot can be embarked and disembarked in a safe manner, including a safe access from the hoist to the deck and vice versa. Such access shall be gained directly by a platform securely guarded by handrails.

(ii) Efficient hand gear shall be provided to lower or recover the person or persons carried, and kept ready for use in the event of power failure.

(iii) The hoist shall be securely attached to the structure of the ship. Attachment shall not be solely by means of the ship's side rails. Proper and strong attachment points shall be provided for hoists of the portable type on each side of the ship.

(iv) If belting is fitted in the way of the hoist position, such belting shall be cut back sufficiently to allow the hoist to operate against the ship's side.

(v) A pilot ladder shall be rigged adjacent to the hoist and available for immediate use so that access to it is available from the hoist at any point of its travel. The pilot ladder shall be capable of reaching the sea level from its own point of access to the ship.

(vi) The position on the ship's side where the hoist will be lowered shall be indicated.

(vii) An adequate protected stowage position shall be provided for the portable hoist. In very cold weather, to avoid the danger of ice formation, the portable hoist shall not be rigged until its use is imminent.

(g) *Associated equipment*

(i) 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 in diameter properly secured to the ship if required by the pilot;

(2) a lifebuoy equipped with a self-igniting light;

(3) a heaving line.

(ii) When required by paragraph (d), stanchions and bulwark ladders shall be provided.

(h) *Lighting*

Adequate lighting shall be provided to illuminate the transfer arrangements overside, the position on deck where a person embarks or disembarks and the controls of the mechanical pilot hoist.

Regulation 18
VHF radiotelephones

[The text of this regulation has been deleted.]

Regulation 19
Use of the automatic pilot

(a) In areas of high traffic density, in conditions of restricted visibility and in all other hazardous navigational situations where the automatic pilot is used, it shall be possible to establish human control of the ship's steering immediately.*

(b) In circumstances as above, it shall be possible for the officer of the watch to have available without delay the services of a qualified helmsman who shall be ready at all times to take over steering control.

(c) The change-over from automatic to manual steering and vice versa shall be made by or under the supervision of a responsible officer.

(d) The manual steering shall be tested after prolonged use of the automatic pilot, and before entering areas where navigation demands special caution.

Regulation 19-1
Operation of steering gear

In areas where navigation demands special caution, ships shall have more than one steering gear power unit in operation when such units are capable of simultaneous operation.

Regulation 19-2
Steering gear: Testing and drills

(a) Within 12 h before departure, the ship's steering gear shall be checked and tested by the ship's crew. The test procedure shall include, where applicable, the operation of the following:

- **(i)** the main steering gear;
- **(ii)** the auxiliary steering gear;
- **(iii)** the remote steering gear control systems;
- **(iv)** the steering positions located on the navigation bridge;
- **(v)** the emergency power supply;
- **(vi)** the rudder angle indicators in relation to the actual position of the rudder;
- **(vii)** the remote steering gear control system power failure alarms;

* Refer to the Recommendation on performance standards for automatic pilots adopted by the Organization by resolution A.342(IX).

(viii) the steering gear power unit failure alarms; and

(ix) automatic isolating arrangements and other automatic equipment.

(b) The checks and tests shall include:

(i) the full movement of the rudder according to the required capabilities of the steering gear;

(ii) a visual inspection of the steering gear and its connecting linkage; and

(iii) the operation of the means of communication between the navigation bridge and steering gear compartment.

(c) **(i)** Simple operating instructions with a block diagram showing the change-over procedures for remote steering gear control systems and steering gear power units shall be permanently displayed on the navigation bridge and in the steering gear compartment.

(ii) All ships' officers concerned with the operation or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.

(d) In addition to the routine checks and tests prescribed in paragraphs (a) and (b), emergency steering drills shall take place at least once every three months in order to practise emergency steering procedures. These drills shall include direct control from within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable, the operation of alternative power supplies.

(e) The Administration may waive the requirement to carry out the checks and tests prescribed in paragraphs (a) and (b) for ships which regularly engage on voyages of short duration. Such ships shall carry out these checks and tests at least once every week.

(f) The date upon which the checks and tests prescribed in paragraphs (a) and (b) are carried out and the date and details of emergency steering drills carried out under paragraph (d), shall be recorded in the log-book as may be prescribed by the Administration.

Regulation 20
Nautical publications

All ships shall carry adequate and up-to-date charts,* sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage.

* Refer to the Recommendation on performance standards for electronic chart display and information systems (ECDIS) (resolution A.817(19), as amended) and resolution MSC.86(70).

Regulation 21
International Code of Signals

All ships which, in accordance with the present Convention, are required to carry radio installations shall carry the International Code of Signals. This publication shall also be carried by any other ship which, in the opinion of the Administration, has a need to use it.

Regulation 22
Navigation bridge visibility

(a) Ships of not less than 45 m in length as defined in regulation III/3.12, constructed on or after 1 July 1998, shall meet the following requirements:

(i) The view of the sea surface from the conning position shall not be obscured by more than two ship lengths, or 500 m, whichever is the less, forward of the bow to 10° on either side under all conditions of draught, trim and deck cargo.

(ii) No blind sector caused by cargo, cargo gear or other obstructions outside of the wheelhouse forward of the beam which obstructs the view of the sea surface as seen from the conning position, shall exceed 10°. The total arc of blind sectors shall not exceed 20°. The clear sectors between blind sectors shall be at least 5°. However, in the view described in paragraph (a)(i), each individual blind sector shall not exceed 5°.

(iii) The horizontal field of vision from the conning position shall extend over an arc of not less than 225°, that is from right ahead to not less than 22.5° abaft the beam on either side of the ship.

(iv) From each bridge wing the horizontal field of vision shall extend over an arc of at least 225°, that is from at least 45° on the opposite bow through right ahead and then from right ahead to right astern through 180° on the same side of the ship.

(v) From the main steering position the horizontal field of vision shall extend over an arc from right ahead to at least 60° on each side of the ship.

(vi) The ship's side shall be visible from the bridge wing.

(vii) The height of the lower edge of the navigation bridge front windows above the bridge deck shall be kept as low as possible. In no case shall the lower edge present an obstruction to the forward view as described in this regulation.

(viii) The upper edge of the navigation bridge front windows shall allow a forward view of the horizon, for a person with a height of eye of 1,800 mm above the bridge deck at the conning position, when the ship is pitching in heavy seas. The

Administration, if satisfied that a height of eye of 1,800 mm is unreasonable and impractical, may allow reduction of the height of eye but not to less than 1,600 mm.

(ix) Windows shall meet the following requirements:

(1) framing between navigation bridge windows shall be kept to a minimum and not be installed immediately forward of any workstation;

(2) to help avoid reflections, the bridge front windows shall be inclined from the vertical plane top out, at an angle of not less than 10° and not more than 25°;

(3) polarized and tinted windows shall not be fitted; and

(4) at all times, regardless of weather conditions, at least two of the navigation bridge front windows shall provide a clear view, and in addition, depending on the bridge configuration, an additional number of windows shall provide a clear view.

(b) Ships constructed before 1 July 1998 shall, where practicable, meet the requirements of paragraphs (a)(i) and (a)(ii). However, structural alterations or additional equipment need not be required.

(c) With ships of unconventional design which, in the opinion of the Administration, cannot comply with this regulation, arrangements shall be provided to achieve a level of visibility that is as near as practical to those prescribed in this regulation.

Regulation 23
Operational limitations

(This regulation applies to all passenger ships to which chapter I applies)

1 On passenger ships constructed before 1 July 1997, the requirements of this regulation shall apply not later than the date of the first periodical survey after 1 July 1997.

2 A list of all limitations on the operation of a passenger ship including exemptions from any of these regulations, restrictions in operating areas, weather restrictions, sea state restrictions, restrictions in permissible loads, trim, speed and any other limitations, whether imposed by the Administration or established during the design or the building stages, shall be compiled before the passenger ship is put in service. The list, together with any necessary explanations, shall be documented in a form acceptable to the Administration, which shall be kept on board readily available to the master. The list shall be kept updated. If the language used is not English or French, the list shall be provided in one of the two languages.

CHAPTER VI
Carriage of cargoes

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Part A
General provisions

Regulation 1
Application

1 This chapter applies to the carriage of cargoes (except liquids in bulk, gases in bulk and those aspects of carriage covered by other chapters) which, owing to their particular hazards to ships or persons on board, may require special precautions in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage. However, for cargo ships of less than 500 gross tonnage, the Administration, if it considers that the sheltered nature and conditions of voyage are such as to render the application of any specific requirements of part A or B of this chapter unreasonable or unnecessary, may take other effective measures to ensure the required safety for these ships.

2 To supplement the provisions of parts A and B of this chapter, each Contracting Government shall ensure that appropriate information on cargo and its stowage and securing is provided, specifying, in particular, precautions necessary for the safe carriage of such cargoes.*

Regulation 2
Cargo information

1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information† shall be

* Refer to:

.1 the Code of Safe Practice for Cargo Stowage and Securing adopted by the Organization by resolution A.714(17), as amended;

.2 the Code of Safe Practice for Ships Carrying Timber Deck Cargoes adopted by the Organization by resolution A.715(17), as amended; MSC/Circ.525, Guidance note on precautions to be taken by the masters of ships of below 100 metres in length engaged in the carriage of logs; and MSC/Circ.548, Guidance note on precautions to be taken by masters of ships engaged in the carriage of timber cargoes; and

.3 the Code of Safe Practice for Solid Bulk Cargoes (BC Code) adopted by the Organization by resolution A.434(XI), as amended.

† Refer to MSC/Circ.663, Form for cargo information.

confirmed in writing* and by appropriate shipping documents prior to loading the cargo on the ship.

2 The cargo information shall include:

.1 in the case of general cargo, and of cargo carried in cargo units, a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo. For the purpose of this regulation the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organization by resolution A.714(17), as may be amended, shall be provided. Any such amendment to sub-chapter 1.9 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;

.2 in the case of bulk cargo, information on the stowage factor of the cargo, the trimming procedures, likelihood of shifting including angle of repose, if applicable, and any other relevant special properties. In the case of a concentrate or other cargo which may liquefy, additional information in the form of a certificate on the moisture content of the cargo and its transportable moisture limit.

.3 in the case of a bulk cargo not classified in accordance with the provisions of regulation VII/2, but which has chemical properties that may create a potential hazard, in addition to the information required by the preceding subparagraphs, information on its chemical properties.

3 Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents.

Regulation 3

Oxygen analysis and gas detection equipment

1 When transporting a bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, an appropriate instrument for measuring the concentration of gas or oxygen in the air shall be provided together with detailed instructions for its use. Such an instrument shall be to the satisfaction of the Administration.

* Reference to documents in this regulation does not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation.

2 The Administration shall take steps to ensure that crews of ships are trained in the use of such instruments.

Regulation 4
The use of pesticides in ships[*]

Appropriate precautions shall be taken in the use of pesticides in ships, in particular for the purposes of fumigation.

Regulation 5
Stowage and securing

1 Cargo and cargo units carried on or under deck shall be so loaded, stowed and secured as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

2 Cargo carried in a cargo unit shall be so packed and secured within the unit as to prevent, throughout the voyage, damage or hazard to the ship and the persons on board.

3 Appropriate precautions shall be taken during loading and transport of heavy cargoes or cargoes with abnormal physical dimensions to ensure that no structural damage to the ship occurs and to maintain adequate stability throughout the voyage.

4 Appropriate precautions shall be taken during loading and transport of cargo units on board ro-ro ships, especially with regard to the securing arrangements on board such ships and on the cargo units and with regard to the strength of the securing points and lashings.

5 Containers shall not be loaded to more than the maximum gross weight indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC).

6 Cargo units, including containers, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. In ships with ro–ro cargo spaces, as defined in regulation II-2/3.14, all securing of cargo units, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.[†]

[*] Refer to the IMO Recommendation on the Safe Use of Pesticides in Ships, as amended.

[†] Refer to MSC/Circ.385 on the Cargo Securing Manual and MSC/Circ.745 on guidelines for the preparation of the Cargo Securing Manual.

Part B
Special provisions for bulk cargoes other than grain

Regulation 6
Acceptability for shipment

1 Prior to loading a bulk cargo, the master shall be in possession of comprehensive information on the ship's stability and on the distribution of cargo for the standard loading conditions. The method of providing such information shall be to the satisfaction of the Administration.*

2 Concentrates or other cargoes which may liquefy shall only be accepted for loading when the actual moisture content of the cargo is less than its transportable moisture limit. However, such concentrates and other cargoes may be accepted for loading even when their moisture content exceeds the above limit, provided that safety arrangements to the satisfaction of the Administration are made to ensure adequate stability in the case of cargo shifting and further provided that the ship has adequate structural integrity.

3 Prior to loading a bulk cargo which is not a cargo classified in accordance with the provisions of regulation VII:2 but which has chemical properties that may create a potential hazard, special precautions for its safe carriage shall be taken.

Regulation 7
Loading, unloading and stowage of bulk cargoes†

1 For the purpose of this regulation, *terminal representative* means a person appointed by the terminal or other facility, where the ship is loading or unloading, who has responsibility for operations conducted by that terminal or facility with regard to the particular ship.

* Refer to:

.1 the Recommendation on intact stability for passenger and cargo ships under 100 metres in length adopted by the Organization by resolution A.167(ES.IV) and to amendments to this Recommendation adopted by the Organization by resolution A.206(VII); and

.2 the Recommendation on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships of 24 metres in length and over adopted by the Organization by resolution A.562(14).

† Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by the Organization by resolution A.862(20).

2 To enable the master to prevent excessive stresses in the ship's structure, the ship shall be provided with a booklet, which shall be written in a language with which the ship's officers responsible for cargo operations are familiar. If this language is not English, the ship shall be provided with a booklet written also in the English language. The booklet shall, as a minimum, include:

.1 stability data, as required by regulation II-1/22 ;

.2 ballasting and deballasting rates and capacities;

.3 maximum allowable load per unit surface area of the tank top plating;

.4 maximum allowable load per hold;

.5 general loading and unloading instructions with regard to the strength of the ship's structure including any limitations on the most adverse operating conditions during loading, unloading, ballasting operations and the voyage;

.6 any special restrictions such as limitations on the most adverse operating conditions imposed by the Administration or organization recognized by it, if applicable; and

.7 where strength calculations are required, maximum permissible forces and moments on the ship's hull during loading, unloading and the voyage.

3 Before a solid bulk cargo is loaded or unloaded, the master and the terminal representative shall agree on a plan* which shall ensure that the permissible forces and moments on the ship are not exceeded during loading or unloading, and shall include the sequence, quantity and rate of loading or unloading, taking into consideration the speed of loading or unloading, the number of pours and the deballasting or ballasting capability of the ship. The plan and any subsequent amendments thereto shall be lodged with the appropriate authority of the port State.

4 Bulk cargoes shall be loaded and trimmed reasonably level, as necessary, to the boundaries of the cargo space so as to minimize the risk of shifting and to ensure that adequate stability will be maintained throughout the voyage.

5 When bulk cargoes are carried in 'tween-decks, the hatchways of such 'tween-decks shall be closed in those cases where the loading information indicates an unacceptable level of stress of the bottom structure if the hatchways are left open. The cargo shall be trimmed reasonably level and shall either extend from side to side or be secured by additional longitudinal divisions of sufficient strength. The safe load-carrying capacity of the

* Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by the Organization by resolution A.862(20).

'tween-decks shall be observed to ensure that the deck-structure is not overloaded.

6 The master and terminal representative shall ensure that loading and unloading operations are conducted in accordance with the agreed plan.

7 If during loading or unloading any of the limits of the ship referred to in paragraph 2 are exceeded or are likely to become so if the loading or unloading continues, the master has the right to suspend operation and the obligation to notify accordingly the appropriate authority of the port State with which the plan has been lodged. The master and the terminal representative shall ensure that corrective action is taken. When unloading cargo, the master and terminal representative shall ensure that the unloading method does not damage the ship's structure.

8 The master shall ensure that ship's personnel continuously monitor cargo operations. Where possible, the ship's draught shall be checked regularly during loading or unloading to confirm the tonnage figures supplied. Each draught and tonnage observation shall be recorded in a cargo log-book. If significant deviations from the agreed plan are detected, cargo or ballast operations or both shall be adjusted to ensure that the deviations are corrected.

Part C
Carriage of grain

Regulation 8
Definitions

For the purposes of this part, unless expressly provided otherwise:

1 *International Grain Code* means the International Code for the Safe Carriage of Grain in Bulk adopted by the Maritime Safety Committee of the Organization by resolution MSC.23(59) 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 The term *grain* includes wheat, maize (corn), oats, rye, barley, rice, pulses, seeds and processed forms thereof whose behaviour is similar to that of grain in its natural state.

Regulation 9
Requirements for cargo ships carrying grain

1 In addition to any other applicable requirements of the present regulations, a cargo ship carrying grain shall comply with the requirements of the International Grain Code, and hold a document of authorization as required by that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

2 A ship without such a document shall not load grain until the master satisfies the Administration, or the Contracting Government of the port of loading on behalf of the Administration, that the ship will comply with the requirements of the International Grain Code in its proposed loaded condition.

CHAPTER VII
Carriage of dangerous goods*

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* See also resolution A.851(20), General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants.

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Part A
*Carriage of dangerous goods in packaged form or in solid form in bulk**

Regulation 1
Application

1 Unless expressly provided otherwise, this part applies to dangerous goods classified under regulation 2 which are carried in packaged form or in solid form in bulk (hereinafter referred to as "dangerous goods"), in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage.

2 The provisions of this part do not apply to ships' stores and equipment.

3 The carriage of dangerous goods is prohibited except in accordance with the provisions of this part. In addition, the requirements of part D shall apply to the carriage of INF cargoes as defined in regulation 14.2.

4 To supplement the provisions of this part, each Contracting Government shall issue, or cause to be issued, detailed instructions on safe packaging and stowage of dangerous goods which shall include the precautions necessary in relation to other cargo.†

Regulation 2
Classification

Dangerous goods shall be divided into the following classes:

Class 1 – Explosives

Class 2 – Gases: compressed, liquefied or dissolved under pressure

Class 3 – Flammable‡ liquids

* Refer to MSC/Circ.559, Form for reporting incidents involving dangerous goods and marine pollutants in packaged form on board ships and in port areas.

† Refer to the International Maritime Dangerous Goods Code (IMDG Code), adopted by the Organization by resolution A.716(17), and to the relevant sections and the related parts of appendix B of the Code of Safe Practice for Solid Bulk Cargoes (BC Code), adopted by the Organization by resolution A.434(XI), as may be amended by the Maritime Safety Committee.

‡ *Flammable* has the same meaning as *inflammable*.

Class 4.1 – Flammable* solids

Class 4.2 – Substances liable to spontaneous combustion

Class 4.3 – Substances which, in contact with water, emit flammable gases

Class 5.1 – Oxidizing substances

Class 5.2 – Organic peroxides

Class 6.1 – Toxic substances

Class 6.2 – Infectious substances

Class 7 – Radioactive materials

Class 8 – Corrosives

Class 9 – Miscellaneous dangerous substances and articles, i.e. any other substance which experience has shown, or may show, to be of such a dangerous character that the provisions of this part shall apply to it.

Regulation 3
Packaging

1 The packaging of dangerous goods shall be:

.1 well made and in good condition;

.2 of such a character that any interior surface with which the contents may come in contact is not dangerously affected by the substance being conveyed; and

.3 capable of withstanding the ordinary risks of handling and carriage by sea.

2 Where the use of absorbent or cushioning material is customary in the packaging of liquids in receptacles, that material shall be:

.1 capable of minimizing the dangers to which the liquid may give rise;

.2 so disposed as to prevent movement and ensure that the receptacle remains surrounded; and

.3 where reasonably possible, of sufficient quantity to absorb the liquid in the event of breakage of the receptacle.

3 Receptacles containing dangerous liquids shall have an ullage at the filling temperature sufficient to allow for the highest temperature during the course of normal carriage.

* *Flammable* has the same meaning as *inflammable*.

4 Cylinders or receptacles for gases under pressure shall be adequately constructed, tested, maintained and correctly filled.

5 Empty uncleaned receptacles which have been used previously for the carriage of dangerous goods shall be subject to the provisions of this part for filled receptacles, unless adequate measures have been taken to nullify any hazard.

Regulation 4
Marking, labelling and placarding

1 Packages containing dangerous goods shall be durably marked with the correct technical name; trade names alone shall not be used.

2 Packages containing dangerous goods shall be provided with distinctive labels or stencils of the labels, or placards, as appropriate, so as to make clear the dangerous properties of the goods contained therein.

3 The method of marking the correct technical name and of affixing labels or applying stencils of labels, or of affixing placards on packages containing dangerous goods, shall be such that this information will still be identifiable on packages surviving at least three months' immersion in the sea. In considering suitable marking, labelling and placarding methods, account shall be taken of the durability of the materials used and of the surface of the package.

4 Packages containing dangerous goods shall be so marked and labelled except that:

.1 packages containing dangerous goods of a low degree of hazard or packed in limited quantities;* or

.2 when special circumstances permit, packages that are stowed and handled in units that are identified by labels or placards; may be exempted from labelling requirements.

Regulation 5
Documents

1 In all documents relating to the carriage of dangerous goods by sea where the goods are named, the correct technical name of the goods shall be used (trade names alone shall not be used) and the correct description given in accordance with the classification set out in regulation 2.

2 The shipping documents prepared by the shipper shall include, or be accompanied by, a signed certificate or declaration that the shipment offered

* Refer to the specific exemptions provided for in the IMDG Code.

for carriage is properly packaged and marked, labelled or placarded, as appropriate, and in proper condition for carriage.

3 The persons responsible for the packing of dangerous goods in a freight container or road vehicle shall provide a signed container packing certificate or vehicle packing declaration stating that the cargo in the unit has been properly packed and secured and that all applicable transport requirements have been met. Such a certificate or declaration may be combined with the document referred to in paragraph 2.

4 Where there is due cause to suspect that a freight container or road vehicle in which dangerous goods are packed is not in compliance with the requirements of paragraph 2 or 3, or where a container packing certificate or vehicle packing declaration is not available, the freight container or vehicle shall not be accepted for shipment.

5 Each ship carrying dangerous goods shall have a special list or manifest setting forth, in accordance with the classification set out in regulation 2, the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.

6 Cargo transport units, including freight containers, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.*

Regulation 6

Stowage requirements

1 Dangerous goods shall be loaded, stowed and secured safely and appropriately in accordance with the nature of the goods. Incompatible goods shall be segregated from one another.

2 Explosives (except ammunition) which present a serious risk shall be stowed in a magazine which shall be kept securely closed while at sea. Such explosives shall be segregated from detonators. Electrical apparatus and cables in any compartment in which explosives are carried shall be so designed and used as to minimize the risk of fire or explosion.

3 Dangerous goods in packaged form which give off dangerous vapours shall be stowed in a mechanically ventilated space or on deck. Dangerous

* Refer to MSC/Circ.385 on the Cargo Securing Manual and MSC/Circ.745 on guidelines for the preparation of the Cargo Securing Manual.

goods in solid form in bulk which give off dangerous vapours shall be stowed in a well ventilated space.

4 In ships carrying flammable liquids or gases, special precautions shall be taken where necessary against fire or explosion.

5 Substances which are liable to spontaneous heating or combustion shall not be carried unless adequate precautions have been taken to minimize the likelihood of the outbreak of fire.

Regulation 7
*Explosives in passenger ships**

1 Explosives in division 1.4, compatibility group S, may be carried in any amount in passenger ships. No other explosives may be carried except any one of the following:

.1 explosive articles for life-saving purposes, if the total net explosives mass of such articles does not exceed 50 kg per ship; or

.2 explosives in compatibility groups C, D and E, if the total net explosives mass does not exceed 10 kg per ship; or

.3 explosive articles in compatibility group G other than those requiring special stowage, if the total net explosives mass does not exceed 10 kg per ship; or

.4 explosive articles in compatibility group B, if the total net explosives mass does not exceed 5 kg per ship.

.5 articles in compatibility group N shall only be allowed in passenger ships if the total net explosive mass does not exceed 50 kg per ship and no other explosives, apart from division 1.4 compatibility group S, are carried.

2 Notwithstanding the provisions of paragraph 1, additional quantities or types of explosives may be carried in passenger ships in which special safety measures approved by the Administration are taken.

Regulation 7-1
Reporting of incidents involving dangerous goods

1 When an incident takes place involving the loss or likely loss overboard of packaged dangerous goods into the sea, the master, or other person having charge of the ship, shall report the particulars of such an incident without delay and to the fullest extent possible to the nearest

* Refer to class 1 of the IMDG Code.

coastal State. The report shall be based on the guidelines and general principles adopted by the Organization.*

2 In the event of the ship referred to in paragraph 1 being abandoned, or in the event of a report from such a ship being incomplete or unobtainable, the owner, charterer, manager or operator of the ship, or their agents shall, to the fullest extent possible, assume the obligations placed upon the master by this regulation.

* Refer to the General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants adopted by the Organization by resolution A.851(20).

Part B
Construction and equipment of ships carrying dangerous liquid chemicals in bulk

Regulation 8
Definitions

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

1 *International Bulk Chemical Code (IBC Code)* means the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Maritime Safety Committee of the Organization by resolution MSC.4(48), 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 *Chemical tanker* means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in chapter 17 of the International Bulk Chemical Code.

3 For the purpose of regulation 9, *ship constructed* means a ship the keel of which is laid or which is at a similar stage of construction.

4 *At 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 1% of the estimated mass of all structural material, whichever is less.

Regulation 9
Application to chemical tankers

1 Unless expressly provided otherwise, this part applies to chemical tankers constructed on or after 1 July 1986 including those of less than 500 gross tonnage. Such tankers shall comply with the requirements of this part in addition to any other applicable requirements of the present regulations.

2 Any chemical tanker, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto

shall continue to comply with at least the requirements previously applicable to the ship. Such a ship, if constructed before 1 July 1986, shall, as a rule, comply with the requirements for a ship constructed on or after that date to at least the same extent as 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 a ship constructed on or after 1 July 1986 in so far as the Administration deems reasonable and practicable.

3 A ship, irrespective of the date of construction, which is converted to a chemical tanker shall be treated as a chemical tanker constructed on the date on which such conversion commenced.

Regulation 10

Requirements for chemical tankers

1 A chemical tanker shall comply with the requirements of the International Bulk Chemical Code and shall, in addition to the requirements of regulation I/8, I/9, and I/10, as applicable, be surveyed and certified as provided for in that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

2 A chemical tanker holding a certificate issued pursuant to the provisions of paragraph 1 shall be subject to the control established in regulation I/19. For this purpose such certificate shall be treated as a certificate issued under regulation I/12 or I/13.

Part C
Construction and equipment of ships carrying liquefied gases in bulk

Regulation 11
Definitions

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

1 *International Gas Carrier Code (IGC Code)* means the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk as adopted by the Maritime Safety Committee of the Organization by resolution MSC.5(48), 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 *Gas carrier* means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other product listed in chapter 19 of the International Gas Carrier Code.

3 For the purpose of regulation 12, *ship constructed* means a ship the keel of which is laid or which is at a similar stage of construction.

4 *At 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 1% of the estimated mass of all structural material, whichever is less.

Regulation 12
Application to gas carriers

1 Unless expressly provided otherwise, this part applies to gas carriers constructed on or after 1 July 1986 including those of less than 500 gross tonnage. Such gas carriers shall comply with the requirements of this part in addition to any other applicable requirements of the present regulations.

2 Any gas carrier, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto

shall continue to comply with at least the requirements previously applicable to the ship. Such a ship if constructed before 1 July 1986 shall, as a rule, comply with the requirements for a ship constructed on or after that date to at least the same extent as 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 a ship constructed on or after 1 July 1986 in so far as the Administration deems reasonable and practicable.

3 A ship, irrespective of the date of construction, which is converted to a gas carrier shall be treated as a gas carrier constructed on the date on which such conversion commenced.

Regulation 13

Requirements for gas carriers

1 A gas carrier shall comply with the requirements of the International Gas Carrier Code and shall, in addition to the requirements of regulation I/8, I/9 and I/10, as applicable, be surveyed and certified as provided for in that Code. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

2 A gas carrier holding a certificate issued pursuant to the provisions of paragraph 1 shall be subject to the control established in regulation I/19. For this purpose such certificate shall be treated as a certificate issued under regulation I/12 or I/13.

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.

CHAPTER VIII
Nuclear ships

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Regulation 1
Application

This chapter applies to all nuclear ships except ships of war.

Regulation 2
Application of other chapters

The regulations contained in the other chapters of the present Convention apply to nuclear ships except as modified by this chapter.*

Regulation 3
Exemptions

A nuclear ship shall not, in any circumstances, be exempted from compliance with any regulations of this Convention.

Regulation 4
Approval of reactor installation

The design, construction and standards of inspection and assembly of the reactor installation shall be subject to the approval and satisfaction of the Administration and shall take account of the limitations which will be imposed on surveys by the presence of radiation.

Regulation 5
Suitability of reactor installation for service on board ship

The reactor installation shall be designed having regard to the special conditions of service on board ship both in normal and exceptional circumstances of navigation.

Regulation 6
Radiation safety

The Administration shall take measures to ensure that there are no unreasonable radiation or other nuclear hazards, at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources.

* Refer to the Code of Safety for Nuclear Merchant Ships (resolution A.491(XII)), which supplements the requirements of this chapter.

Regulation 7
Safety assessment

(a) A safety assessment shall be prepared to permit evaluation of the nuclear power plant and safety of the ship to ensure that there are no unreasonable radiation or other hazards, at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources. The Administration, when satisfied, shall approve such safety assessment which shall always be kept up to date.

(b) The safety assessment shall be made available sufficiently in advance to the Contracting Governments of the countries which a nuclear ship intends to visit so that they may evaluate the safety of the ship.

Regulation 8
Operating manual

A fully detailed operating manual shall be prepared for the information and guidance of the operating personnel in their duties on all matters relating to the operation of the nuclear power plant and having an important bearing on safety. The Administration, when satisfied, shall approve such operating manual and a copy shall be kept on board the ship. The operating manual shall always be kept up to date.

Regulation 9
Surveys

Survey of nuclear ships shall include the applicable requirements of regulation 7 of chapter I, or of regulations 8, 9 and 10 of chapter I, except in so far as surveys are limited by the presence of radiation. In addition, the surveys shall include any special requirements of the safety assessment. They shall in all cases, notwithstanding the provisions of regulations 8 and 10 of chapter I, be carried out not less frequently than once a year.

Regulation 10
Certificates

(a) The provisions of paragraph (a) of regulation 12 of chapter I and of regulation 14 of chapter I shall not apply to nuclear ships.

(b) A certificate, called a Nuclear Passenger Ship Safety Certificate shall be issued after inspection and survey to a nuclear passenger ship which complies with the requirements of chapters II–1, II–2, III, IV and VIII, and any other relevant requirements of the present regulations.

(c) A certificate, called a Nuclear Cargo Ship Safety Certificate shall be issued after inspection and survey to a nuclear cargo ship which satisfies the requirements for cargo ships on survey set out in regulation 10 of chapter I, and complies with the requirements of chapters II–1, II–2, III, IV and VIII and any other relevant requirements of the present regulations.

(d) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall state: "That the ship, being a nuclear ship, complied with all requirements of chapter VIII of the Convention and conformed to the Safety Assessment approved for the ship".

(e) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall be valid for a period of not more than 12 months.

(f) Nuclear Passenger Ship Safety Certificates and Nuclear Cargo Ship Safety Certificates shall be issued either by the Administration or by any person or organization duly authorized by it. In every case, that Administration assumes full responsiblity for the certificate.

Regulation 11
Special control[*]

In addition to the control established by regulation 19 of chapter I, nuclear ships shall be subject to special control before entering the ports and in the ports of Contracting Governments, directed towards verifying that there is on board a valid Nuclear Ship Safety Certificate and that there are no unreasonable radiation or other hazards at sea or in port, to the crew, passengers or public, or to the waterways or food or water resources.

Regulation 12
Casualties

In the event of any accident likely to lead to an environmental hazard the master of a nuclear ship shall immediately inform the Administration. The master shall also immediately inform the competent governmental authority of the country in whose waters the ship may be, or whose waters the ship approaches in a damaged condition.

[*] Refer to the IMO/IAEA Safety Recommendation on the Use of Ports by Nuclear Merchant Ships.

CHAPTER IX
Management for the safe operation of ships

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2 Application. 417
3 Safety management requirements. 418
4 Certification 418
5 Maintenance of conditions 418
6 Verification and control 419

Regulation 1
Definitions

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

1 *International Safety Management (ISM) Code* means the International Management Code for the Safe Operation of Ships and for Pollution Prevention adopted by the Organization by resolution A.741(18), 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 *Company* means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code.

3 *Oil tanker* means an oil tanker as defined in regulation II-1/2.12.

4 *Chemical tanker* means a chemical tanker as defined in regulation VII/8.2.

5 *Gas carrier* means a gas carrier as defined in regulation VII/11.2.

6 *Bulk carrier* means a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers.*

7 *Mobile offshore drilling unit (MODU)* means a vessel capable of engaging in drilling operations for the exploration for or exploitation of resources beneath the sea-bed such as liquid or gaseous hydrocarbons, sulphur or salt.

8 *High-speed craft* means a craft as defined in regulation X/1.2.

Regulation 2
Application

1 This chapter applies to ships, regardless of the date of construction, as follows:

.1 passenger ships including passenger high-speed craft, not later than 1 July 1998;

* Refer to resolution MSC.79(70) relating to interpretation of provisions of SOLAS chapter XII on additional safety measures for bulk carriers.

.2 oil tankers, chemical tankers, gas carriers, bulk carriers and cargo high-speed craft of 500 gross tonnage and upwards, not later than 1 July 1998; and

.3 other cargo ships and mobile offshore drilling units of 500 gross tonnage and upwards, not later than 1 July 2002.*

2 This chapter does not apply to government-operated ships used for non-commercial purposes.

Regulation 3
Safety management requirements

1 The company and the ship shall comply with the requirements of the International Safety Management Code.

2 The ship shall be operated by a company holding a Document of Compliance referred to in regulation 4.

Regulation 4
Certification

1 A Document of Compliance shall be issued to every company which complies with the requirements of the International Safety Management Code. This document shall be issued by the Administration, by an organization recognized by the Administration, or at the request of the Administration by another Contracting Government.

2 A copy of the Document of Compliance shall be kept on board the ship in order that the master can produce it on request for verification.

3 A Certificate, called a Safety Management Certificate, shall be issued to every ship by the Administration or an organization recognized by the Administration. The Administration or organization recognized by it shall, before issuing the Safety Management Certificate, verify that the company and its shipboard management operate in accordance with the approved safety-management system.

Regulation 5
Maintenance of conditions

The safety-management system shall be maintained in accordance with the provisions of the International Safety Management Code.

* The Maritime Safety Committee, at its sixty-sixth session, decided that mobile offshore drilling units not propelled by mechanical means need not comply with the requirements of the chapter.

Regulation 6
Verification and control

1 The Administration, another Contracting Government at the request of the Administration or an organization recognized by the Administration shall periodically verify the proper functioning of the ship's safety-management system.

2 Subject to the provisions of paragraph 3 of this regulation, a ship required to hold a certificate issued pursuant to the provisions of regulation 4.3 shall be subject to control in accordance with the provisions of regulation XI/4. For this purpose such certificate shall be treated as a certificate issued under regulation I/12 or I/13.

3 In cases of change of flag State or company, special transitional arrangements shall be made in accordance with the guidelines developed by the Organization.*

* Refer to the Guidelines on implementation of the International Safety Management (ISM) Code by Administrations, adopted by the Organization by resolution A.788(19).

CHAPTER X
Safety measures for high-speed craft

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3	Requirements for high-speed craft	424

Regulation 1
Definitions

For the purpose of this chapter:

1 *High-Speed Craft Code (HSC Code)* means the International Code of Safety for High-Speed Craft adopted by the Maritime Safety Committee of the Organization by resolution MSC.36(63), 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 *High-speed craft* is a craft capable of a maximum speed in metres per second (m/s) equal to or exceeding:

$$3.7\nabla^{0.1667}$$

where: ∇ = displacement corresponding to the design waterline (m^3)

3 *Craft constructed* means a craft the keel of which is laid or which is at a similar stage of construction.

4 *Similar stage of construction* means a stage at which:

.1 construction identifiable with a specific craft begins; and

.2 assembly of that craft has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is the less.

Regulation 2
Application

1 This chapter applies to high-speed craft constructed on or after 1 January 1996, as follows:

.1 passenger craft which do not proceed in the course of their voyage more than 4 h at operational speed from a place of refuge when fully laden; and

.2 cargo craft of 500 gross tonnage and upwards which do not proceed in the course of their voyage more than 8 h at operational speed from a place of refuge when fully laden.

2 Any craft, irrespective of the date of construction, which undergoes repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to the craft. Such a craft, if constructed before 1 January 1996, shall, as a rule, comply with the requirements for a craft constructed on or after that date to at least the same extent as it 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 a craft constructed on or after 1 January 1996 in so far as the Administration deems reasonable and practicable.

Regulation 3

Requirements for high-speed craft

1 Notwithstanding the provisions of chapters I to IV and regulation V/12, a high-speed craft which complies with the requirements of the High-Speed Craft Code in its entirety and which has been surveyed and certified as provided for in that Code shall be deemed to have complied with the requirements of chapters I to IV and regulation V/12. For the purpose of this regulation, the requirements of the Code shall be treated as mandatory.

2 The certificates and permits issued under the High-Speed Craft Code shall have the same force and the same recognition as the certificates issued under chapter I.

CHAPTER XI
Special measures to enhance maritime safety

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Regulation 1
Authorization of recognized organizations

Organizations referred to in regulation I/6 shall comply with the guidelines adopted by the Organization by resolution A.739(18), as may be amended by the Organization, and the specifications adopted by the Organization by resolution A.789(19), 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.

Regulation 2
*Enhanced surveys**

Bulk carriers as defined in regulation IX/1.6 and oil tankers as defined in regulation II-1/2.12 shall be subject to an enhanced programme of inspections in accordance with the guidelines adopted by the Assembly of the Organization by resolution A.744(18), 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.

Regulation 3
Ship identification number

1 This regulation applies to all passenger ships of 100 gross tonnage and upwards and to all cargo ships of 300 gross tonnage and upwards.

2 Every ship shall be provided with an identification number which conforms to the IMO ship identification number scheme adopted by the Organization.†

3 The ship's identification number shall be inserted on the certificates and certified copies thereof issued under regulation I/12 or regulation I/13.

4 For ships constructed before 1 January 1996, this regulation shall take effect when a certificate is renewed on or after 1 January 1996.

Regulation 4

*Port State control on operational requirements**

1 A ship when in a port of another Contracting Government is subject to control by officers duly authorized by such Government concerning operational requirements in respect of the safety of ships, when there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the safety of ships.

2 In the circumstances defined in paragraph 1 of this regulation, the Contracting Government carrying out the control shall take such steps as will ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of the present Convention.

3 Procedures relating to the port State control prescribed in regulation I/19 shall apply to this regulation.

4 Nothing in the present regulation shall be construed to limit the rights and obligations of a Contracting Government carrying out control over operational requirements specifically provided for in the regulations.

* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19), as amended by resolution A.882(21).

CHAPTER XII
Additional safety measures for bulk carriers

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Regulation 1
Definitions

For the purpose of this chapter:

1 *Bulk carrier* means a bulk carrier as defined in regulation IX/1.6.

2 *Bulk carrier of single side skin construction* means a bulk carrier in which a cargo hold is bounded by the side shell.

3 *Length* of a bulk carrier means the length as defined in the International Convention on Load Lines in force.

4 *Solid bulk cargo* means any material, 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.

5 *Bulk carrier bulkhead and double bottom strength standards* means the "Standards for the evaluation of scantlings of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds and for the evaluation of allowable hold loading of the foremost cargo hold" adopted by resolution 4 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974, on 27 November 1997, 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.

6 The term *ships constructed* has the same meaning as defined in regulation II-1/1.1.3.1.

Regulation 2
Application[*]

Bulk carriers shall comply with the requirements of this chapter in addition to the applicable requirements of other chapters.

Regulation 3
Implementation schedule

(This regulation applies to bulk carriers constructed before 1 July 1999)

Bulk carriers to which regulations 4 or 6 apply shall comply with the provisions of such regulations according to the following schedule, with

[*] Refer to the Interpretation of the provisions of SOLAS chapter XII on additional safety measures for bulk carriers, adopted by the Maritime Safety Committee of the Organization by resolution MSC.79(70).

reference to the enhanced programme of inspections required by regulation XI/2:

.1 bulk carriers which are 20 years of age and over on 1 July 1999, by the date of the first intermediate survey or the first periodical survey after 1 July 1999, whichever comes first;

.2 bulk carriers which are 15 years of age and over but less than 20 years of age on 1 July 1999, by the date of the first periodical survey after 1 July 1999, but not later than 1 July 2002; and

.3 bulk carriers which are less than 15 years of age on 1 July 1999, by the date of the first periodical survey after the date on which the ship reaches 15 years of age, but not later than the date on which the ship reaches 17 years of age.

Regulation 4

Damage stability requirements applicable to bulk carriers

1 Bulk carriers of 150 m in length and upwards of single side skin construction, designed to carry solid bulk cargoes having a density of 1,000 kg/m^3 and above, constructed on or after 1 July 1999 shall, when loaded to the summer load line, be able to withstand flooding of any one cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium, as specified in paragraph 3.

2 Bulk carriers of 150 m in length and upwards of single side skin construction, carrying solid bulk cargoes having a density of 1,780 kg/m^3 and above, constructed before 1 July 1999 shall, when loaded to the summer load line, be able to withstand flooding of the foremost cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium, as specified in paragraph 3. This requirement shall be complied with in accordance with the implementation schedule specified in regulation 3.

3 Subject to the provisions of paragraph 6, the condition of equilibrium after flooding shall satisfy the condition of equilibrium laid down in the annex to resolution A.320(IX), Regulation equivalent to regulation 27 of the International Convention on Load Lines, 1966, as amended by resolution A.514(13). The assumed flooding need only take into account flooding of the cargo hold space. The permeability of a loaded hold shall be assumed as 0.9 and the permeability of an empty hold shall be assumed as 0.95, unless a permeability relevant to a particular cargo is assumed for the volume of a flooded hold occupied by cargo and a permeability of 0.95 is assumed for the remaining empty volume of the hold.

4 Bulk carriers constructed before 1 July 1999 which have been assigned a reduced freeboard in compliance with regulation 27(7) of the International Convention on Load Lines, 1966, as adopted on 5 April 1966, may be considered as complying with paragraph 2 of this regulation.

5 Bulk carriers which have been assigned a reduced freeboard in compliance with the provisions of paragraph (8) of the regulation equivalent to regulation 27 of the International Convention on Load Lines, 1966, adopted by resolution A.320(IX), as amended by resolution A.514(13), may be considered as complying with paragraphs 1 or 2, as appropriate.

6 On bulk carriers which have been assigned reduced freeboard in compliance with the provisions of regulation 27(8) set out in annex B of the Protocol of 1988 relating to the International Convention on Load Lines, 1966, the condition of equilibrium after flooding shall satisfy the relevant provisions of that Protocol.

Regulation 5
Structural strength of bulk carriers

(This regulation applies to bulk carriers constructed on or after 1 July 1999)

Bulk carriers of 150 m in length and upwards of single side skin construction, designed to carry solid bulk cargoes having a density of 1,000 kg/m^3 and above, shall have sufficient strength to withstand flooding of any one cargo hold in all loading and ballast conditions, taking also into account dynamic effects resulting from the presence of water in the hold, and taking into account the recommendations adopted by the Organization.*

Regulation 6
Structural and other requirements for bulk carriers

(This regulation applies to bulk carriers constructed before 1 July 1999)

1 Bulk carriers of 150 m in length and upwards of single side skin construction, carrying solid bulk cargoes having a density of 1,780 kg/m^3 and above, shall comply with the requirements of this regulation in accordance with the implementation schedule specified in regulation 3.

2 The transverse watertight bulkhead between the two foremost cargo holds and the double bottom of the foremost cargo hold shall have sufficient strength to withstand flooding of the foremost cargo hold, taking also into account dynamic effects resulting from the presence of water in the hold, in compliance with the bulk carrier bulkhead and double bottom strength standards. For the purpose of this regulation, the bulk carrier bulkhead and double bottom strength standards shall be treated as mandatory.

* Refer to resolution 3, Recommendation on compliance with SOLAS regulation XII/5, adopted by the 1997 SOLAS Conference.

3 In considering the need for, and the extent of, strengthening of the transverse watertight bulkhead or double bottom to meet the requirements of paragraph 2, the following restrictions may be taken into account:

.1 restrictions on the distribution of the total cargo weight between the cargo holds; and

.2 restrictions on the maximum deadweight.

4 For bulk carriers using either of, or both, the restrictions given in paragraphs 3.1 and 3.2 above for the purpose of fulfilling the requirements of paragraph 2, these restrictions shall be complied with whenever solid bulk cargoes having a density of 1,780 kg/m^3 and above are carried.

Regulation 7

Survey of the cargo hold structure of bulk carriers

(This regulation applies to bulk carriers constructed before 1 July 1999)

A bulk carrier of 150 m in length and upwards of single side skin construction, of 10 years of age and over, shall not carry solid bulk cargoes having a density of 1,780 kg/m^3 and above unless it has satisfactorily undergone either:

.1 a periodical survey in accordance with the enhanced programme of inspections required by regulation XI/2; or

.2 a survey of all cargo holds to the same extent as required for periodical surveys in the enhanced survey programme of inspections required by regulation XI/2.

Regulation 8

Information on compliance with requirements for bulk carriers

1 The booklet required by regulation VI/7.2 shall be endorsed by the Administration or on its behalf to indicate that regulations 4, 5, 6 and 7 as appropriate, are complied with.

2 Any restrictions imposed on the carriage of solid bulk cargoes having a density of 1,780 kg/m^3 and above in accordance with the requirements of regulation 6 shall be identified and recorded in the booklet referred to in paragraph 1.

3 A bulk carrier to which paragraph 2 applies shall be permanently marked on the side shell at amidships, port and starboard, with a solid equilateral triangle having sides of 500 mm and its apex 300 mm below the deck line, and painted a contrasting colour to that of the hull.

Regulation 9
Requirements for bulk carriers not being capable of complying with regulation 4.2 due to the design configuration of their cargo holds

(This regulation applies to bulk carriers constructed before 1 July 1999)

For bulk carriers being within the application limits of regulation 4.2, which have been constructed with an insufficient number of transverse watertight bulkheads to satisfy that regulation, the Administration may allow relaxation from the application of regulations 4.2 and 6 on condition that they shall comply with the following requirements:

.1 for the foremost cargo hold, the inspections prescribed for the annual survey in the enhanced programme of inspections required by regulation XI/2 shall be replaced by the inspections prescribed therein for the intermediate survey of cargo holds;

.2 are provided with bilge well high water level alarms in all cargo holds, or in cargo conveyor tunnels, as appropriate, giving an audible and visual alarm on the navigation bridge, as approved by the Administration or an organization recognized by it in accordance with the provisions of regulation XI/1; and

.3 are provided with detailed information on specific cargo hold flooding scenarios. This information shall be accompanied by detailed instructions on evacuation preparedness under the provisions of section 8 of the International Safety Management (ISM) Code and be used as the basis for crew training and drills.

Regulation 10
Solid bulk cargo density declaration

1 Prior to loading bulk cargo on a bulk carrier, the shipper shall declare the density of the cargo, in addition to providing the cargo information required by regulation VI/2.

2 For bulk carriers to which regulation 6 applies, unless such bulk carriers comply with all the relevant requirements of this chapter applicable to the carriage of solid bulk cargoes having a density of 1,780 kg/m^3 and above, any cargo declared to have a density within the range 1,250 kg/m^3 to 1,780 kg/m^3 shall have its density verified by an accredited testing organization.*

* In verifying the density of solid bulk cargoes, reference may be made to MSC/Circ.908, Uniform method of measurement of the density of bulk cargoes.

Regulation 11
Loading instrument

(This regulation applies to bulk carriers regardless of their date of construction)

1 Bulk carriers of 150 m in length and upwards shall be fitted with a loading instrument capable of providing information on hull girder shear forces and bending moments, taking into account the recommendation adopted by the Organization.*

2 Bulk carriers of 150 m in length and upwards constructed before 1 July 1999 shall comply with the requirements of paragraph 1 not later than the date of the first intermediate or periodical survey of the ship to be carried out after 1 July 1999.

* Refer to resolution 5, Recommendation on loading instruments, adopted by the 1997 SOLAS Conference.

APPENDIX
Certificates*

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P88 Form of Passenger Ship Safety Certificate 439

P88 Form of Cargo Ship Safety Construction Certificate 447

P88 Form of Cargo Ship Safety Equipment Certificate 453

P88 Form of Cargo Ship Safety Radio Certificate 462

P88 Form of Cargo Ship Safety Certificate 470

P88 Form of Exemption Certificate. 485

Form of Nuclear Passenger Ship Safety Certificate. 488

Form of Nuclear Cargo Ship Safety Certificate 491

* The regulations relating to life-saving appliances and arrangements referred to in the forms of certificates and related records of equipment are those of SOLAS chapter III as amended by resolution MSC.47(66).

P88 Form of Safety Certificate for Passenger Ships

PASSENGER SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment
(Form P)

(Official seal) *(State)*

for $\frac{\text{an}}{\text{a short}}$[1] international voyage

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as modified by the Protocol of 1988 relating thereto

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

[1] Delete as appropriate

Particulars of ship[2]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Sea areas in which ship is certified to operate (regulation IV/2) . . . . . .

IMO Number[3] . . . . . .

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. . . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards:

.1 the structure, main and auxiliary machinery, boilers and other pressure vessels;

.2 the watertight subdivision arrangements and details;

.3 the following subdivision load lines;

Subdivision load lines assigned and marked on the ship's side amidships (regulation II-1/13)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C.1	. . . . .	. . . . .
C.2	. . . . .	. . . . .
C.3	. . . . .	. . . . .

2.2 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;

[2] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[3] In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.600(15).

2.3 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.4 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.5 the ship complied with the requirements of the Convention as regards radio installations;

2.6 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.7 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.8 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.9 in all other respects the ship complied with the relevant requirements of the Convention.

3 That an Exemption Certificate has/has not[1] been issued.

This certificate is valid until . . . .

Issued at . . . .
(Place of issue of certificate)

. . . .
(Date of issue) *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

[1] Delete as appropriate.

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

This certificate shall, in accordance with regulation I/14(e)/I/14(f)[1] of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[1] Delete as appropriate.

RECORD OF EQUIPMENT FOR THE PASSENGER SHIP SAFETY CERTIFICATE (FORM P)

This Record shall be permanently attached to the Passenger Ship Safety Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Number of passengers for which certified . . . . . .

Minimum number of persons with required qualifications to operate the radio installations. . . . . .

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 lifeboats	. . . . .	. . . . .
2.1	Total number of persons accommodated by them	. . . . .	. . . . .
2.2	Number of partially enclosed lifeboats (regulation III/21 and LSA Code, section 4.5)	. . . . .	. . . . .
2.3	Number of totally enclosed lifeboats (regulation III/21 and LSA Code, section 4.6)	. . . . .	. . . . .
2.4	Other lifeboats	. . . . .	. . . . .
2.4.1	Number	. . . . .	. . . . .
2.4.2	Type	. . . . .	. . . . .

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

3	Number of motor lifeboats included in the total lifeboats shown above	. . . . .
3.1	Number of lifeboats fitted with searchlights	. . . . .
4	Number of rescue boats	. . . . .
4.1	Number of boats which are included in the total lifeboats shown above	. . . . .
5	Liferafts	. . . . .
5.1	Those for which approved launching appliances are required	. . . . .
5.1.1	Number of liferafts	. . . . .
5.1.2	Number of persons accommodated by them	. . . . .
5.2	Those for which approved launching appliances are not required	. . . . .
5.2.1	Number of liferafts	. . . . .
5.2.2	Number of persons accommodated by them	. . . . .
6	Buoyant apparatus	. . . . .
6.1	Number of apparatus	. . . . .
6.2	Number of persons capable of being supported	. . . . .
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 thermal protective aids[1]	. . . . .
11	Radio installations used in life-saving appliances	. . . . .
11.1	Number of radar transponders	. . . . .
11.2	Number of two-way VHF radiotelephone apparatus	. . . . .

[1] Excluding those required by the LSA Code, paragraphs 4.1.5.1.24; 4.4.8.31 and 5.1.2.2.13.

3 *Details of radio facilities*

Item		Actual provision
1	Primary systems	. . . . .
1.1	VHF radio installation	. . . . .
1.1.1	DSC encoder	. . . . .
1.1.2	DSC watch receiver	. . . . .
1.1.3	Radiotelephony	. . . . .
1.2	MF radio installation	. . . . .
1.2.1	DSC encoder	. . . . .
1.2.2	DSC watch receiver	. . . . .
1.2.3	Radiotelephony	. . . . .
1.3	MF/HF radio installation	. . . . .
1.3.1	DSC encoder	. . . . .
1.3.2	DSC watch receiver	. . . . .
1.3.3	Radiotelephony	. . . . .
1.3.4	Direct-printing radiotelegraphy	. . . . .
1.4	INMARSAT ship earth station	. . . . .
2	Secondary means of alerting	. . . . .
3	Facilities for reception of maritime safety information	. . . . .
3.1	NAVTEX receiver	. . . . .
3.2	EGC receiver	. . . . .
3.3	HF direct-printing radiotelegraph receiver	. . . . .
4	Satellite EPIRB	. . . . .
4.1	COSPAS–SARSAT	. . . . .
4.2	INMARSAT	. . . . .
5	VHF EPIRB	. . . . .
6	Ship's radar transponder	. . . . .
7	Radiotelephone distress frequency watch receiver on 2,182 kHz[2]	. . . . .
8	Device for generating the radiotelephone alarm signal on 2,182 kHz[3]	. . . . .

4 *Methods used to ensure availability of radio facilities* (regulations IV/15.6 and 15.7)

4.1 Duplication of equipment . . . . . .

4.2 Shore-based maintenance . . . . . .

4.3 At-sea maintenance capability . . . . . .

[2] Unless another date is determined by the Maritime Safety Committee, this item need not be reproduced on the record attached to certificates issued after 1 February 1999.

[3] This item need not be reproduced on the record attached to certificates issued after 1 February 1999.

5 *Ships constructed before 1 February 1995 which do not comply with all the applicable requirements of chapter IV of the Convention as amended in 1988*[4]

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .

6 *Ships constructed before 1 February 1992 which do not fully comply with the applicable requirements of chapter III of the Convention as amended in 1988*[5]

	Actual provision
Radiotelegraph installation for lifeboat	. . . . .
Portable radio apparatus for survival craft	. . . . .
Survival craft EPIRB (121.5 MHz and 243.0 MHz)	. . . . .
Two-way radiotelephone apparatus	. . . . .

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . . . .
(Place of issue of the Record)

. . . . . .
(Date of issue)

. . . . . .
(Signature of duly authorized official issuing the Record)

(Seal or stamp of the issuing authority, as appropriate)

[4] This section need not be reproduced on the record attached to certificates issued after 1 February 1999.

[5] This section need not be reproduced on the record attached to certificates issued after 1 February 1995.

P88 Form of Safety Construction Certificate for Cargo Ships

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as modified by the Protocol of 1988 relating thereto

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

Deadweight of ship (metric tons)[2] . . . . . .

IMO Number[3] . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

[2] For oil tankers, chemical tankers and gas carriers only.

[3] In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.600(15).

Type of ship[4]

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

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. . . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/10 of the Convention.

2 That the survey showed that 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).

3 That the last two inspections of the outside of the ship's bottom took place on . . . . . and . . . . . *(dates)*

4 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until . . . . . [5] subject to the annual and intermediate surveys and inspections of the outside of the ship's bottom in accordance with regulation I/10 of the Convention

Issued at. . . . . *(Place of issue of certificate)*

. . . . . *(Date of issue)*

. . . . . *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

[4] Delete as appropriate.

[5] Insert the date of expiry as specified by the Administration in accordance with regulation I/14(a) of the Convention. The day and the month of this date correspond to the anniversary date, as defined in regulation I/2(n) of the Convention, unless amended in accordance with regulation I/4(h).

Endorsement for annual and intermediate surveys

THIS IS TO CERTIFY that, at a survey required by regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Annual/intermediate survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/intermediate survey[4] in accordance with regulation I/14(h)(iii) of the Convention, this ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement for inspections of the outside of the ship's bottom[6]

THIS IS TO CERTIFY that, at an inspection required by regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

First inspection: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Second inspection: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.
[6] Provision may be made for additional inspections.

Endorsement to extend the certificate if valid for less than 5 years where regulation I/14(c) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(c) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

The certificate shall, in accordance with regulation I/14(e)/I/14(f)[4] of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Endorsement for advancement of anniversary date where regulation I/14(h) applies

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

P88 Form of Safety Equipment Certificate for Cargo Ships

CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment (Form E)

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as modified by the Protocol of 1988 relating thereto

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

Deadweight of ship (metric tons)[2] . . . . . .

Length of ship (regulation III/3.12) . . . . . .

IMO Number[3] . . . . . .

Type of ship[4]

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

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 . . . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/8 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.2 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.3 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.4 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

[2] For oil tankers, chemical tankers and gas carriers only.
[3] In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.600(15).
[4] Delete as appropriate.

2.5 the ship was provided with lights, shapes and means of making sound signals and distress signals in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.6 in all other respects the ship complied with the relevant requirements of the Convention.

3 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until . . . . [5] subject to the annual and periodical surveys in accordance with regulation I/8 of the Convention.

Issued at. . . . .
(Place of issue of certificate)

. . . .
(Date of issue) *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

[4] Delete as appropriate.

[5] Insert the date of expiry as specified by the Administration in accordance with regulation I/14(a) of the Convention. The day and the month of this date correspond to the anniversary date as defined in regulation I/2(n) of the Convention, unless amended in accordance with regulation I/14(h).

Endorsement for annual and periodical surveys

THIS IS TO CERTIFY that, at a survey required by regulation I/8 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey: Signed: . . . . . .
(Signature of authorized official)
Place: . . . . . .
Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: . . . . . .
(Signature of authorized official)
Place: . . . . . .
Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: . . . . . .
(Signature of authorized official)
Place: . . . . . .
Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: . . . . . .
(Signature of authorized official)
Place: . . . . . .
Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Annual/periodical survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/periodical[4] survey in accordance with regulation I/14(h)(iii) of the Convention, this ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the certificate if valid for less than 5 years where regulation I/14(c) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(c) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

The certificate shall, in accordance with regulation I/14(e)/I/14(f)[4] of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement for advancement of anniversary date where regulation I/14(h) applies

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

RECORD OF EQUIPMENT FOR THE CARGO SHIP SAFETY EQUIPMENT CERTIFICATE
(FORM E)

This Record shall be permanently attached to the Cargo Ship Safety Equipment Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

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 lifeboats	. . . . .	. . . . .
2.1	Total number of persons accommodated by them	. . . . .	. . . . .
2.2	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.6)	. . . . .	. . . . .
2.3	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)	. . . . .	. . . . .
2.4	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)	. . . . .	. . . . .
2.5	Other lifeboats	. . . . .	. . . . .
2.5.1	Number	. . . . .	. . . . .
2.5.2	Type	. . . . .	. . . . .

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

2.6	Number of freefall lifeboats	. . . . .
2.6.1	Totally enclosed (regulation III/31 and LSA Code, section 4.7)	. . . . .
2.6.2	Self-contained (regulation III/31 and LSA Code, section 4.8)	. . . . .
2.6.3	Fire-protected (regulation III/31 and LSA Code, section 4.9)	. . . . .
3	Number of motor lifeboats (included in the total lifeboats shown above)	. . . . .
3.1	Number of lifeboats fitted with searchlights	. . . . .
4	Number of rescue boats	. . . . .
4.1	Number of boats which are included in the total lifeboats shown above	. . . . .
5	Liferafts	. . . . .
5.1	Those for which approved launching appliances are required	. . . . .
5.1.1	Number of liferafts	. . . . .
5.1.2	Number of persons accommodated by them	. . . . .
5.2	Those for which approved launching appliances are not required	. . . . .
5.2.1	Number of liferafts	. . . . .
5.2.2	Number of persons accommodated by them	. . . . .
5.3	Number of liferafts required by regulation III/31.1.4	. . . . .
6	Number of lifebuoys	. . . . .
7	Number of lifejackets	. . . . .
8	Immersion suits	. . . . .
8.1	Total number	. . . . .
8.2	Number of suits complying with the requirements for lifejackets	. . . . .
9	Number of thermal protective aids[1]	. . . . .
10	Radio installations used in life-saving appliances	. . . . .
10.1	Number of radar transponders	. . . . .
10.2	Number of two-way VHF radiotelephone apparatus	. . . . .

[1] Excluding those required by the LSA Code, paragraphs 4.1.5.1.24; 4.4.8.31 and 5.1.2.2.13.

3 ***Ships constructed before 1 February 1992 which do not fully comply with the applicable requirements of chapter III of the Convention as amended in 1988***[2]

	Actual provision
Radiotelegraph installation for lifeboat	. . . .
Portable radio apparatus for survival craft	. . . .
Survival craft EPIRB (121.5 MHz and 243.0 MHz)	. . . .
Two-way radiotelephone apparatus	. . . .

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . .
(Place of issue of the Record)

. . . .
(Date of issue) *(Signature of duly authorized official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

[2] This section need not be reproduced on the record attached to certificates issued after 1 February 1995.

P88 Form of Safety Radio Certificate for Cargo Ships

CARGO SHIP SAFETY RADIO CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment of Radio Facilities (Form R)

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as modified by the Protocol of 1988 relating thereto

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

Sea areas in which ship is certified to operate (regulation IV/2) . . . .

IMO Number[2] . . . .

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 . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/9 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards radio installations;

2.2 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention.

3 That an Exemption Certificate has/has not[3] been issued.

This certificate is valid until . . . . [4] subject to the periodical surveys in accordance with regulation I/9 of the Convention.

Issued at. . . . .
(Place of issue of certificate)

. . . .
(Date of issue) *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

[2] In accordance with the IMO ship identification number scheme adopted by the Organization by resolution A.600(15).
[3] Delete as appropriate.
[4] Insert the date of expiry as specified by the Administration in accordance with regulation I/14(a) of the Convention. The day and the month of this date correspond to the anniversary date as defined in regulation 1/2(n) of the Convention, unless amended in accordance with regulation I/14(h).

Endorsement for periodical surveys

THIS IS TO CERTIFY that, at a survey required by regulation I/9 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at a periodical survey in accordance with regulation I/14(h)(iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the certificate if valid for less than 5 years where regulation I/14(c) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(c) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

The certificate shall, in accordance with regulation I/14(e)/I/14(f)[3] of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement for advancement of anniversary date where regulation I/14(h) applies

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[3] Delete as appropriate.

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

This Record shall be permanently attached to the Cargo Ship Safety Radio Certificate

RECORD OF EQUIPMENT OF RADIO FACILITIES FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Minimum number of persons with required qualifications to operate the radio installations. . . . . .

2 *Details of radio facilities*

	Item	Actual provision
1	Primary systems	
1.1	VHF radio installation	
1.1.1	DSC encoder	. . . . .
1.1.2	DSC watch receiver	. . . . .
1.1.3	Radiotelephony	. . . . .
1.2	MF radio installation	. . . . .
1.2.1	DSC encoder	. . . . .
1.2.2	DSC watch receiver	. . . . .
1.2.3	Radiotelephony	. . . . .
1.3	MF/HF radio installation	. . . . .
1.3.1	DSC encoder	. . . . .
1.3.2	DSC watch receiver	. . . . .
1.3.3	Radiotelephony	. . . . .
1.3.4	Direct-printing telegraphy	. . . . .
1.4	INMARSAT ship earth station	. . . . .
2	Secondary means of alerting	. . . . .
3	Facilities for reception of maritime safety information	
3.1	NAVTEX receiver	. . . . .
3.2	EGC receiver	. . . . .
3.3	HF direct-printing radiotelegraph receiver	. . . . .
4	Satellite EPIRB	
4.1	COSPAS–SARSAT	. . . . .
4.2	INMARSAT	. . . . .

2 ***Details of radio facilities*** *(continued)*

	Item	Actual provision
5	VHF EPIRB	. . . . .
6	Ship's radar transponder	. . . . .
7	Radiotelephone distress frequency watch receiver on 2,182 kHz[1]	. . . . .
8	Device for generating the radiotelephone alarm signal on 2,182 kHz[2]	. . . . .

3 ***Methods used to ensure availability of radio facilities*** (regulations IV/15.6 and 15.7)

3.1 Duplication of equipment . . . . . .

3.2 Shore-based maintenance . . . . . .

3.3 At-sea maintenance capability . . . . . .

4 ***Ships constructed before 1 February 1995 which do not comply with all the applicable requirements of chapter IV of the Convention as amended in 1988***[2]

4.1 For ships required to be fitted with radiotelegraphy in accordance with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .

4.2 For ships required to be fitted with radiotelephony with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .

[1] Unless another date is determined by the Maritime Safety Committee, this item need not be reproduced on the record attached to certificates issued after 1 February 1999.

[2] This item need not be reproduced on the record attached to certificates issued after 1 February 1999.

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . .
(Place of issue of the Record)

. . . .

(Date of issue) *(Signature of duly authorized official issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

P88 Form of Safety Certificate for Cargo Ships

CARGO SHIP SAFETY CERTIFICATE

This Certificate shall be supplemented by a Record of Equipment
(Form C)

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE
AT SEA, 1974, as modified by the Protocol of 1988 relating thereto

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Port of registry . . . . . .

Gross tonnage . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

Deadweight of ship (metric tons)[2] . . . . . .

Length of ship (regulation III/3.12) . . . . . .

Sea areas in which ship is certified to operate (regulation IV/2) . . . . . .

IMO Number[3] . . . . . .

Type of ship[4]

Oil tanker

Chemical tanker

Gas carrier

Cargo ship other than any of the above

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for an alteration or modification of a major character was commenced . . . . . .

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulations I/8, I/9 and I/10 of the Convention.

2 That the survey showed that:

2.1 the condition of the structure, machinery and equipment as defined in regulation I/10 was satisfactory and the ship complied with the relevant requirements of chapter II-1 and chapter II-2 of the Convention (other than those relating to fire safety systems and appliances and fire control plans);

2.2 the last two inspections of the outside of the ship's bottom took place on

. . . . . and . . . . . .
(dates)

2.3 the ship complied with the requirements of the Convention as regards fire safety systems and appliances and fire control plans;

2.4 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

[2] For oil tankers, chemical tankers and gas carriers only.
[3] In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.600(15).
[4] Delete as appropriate.

2.5 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.6 the ship complied with the requirements of the Convention as regards radio installations;

2.7 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.8 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.9 the ship was provided with lights, shapes, means of making sound signals and distress signals in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.10 in all other respects the ship complied with the relevant requirements of the Convention.

3 That an Exemption Certificate has/has not[4] been issued.

This certificate is valid until . . . . [5] subject to the annual, intermediate and periodical surveys and inspections of the outside of the ship's bottom in accordance with regulations I/8, I/9 and I/10 of the Convention.

Issued at . . . .
(Place of issue of certificate)

. . . .
(Date of issue)

. . . .
(Signature of authorized official issuing the certificate)

(Seal or stamp of the issuing authority, as appropriate)

[4] Delete as appropriate.

[5] Insert the date of expiry as specified by the Administration in accordance with regulation I/14(a) of the Convention. The day and the month of this date correspond to the anniversary date as defined in regulation I/2(n) of the Convention, unless amended in accordance with regulation I/14(h).

Endorsement for annual and intermediate surveys relating to structure, machinery and equipment referred to in paragraph 2.1 of this certificate

THIS IS TO CERTIFY that, at a survey required by regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Annual/intermediate survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/intermediate[4] survey in accordance with regulations I/10 and I/14(h)(iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement for inspections of the outside of the ship's bottom[6]

THIS IS TO CERTIFY that, at an inspection required by regulation I/10 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

First inspection:

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Second inspection:

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.
[6] Provision may be made for additional inspections.

Endorsement for annual and periodical surveys relating to life-saving appliances and other equipment referred to in paragraphs 2.3, 2.4, 2.5, 2.8 and 2.9 of this certificate

THIS IS TO CERTIFY that, at a survey required by regulation I/8 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual/Periodical[4] survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed: . . . . . *(Signature of authorized official)*

Place: . . . . .

Date: . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Annual/periodical survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at an annual/periodical[4] survey in accordance with regulations I/8 and I/14(h)(iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

Endorsement for periodical surveys relating to radio installations referred to in paragraphs 2.6 and 2.7 of this certificate

THIS IS TO CERTIFY that, at a survey required by regulation I/9 of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey: Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Periodical survey in accordance with regulation I/14(h)(iii)

THIS IS TO CERTIFY that, at a periodical survey in accordance with regulations I/9 and I/14(h)(iii) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the certificate if valid for less than 5 years where regulation I/14(c) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(c) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

The ship complies with the relevant requirements of the Convention, and this certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

The certificate shall, in accordance with regulation I/14(e)/I/14(f)[4] of the Convention, be accepted as valid until . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement for advancement of anniversary date where regulation I/14(h) applies

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

In accordance with regulation I/14(h) of the Convention, the new anniversary date is . . . . . .

Signed: . . . . . .
(Signature of authorized official)

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[4] Delete as appropriate.

RECORD OF EQUIPMENT FOR THE CARGO SHIP SAFETY CERTIFICATE (FORM C)

This Record shall be permanently attached to the Cargo Ship Safety Equipment Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS MODIFIED BY THE PROTOCOL OF 1988 RELATING THERETO

1 *Particulars of ship*

Name of ship . . . . . .

Distinctive number or letters . . . . . .

Minimum number of persons with required qualifications to operate the radio installations. . . . . .

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 lifeboats	. . . . .	. . . . .
2.1	Total number of persons accommodated by them	. . . . .	. . . . .
2.2	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.6)	. . . . .	. . . . .
2.3	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)	. . . . .	. . . . .
2.4	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)	. . . . .	. . . . .
2.5	Other lifeboats	. . . . .	. . . . .
2.5.1	Number	. . . . .	. . . . .
2.5.2	Type	. . . . .	. . . . .

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

2.6	Number of freefall lifeboats	. . . . .
2.6.1	Totally enclosed (regulation III/31 and LSA Code, section 4.7)	. . . . .
2.6.2	Self-contained (regulation III/31 and LSA Code, section 4.8)	. . . . .
2.6.3	Fire-protected (regulation III/31 and LSA Code, section 4.9)	. . . . .
3	Number of motor lifeboats included in the total lifeboats shown above	. . . . .
3.1	Number of lifeboats fitted with searchlights	. . . . .
4	Number of rescue boats	. . . . .
4.1	Number of boats which are included in the total lifeboats shown above	. . . . .
5	Liferafts	. . . . .
5.1	Those for which approved launching appliances are required	. . . . .
5.1.1	Number of liferafts	. . . . .
5.1.2	Number of persons accommodated by them	. . . . .
5.2	Those for which approved launching appliances are not required	. . . . .
5.2.1	Number of liferafts	. . . . .
5.2.2	Number of persons accommodated by them	. . . . .
5.3	Number of liferafts required by regulation III/31.1.4	. . . . .
6	Number of lifebuoys	. . . . .
7	Number of lifejackets	. . . . .
8	Immersion suits	. . . . .
8.1	Total number	. . . . .
8.2	Number of suits complying with the requirements for lifejackets	. . . . .
9	Number of thermal protective aids[1]	. . . . .
10	Radio installations used in life-saving appliances	. . . . .
10.1	Number of radar transponders	. . . . .
10.2	Number of two-way VHF radiotelephone apparatus	. . . . .

[1] Excluding those required by the LSA Code, paragraphs 4.1.5.1.24; 4.4.8.31 and 5.1.2.2.13.

3 *Details of radio facilities*

	Item	Actual provision
1	Primary systems	
1.1	VHF radio installation	
1.1.1	DSC encoder	. . . . .
1.1.2	DSC watch receiver	. . . . .
1.1.3	Radiotelephony	. . . . .
1.2	MF radio installation	. . . . .
1.2.1	DSC encoder	. . . . .
1.2.2	DSC watch receiver	. . . . .
1.2.3	Radiotelephony	. . . . .
1.3	MF/HF radio installation	. . . . .
1.3.1	DSC encoder	. . . . .
1.3.2	DSC watch receiver	. . . . .
1.3.3	Radiotelephony	. . . . .
1.3.4	Direct-printing telegraphy	. . . . .
1.4	INMARSAT ship earth station	. . . . .
2	Secondary means of alerting	. . . . .
3	Facilities for reception of maritime safety information	
3.1	NAVTEX receiver	. . . . .
3.2	EGC receiver	. . . . .
3.3	HF direct-printing radiotelegraph receiver	. . . . .
4	Satellite EPIRB	
4.1	COSPAS–SARSAT	. . . . .
4.2	INMARSAT	. . . . .
5	VHF EPIRB	. . . . .
6	Ship's radar transponder	. . . . .
7	Radiotelephone distress frequency watch receiver on 2,182 kHz[2]	. . . . .
8	Device for generating the radiotelephone alarm signal on 2,182 kHz[3]	. . . . .

4 *Methods used to ensure availability of radio facilities* (regulations IV/15.6 and 15.7)

4.1 Duplication of equipment . . . . . .

4.2 Shore-based maintenance . . . . . .

4.3 At-sea maintenance capability . . . . . .

[2] Unless another date is determined by the Maritime Safety Committee, this item need not be reproduced on the record attached to certificates issued after 1 February 1999.

[3] This item need not be reproduced on the record attached to certificates issued after 1 February 1999.

5 *Ships constructed before 1 February 1995 which do not comply with all the applicable requirements of chapter IV of the Convention as amended in 1988*[4]

5.1 For ships required to be fitted with radiotelegraphy in accordance with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .

5.2 For ships required to be fitted with radiotelephony in accordance with the Convention in force prior to 1 February 1992.

	Requirements of regulations	Actual provision
Hours of listening	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .

6 *Ships constructed before 1 February 1992 which do not fully comply with the applicable requirements of chapter III of the Convention as amended in 1988*[5]

	Actual provision
Radiotelegraph installation for lifeboat	. . . . .
Portable radio apparatus for survival craft	. . . . .
Survival craft EPIRB (121.5 MHz and 243.0 MHz)	. . . . .
Two-way radiotelephone apparatus	. . . . .

[4] This section need not be reproduced on the record attached to certificates issued after 1 February 1999.

[5] This section need not be reproduced on the record attached to certificates issued after 1 February 1995.

THIS IS TO CERTIFY that this Record is correct in all respects

Issued at . . . . . .
(Place of issue of the Record)

. . . . . .
(Date of issue)

. . . . . .
(Signature of duly authorized official issuing the Record)

(Seal or stamp of the issuing authority, as appropriate)

P88 Form of Exemption Certificate

EXEMPTION CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as modified by the Protocol of 1988 relating thereto,

under the authority of the Government of

_____

(name of the State)

by _____

(person or organization authorized)

Particulars of ship[1]

Name of ship . . . . . .

Distinctive number or letters . . . . . .

[1] Alternatively, the particulars of the ship may be placed horizontally in boxes.

Port of registry . . . .

Gross tonnage . . . .

IMO Number[2] . . . .

THIS IS TO CERTIFY:

That the ship is, under the authority conferred by regulation . . . .
of the Convention, exempted from the requirements of . . . .
. . . . of the Convention.

Conditions, if any, on which the Exemption Certificate is granted:
. . . .
. . . .

Voyages, if any, for which the Exemption Certificate is granted:
. . . .
. . . .

This certificate is valid until . . . . subject
to the . . . . .Certificate,
to which this certificate is attached, remaining valid.

Issued at. . . . .
(Place of issue of certificate)

. . . .
(Date of issue) *(Signature of authorized official issuing the certificate)*

(Seal or stamp of the issuing authority, as appropriate)

[2] In accordance with IMO ship identification number scheme adopted by the Organization by resolution A.600(15)

Endorsement to extend the certificate if valid for less than 5 years where regulation I/14(c) applies

This certificate shall, in accordance with regulation I/14(c) of the Convention, be accepted as valid until . . . . . subject to the . . . . . Certificate, to which this certificate is attached, remaining valid.

Signed: . . . . . *(Signature of authorized official)*

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement where the renewal survey has been completed and regulation I/14(d) applies

This certificate shall, in accordance with regulation I/14(d) of the Convention, be accepted as valid until . . . . . subject to the . . . . . Certificate, to which this certificate is attached, remaining valid.

Signed: . . . . . *(Signature of authorized official)*

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

Endorsement to extend the validity of the certificate until reaching the port of survey or for a period of grace where regulation I/14(e) or I/14(f) applies

The certificate shall, in accordance with regulation I/14(e)/I/14(f)[3] of the Convention, be accepted as valid until . . . . . subject to the . . . . . Certificate, to which this certificate is attached, remaining valid.

Signed: . . . . . *(Signature of authorized official)*

Place: . . . . . .

Date: . . . . . .

(Seal or stamp of the authority, as appropriate)

[3] Delete as appropriate.

Form of Nuclear Passenger Ship Safety Certificate

NUCLEAR PASSENGER SHIP SAFETY CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage	Particulars of voyages, if any, sanctioned under regulation 27(c)(vii) of chapter III*	Date on which keel was laid (see NOTE below)

The
I, the undersigned

(*Name*) Government certifies
(*Name*) certify

I. that the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. that the ship, being a nuclear ship, complied with all the requirements of chapter VIII of the Convention and conformed to the safety assessment approved for the ship.

III. that the survey showed that the ship complied with the requirements of the regulations annexed to the said Convention as regards:

* Now regulation III/21.1.2.

(1) the structure, main and auxiliary boilers and other pressure vessels and machinery;

(2) the watertight subdivision arrangements and details;

(3) the following subdivision load lines:

Subdivision load lines assigned and marked on the ship's side at amidships (regulation 11 of chapter II-1)*	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C.1	. . . . .	. . . . .
C.2	. . . . .	. . . . .
C.3	. . . . .	. . . . .

IV. that the life-saving appliances provide for a total number of . . . . . persons and no more, viz.:

. . . . . lifeboats (including . . . . . motor lifeboats) capable of accommodating . . . . . persons, and . . . . . motor lifeboats fitted with radiotelegraph installation and searchlight (included in the total lifeboats shown above) and . . . . . motor lifeboats fitted with searchlight only (also included in the total lifeboats shown above), requiring . . . . . certificated lifeboatmen;

. . . . . liferafts, for which approved launching devices are required, capable of accommodating . . . . . persons; and

. . . . . liferafts, for which approved launching devices are not required, capable of accommodating . . . . . persons;

. . . . . buoyant apparatus capable of supporting . . . . . persons;

. . . . . lifebuoys;

. . . . . lifejackets.

V. that the lifeboats and liferafts were equipped in accordance with the provisions of the regulations.

VI. that the ship was provided with a line-throwing appliance and portable radio apparatus for survival craft, in accordance with the provisions of the regulations.

VII. that the ship complied with the requirements of the regulations as regards radiotelegraph installations, viz.:

* Now regulation II-1/13.

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .
Whether direction-finder fitted	. . . . .	. . . . .
Whether radio equipment for homing on the radio-telephone distress frequency fitted	. . . . .	. . . . .
Whether radar fitted	. . . . .	. . . . .
Number of passengers for which certificated	. . . . .	. . . . .

VIII. that the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the regulations.

IX. that the ship complied with the requirements of the regulations as regards fire-detecting and fire-extinguishing appliances, radar, echo-sounding device and gyro-compass and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals, and distress signals in accordance with the provisions of the regulations and also the International Regulations for Preventing Collisions at Sea in force.

X. that in all other respects the ship complied with the requirements of the regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the . . . . . Government. It will remain in force until. . . . . .

Issued at . . . . . the . . . . . day of . . . . . 19. . . . .

Here follows the seal or signature of the authority entitled to issue the certificate.

(Seal)

If signed, the following paragraph is to be added:

The undersigned declares that he is duly authorized by the said Government to issue this certificate.

(Signature)

NOTE: In the case of a ship which is converted as provided in regulation 1(b)(i) of chapter II-1* or regulation 1(a)(i) of chapter II-2†, the date on which the work of conversion was begun should be given.

* Now regulation II-1/1.1.3.3.
† Now regulation II-2/1.1.3.3.

Form of Nuclear Cargo Ship Safety Certificate

NUCLEAR CARGO SHIP SAFETY CERTIFICATE

(Official seal) *(State)*

Issued under the provisions of the

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage	Date on which keel was laid

The
I, the undersigned

(*Name*) Government certifies
(*Name*) certify

I. that the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. that the ship, being a nuclear ship, complied with all the requirements of chapter VIII of the Convention and conformed to the safety assessment approved for the ship.

III. that the survey showed that the ship satisfied the requirements set out in regulation 10 of chapter I of the Convention as to hull, machinery and equipment, and complied with the relevant requirements of chapter II-1 and chapter II-2.

IV. that the life-saving appliances provide for a total number of . . . . . persons and no more, viz.:

. . . . . lifeboats on port side capable of accommodating . . . . . persons;

. . . . . lifeboats on starboard side capable of accommodating . . . . . persons;

. . . . . motor lifeboats (included in the total lifeboats shown above) including . . . . . motor lifeboats fitted with radiotelegraph installation and searchlight, and . . . . . motor lifeboats fitted with searchlight only;

. . . . . liferafts, for which approved launching devices are required, capable of accommodating . . . . . persons; and

. . . . . liferafts, for which approved launching devices are not required, capable of accommodating . . . . . persons;

. . . . . lifebuoys;

. . . . . lifejackets.

V. that the lifeboats and liferafts were equipped in accordance with the provisions of the regulations annexed to the Convention.

VI. that the ship was provided with a line-throwing apparatus and portable radio apparatus for survival craft in accordance with the provisions of the regulations.

VII. that the ship complied with the requirements of the regulations as regards radiotelegraph installations, viz.:

	Requirements of regulations	Actual provision
Hours of listening by operator	. . . . .	. . . . .
Number of operators	. . . . .	. . . . .
Whether auto alarm fitted	. . . . .	. . . . .
Whether main installation fitted	. . . . .	. . . . .
Whether reserve installation fitted	. . . . .	. . . . .
Whether main and reserve transmitters electrically separated or combined	. . . . .	. . . . .
Whether direction-finder fitted	. . . . .	. . . . .
Whether radio equipment for homing on the radio-telephone distress frequency fitted	. . . . .	. . . . .
Whether radar fitted	. . . . .	. . . . .

VIII. that the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the regulations.

IX. that the inspection showed that the ship complied with the requirements of the said Convention as regards fire-extinguishing appliances, radar, echo-sounding device and gyro-compass and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals in accordance with the provisions of the regulations and the International Regulations for Preventing Collisions at Sea in force.

X. that in all other respects the ship complied with the requirements of the regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the . . . . . Government. It will remain in force until . . . . . .

Issued at . . . . . the . . . . . day of . . . . . 19. . . .

Here follows the seal or signature of the authority entitled to issue the certificate.

(Seal)

If signed, the following paragraph is to be added:

The undersigned declares that he is duly authorized by the said Government to issue this certificate.

(Signature)

NOTE: In the case of a ship which is converted as provided in regulation 1(b)(i) of chapter II-1* or regulation 1(a)(i) of chapter II-2†, the date on which the work of conversion was begun should be given.

* Now regulation II-1/1.1.3.3.
† Now regulation II-2/1.1.3.3.

Part 2

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Annex 1

Resolution A.883(21)

Global and uniform implementation of the harmonized system of survey and certification (HSSC)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO that the International Conference on the Harmonized System of Survey and Certification, 1988 (1988 HSSC Conference), adopted the Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974 (1988 SOLAS Protocol), and the Protocol of 1988 relating to the International Convention on Load Lines, 1966 (1988 Load Line Protocol), which introduce, *inter alia*, the harmonized system of survey and certification under the International Convention for the Safety of Life at Sea, 1974 (1974 SOLAS Convention) and the International Convention on Load Lines, 1966 (1966 Load Line Convention),

NOTING that the 1988 SOLAS and Load Line Protocols are due to enter into force on 3 February 2000, resulting in the harmonized system of survey and certification taking effect as from that date with respect to ships entitled to fly the flag of States Parties to the 1988 SOLAS and Load Line Protocols,

NOTING ALSO that, by the resolutions given below, amendments have been adopted to introduce the harmonized system of survey and certification in the following instruments:

(a) Annexes I and II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), by resolution MEPC.39(29);

(b) the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code), by resolutions MEPC.40(29) and MSC.16(58);

(c) the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), by resolution MSC.17(58); and

(d) the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code), by resolutions MEPC.41(29) and MSC.18(58),

NOTING FURTHER that the aforementioned amendments to the above instruments will also enter into force on 3 February 2000, and that:

(a) amendments to MARPOL 73/78, the IBC Code and BCH Code will take effect with respect to ships entitled to fly the flags of States Parties to MARPOL 73/78; and

(b) amendments to the IBC Code and the IGC Code will take effect with respect to ships entitled to fly the flags of States the Governments of which are Contracting Governments of the 1974 SOLAS Convention,

irrespective of whether or not they are also Parties to the 1988 SOLAS and Load Line Protocols,

BEING DESIROUS that all States apply a single and uniform system of survey and certification to all types of ships entitled to fly their flags,

RECOGNIZING the need for the change-over from the existing system of survey and certification to the harmonized system in a uniform manner,

RECALLING resolution A.718(17) on early implementation of the harmonized system of survey and certification, which encourages States to introduce the harmonized system of survey and certification prior to the entry into force of the 1988 SOLAS and Load Line Protocols,

BEING CONVINCED that the harmonized system of survey and certification is at least equivalent to the system prescribed in the existing SOLAS and Load Line Conventions,

BELIEVING that the implementation of a single and uniform system of survey and certification could best be achieved through the introduction of the harmonized system of survey and certification also by States which are not Parties to the 1988 SOLAS and Load Line Protocols, as equivalent to the existing system,

BELIEVING ALSO that the global and uniform implementation of the harmonized system of survey and certification by all States could avoid possible problems or confusion by contributing to the determination of the duration and validity of certificates issued,

HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its seventy-first session and by the Marine Environment Protection Committee at its forty-third session,

1. INVITES States to introduce the harmonized system of survey and certification in the manner provided for in annex 1 to the present resolution;

2. AGREES that States which are Contracting Governments to the 1974 SOLAS Convention and the 1966 Load Line Convention, but not Parties to the 1988 SOLAS and Load Line Protocols, may:

(a) implement the harmonized system of survey and certification as from 3 February 2000; and

(b) issue certificates in the form prescribed by the 1988 SOLAS and Load Line Protocols as modified in accordance with annex 2 to the present resolution;

3. INVITES port States, whether or not they are Parties to the 1988 SOLAS and Load Line Protocols, to accept the certificates issued in accordance with paragraph 1 above as equivalent to the certificates issued under the SOLAS and Load Line Convention or Protocols in force for those States;

4. REQUESTS Governments that implement the harmonized system of survey and certification in accordance with the provisions of this resolution to inform the Secretary-General of their action and of the date when it will take effect;

5. REQUESTS ALSO that the Secretary-General keep Governments informed of those Governments that are introducing the harmonized system of survey and certification in accordance with the provisions of this resolution;

6. URGES States which have not yet become Party to the 1988 SOLAS and Load Line Protocols to do so as soon as possible.

Annex 1

Introduction of the harmonized system of survey and certification

1 The current certificates that are on board a particular ship on 3 February 2000 will remain valid until they expire.

2 The date for the introduction of the harmonized system of survey and certification (HSSC) after 3 February 2000 should normally be the latest expiry date of certificates issued under the SOLAS, Load Line and MARPOL Conventions, unless another convenient date, e.g. the expiry date of the Cargo Ship Safety Construction Certificate, the date of dry-docking or date of repair or renovation, is agreed upon between the shipowner or company and the Administration.

3 In the case where an existing certificate has expired before the date of introduction of the harmonized system, a new certificate using the form prescribed under the harmonized system may be issued after the renewal

survey has been carried out. The validity of the new certificate may be limited to the date of introduction of the harmonized system as provided for in paragraph 2 above.

4 Notwithstanding that some certificates may still be valid when the harmonized system of survey and certification is introduced on a particular ship, renewal surveys should be carried out whether or not they are due, and a new set of the relevant certificates under the harmonized system should be issued and the anniversary date common to all certificates should be specified. In general, renewal surveys completed within three months of the date of introduction of the harmonized system may be valid, and the extent of renewal surveys to be carried out may take account of the date and extent of the previous renewal surveys if carried out only recently.

5 When implementing the harmonized system of survey and certification, it should be applied to all types of ships and in respect of all relevant instruments.

Annex 2

Modifications to the forms of certificates prescribed by the 1988 SOLAS and Load Line Protocols

Passenger Ship Safety Certificate
Cargo Ship Safety Construction Certificate
Cargo Ship Safety Equipment Certificate
Cargo Ship Safety Radio Certificate
Cargo Ship Safety Certificate

After the words ''Issued under the provisions of the INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974'' *delete* ''as modified by the Protocol of 1988 relating thereto'' *and insert* ''in accordance with Assembly resolution A.883(21) relating to the global implementation of the harmonized system of survey and certification''.

Record of Equipment for the Passenger Ship Safety Certificate (Form P)
Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E)
Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R)
Record of Equipment for the Cargo Ship Safety Certificate (Form C)

After the words ''RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974''

delete ''as modified by the Protocol of 1988 relating thereto'' *and insert* ''in accordance with Assembly resolution A.883(21) relating to the global implementation of the harmonized system of survey and certification''.

International Load Line Certificate
International Load Line Exemption Certificate

After the words ''Issued under the provisions of the INTERNATIONAL CONVENTION ON LOAD LINES, 1966'' *delete* ''as modified by the Protocol of 1988 relating thereto'' *and insert* ''in accordance with Assembly resolution A.883(21) relating to the global implementation of the harmonized system of survey and certification''.

Annex 2
Certificates and documents required to be carried on board ships

(Note: All certificates to be carried on board must be originals)

	Reference
1 All ships	
International Tonnage Certificate (1969) An International Tonnage Certificate (1969) shall be issued to every ship, the gross and net tonnage of which have been determined in accordance with the Convention.	Tonnage Convention, art. 7
International Load Line Certificate An International Load Line Certificate shall be issued under the provisions of the International Convention on Load Lines, 1966, to every ship which has been surveyed and marked in accordance with the Convention or the Convention as modified by the 1988 LL Protocol, as appropriate.	LL Convention, art. 16; 1988 LL Protocol, art. 18
International Load Line Exemption Certificate An International Load Line Exemption Certificate shall be issued to any ship to which an exemption has been granted under and in accordance with article 6 of the Load Line Convention or the Convention as modified by the 1988 LL Protocol, as appropriate.	LL Convention, art. 6; 1988 LL Protocol, art. 18
Intact Stability Booklet Every passenger ship regardless of size and every cargo ship of 24 m and over shall be inclined on completion and the elements of their stability determined. The master shall be supplied with a Stability Booklet containing such information as is necessary to enable him, by rapid and simple procedures, to obtain accurate guidance as to the ship under varying conditions of loading. For bulk carriers, the information required in a bulk carrier booklet may be contained in the stability booklet.	SOLAS 1974, regs. II-1/22 and II-1/25-8; 1988 LL Protocol, reg. 10

	Reference
Damage control booklets On passenger and cargo ships, there shall be permanently exhibited 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. Booklets containing the aforementioned information shall be made available to the officers of the ship.	SOLAS 1974, regs. II-1/23, 23-1, 25-8
Minimum safe manning document Every ship to which chapter I of the Convention applies shall be provided with an appropriate safe manning document or equivalent issued by the Administration as evidence of the minimum safe manning.	SOLAS 1974 (1989 amdts.), reg. V/13(b)
Certificates for masters, officers or ratings Certificates for masters, officers or ratings shall be issued to those candidates who, to the satisfaction of the Administration, meet the requirements for service, age, medical fitness, training, qualifications and examinations in accordance with the provisions of the STCW Code annexed to the Convention on Standards of Training, Certification and Watch-keeping for Seafarers, 1978. Formats of certificates are given in section A-I/2 of the STCW Code. Certificates must be kept available in their original form on board the ships on which the holder is serving.	STCW 1978 (1995 amdts.), art. VI, reg. I/2; STCW Code, section A-I/2
International Oil Pollution Prevention Certificate An International Oil Pollution Prevention Certificate shall be issued after survey in accordance with regulation 4 of Annex I of MARPOL 73/78, to any oil tanker of 150 gross tonnage and above and any other ship of 400 gross tonnage and above which are engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to MARPOL 73/78. The certificate is supplemented by a Record of Construction and Equipment for Ships Other Than Oil Tankers (Form A) or a Record of Construction and Equipment for Oil Tankers (Form B), as appropriate.	MARPOL 73/78, Annex I, reg. 5

	Reference
Oil Record Book Every oil tanker of 150 gross tonnage and above and every ship of 400 gross tonnage and above other than an oil tanker shall be provided with an Oil Record Book, Part I (Machinery space operations). Every oil tanker of 150 gross tonnage and above shall also be provided with an Oil Record Book, Part II (Cargo/ ballast operations).	MARPOL 73/78, Annex I, reg. 20
Shipboard Oil Pollution Emergency Plan Every oil tanker of 150 gross tonnage and above and every ship other than an oil tanker of 400 gross tonnage and above shall carry on board a Shipboard Oil Pollution Emergency Plan approved by the Administration.	MARPOL 73/78, Annex I, reg. 26
Garbage Management Plan Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 persons or more shall carry a garbage management plan which the crew shall follow.	MARPOL 73/78, Annex V, reg. 9
Garbage Record Book Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 persons or more engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention and every fixed and floating platform engaged in exploration and exploitation of the sea-bed shall be provided with a Garbage Record Book.	MARPOL 73/78, Annex V, reg. 9
Cargo Securing Manual Cargo units, including containers, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. The Cargo Securing Manual is required on all types of ships engaged in the carriage of all cargoes other than solid and liquid bulk cargoes, which shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.	SOLAS 1974, regs. VI/5, VII/6; MSC/Circ.745
Document of Compliance A document of compliance shall be issued to every company which complies with the requirements of the ISM Code. A copy of the document shall be kept on board.	SOLAS 1974, reg. IX/4; ISM Code, paragraph 13

	Reference
Safety Management Certificate	
A Safety Management Certificate shall be issued to every ship by the Administration or an organization recognized by the Administration. The Administration or an organization recognized by it shall, before issuing the Safety Management Certificate, verify that the company and its shipboard management operate in accordance with the approved safety management system.	SOLAS 1974, reg. IX/4; ISM Code, paragraph 13
2 In addition to the certificates listed in section 1 above, passenger ships shall carry:	
Passenger Ship Safety Certificate[*] A certificate called a Passenger Ship Safety Certificate shall be issued after inspection and survey to a passenger ship which complies with the requirements of chapters II-1, II-2, III and IV and any other relevant requirements of SOLAS 1974. A Record of Equipment for the Passenger Ship Safety Certificate (Form P) shall be permanently attached.	SOLAS 1974, reg. I/12, as amended by the GMDSS amdts.; 1988 SOLAS Protocol, reg. I/12
Exemption Certificate[†] When an exemption is granted to a ship under and in accordance with the provisions of SOLAS 1974, a certificate called an Exemption Certificate shall be issued in addition to the certificates listed above.	SOLAS 1974, reg. I/12; 1988 SOLAS Protocol, reg. I/12
Special trade passenger ships A form of safety certificate for special trade passenger ships, issued under the provisions of the Special Trade Passenger Ships Agreement, 1971.	STP Agreement, reg. 6
Special Trade Passenger Ships Space Certificate issued under the provisions of the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.	SSTP 73, rule 5
Search and rescue co-operation plan Passenger ships to which chapter I of the Convention applies, trading on fixed routes, shall have on board a plan for co-operation with appropriate search and rescue services in event of an emergency.	SOLAS 1974 (1995 Conference amdts), reg. V/15(c)

[*] The form of the certificate and its Record of Equipment may be found in the GMDSS amendments to SOLAS 1974.

[†] SLS.14/Circ.115 and Add. 1 refers to the issue of exemption certificates.

	Reference
List of operational limitations Passenger ships to which chapter I of the Convention applies shall keep on board a list of all limitations on the operation of the ship, including exemptions from any of the SOLAS regulations, restrictions in operating areas, weather restrictions, sea state restrictions, restrictions in permissible loads, trim, speed and any other limitations, whether imposed by the Administration or established during the design or the building stages.	SOLAS 1974 (1995 Conference amdts), reg. V/23
Decision support system for masters In all passenger ships, a decision support system for emergency management shall be provided on the navigation bridge.	SOLAS 1974, reg. III/24-4

3 In addition to the certificates listed in section 1 above, cargo ships shall carry:

Cargo Ship Safety Construction Certificate[*] A certificate called a Cargo Ship Safety Construction Certificate shall be issued after survey to a cargo ship of 500 gross tonnage and over which satisfies the requirements for cargo ships on survey, set out in regulation I/10 of SOLAS 1974, and complies with the applicable requirements of chapters II-1 and II-2, other than those relating to fire-extinguishing appliances and fire control plans.	SOLAS 1974, reg. I/12, as amended by the GMDSS amdts.; 1988 SOLAS Protocol, reg. I/12
Cargo Ship Safety Equipment Certificate[†] A certificate called a Cargo Ship Safety Equipment Certificate shall be issued after survey to a cargo ship of 500 gross tonnage and over which complies with the relevant requirements of chapters II-1, II-2 and III and any other relevant requirements of SOLAS 1974. A Record of Equipment for the Cargo Ship Safety Equipment Certificate (Form E) shall be permanently attached.	SOLAS 1974, reg. I/12, as amended by the GMDSS amdts.; 1988 SOLAS Protocol, reg. I/12

[*] The form of the certificate may be found in the GMDSS amendments to SOLAS 1974.

[†] The form of the certificate and its Record of Equipment may be found in the GMDSS amendments to SOLAS 1974.

	Reference
Cargo Ship Safety Radio Certificate[*] A certificate called a Cargo Ship Safety Radio Certificate shall be issued after survey to a cargo ship of 300 gross tonnage and over, fitted with a radio installation, including those used in life-saving appliances which complies with the requirements of chapters III and IV and any other relevant requirements of SOLAS 1974. A Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R) shall be permanently attached.	SOLAS 1974, reg. I/12, as amended by the GMDSS amdts.; 1988 SOLAS Protocol, reg. I/12
Cargo Ship Safety Certificate A certificate called a Cargo Ship Safety Certificate may be issued after survey to a cargo ship which complies with the relevant requirements of chapters II-1, II-2, III, IV and V and other relevant requirements of SOLAS 1974 as modified by the 1988 SOLAS Protocol, as an alternative to the above cargo ship safety certificates.	1988 SOLAS Protocol, reg. I/12
Exemption Certificate[†] When an exemption is granted to a ship under and in accordance with the provisions of SOLAS 1974, a certificate called an Exemption Certificate shall be issued in addition to the certificates listed above.	SOLAS 1974, reg. I/12; 1988 SOLAS Protocol, reg. I/12
Document of compliance with the special requirements for ships carrying dangerous goods An appropriate document as evidence of compliance with the construction and equipment requirements of that regulation.	SOLAS 1974, reg. II-2/54.3
Dangerous goods manifest or stowage plan Each ship carrying dangerous goods shall have a special list or manifest setting forth, in accordance with the classification set out in regulation VII/2, the dangerous goods on board and the location thereof. A detailed stowage plan which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.	SOLAS 1974, reg. VII/5(5); MARPOL 73/78, Annex III, reg. 4

[*] The form of the Certificate and its Record of Equipment may be found in the GMDSS amendments to SOLAS 1974.

[†] SLS.14/Circ.115 and Add. 1 refers to the issue of exemption certificates.

	Reference
Document of authorization for the carriage of grain A document of authorization shall be issued for every ship loaded in accordance with the regulations of the International Code for the Safe Carriage of Grain in Bulk either by the Administration or an organization recognized by it or by a Contracting Government on behalf of the Administration. The document shall accompany or be incorporated into the grain loading manual provided to enable the master to meet the stability requirements of the Code.	SOLAS 1974, reg. VI/9; International Code for the Safe Carriage of Grain in Bulk, section 3
Certificate of insurance or other financial security in respect of civil liability for oil pollution damage A certificate attesting that insurance or other financial security is in force shall be issued to each ship carrying more than 2,000 tons of oil in bulk as cargo. It shall be issued or certified by the appropriate authority of the State of the ship's registry after determining that the requirements of article VII, paragraph 1, of the CLC Convention have been complied with.	CLC 69, art. VII
Enhanced survey report file Bulk carriers and oil tankers shall have a survey report file and supporting documents complying with paragraphs 6.2 and 6.3 of annex A and annex B of resolution A.744(18), Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers.	MARPOL 73/78, Annex I, reg. 13G; SOLAS 1974, reg. XI/2
Record of oil discharge monitoring and control system for the last ballast voyage Subject to provisions of paragraphs (4), (5), (6) and (7) of regulation 15 of Annex I of MARPOL 73/78, every oil tanker of 150 gross tonnage and above shall be fitted with an oil discharge monitoring and control system approved by the Administration. The system shall be fitted with a recording device to provide a continuous record of the discharge in litres per nautical mile and total quantity discharged, or the oil content and rate of discharge. This record shall be identifiable as to time and date and shall be kept for at least three years.	MARPOL 73/78, Annex I, reg. 15(3)(a)

	Reference
Bulk Carrier Booklet To enable the master to prevent excessive stress in the ship's structure, the ship loading and unloading of solid bulk cargoes shall be provided with a booklet referred to in SOLAS regulation VI/7.2. As an alternative to a separate booklet, the required information may be contained in the intact stability booklet.	SOLAS 1974 (1996 amdts), reg. VI/7; the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)
4 In addition to the certificates listed in sections 1 and 3 above, where appropriate, any ship carrying noxious liquid chemical substances in bulk shall carry:	
International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate) An international pollution prevention certificate for the carriage of noxious liquid substances in bulk (NLS Certificate) shall be issued, after survey in accordance with the provisions of regulation 10 of Annex II of MARPOL 73/78, to any ship carrying noxious liquid substances in bulk and which is engaged in voyages to ports or terminals under the jurisdiction of other Parties to MARPOL 73/78. In respect of chemical tankers, the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk and the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, issued under the provisions of the Bulk Chemical Code and the International Bulk Chemical Code, respectively, shall have the same force and receive the same recognition as the NLS Certificate.	MARPOL 73/78 Annex II, regs. 12 and 12a
Cargo Record Book Every ship to which Annex II of MARPOL 73/78 applies shall be provided with a Cargo Record Book, whether as part of the ship's official log-book or otherwise, in the form specified in appendix IV to the Annex.	MARPOL 73/78, Annex II, reg. 9

	Reference
Procedures and Arrangements Manual (P & A Manual) Every ship certified to carry noxious liquid substances in bulk shall have on board a Procedures and Arrangements Manual approved by the Administration.	Resolution MEPC.18(22), chapter 2; MARPOL 73/78, Annex II, regs. 5, 5A and 8
Shipboard Marine Pollution Emergency Plan for Noxious Liquid Substances Every ship of 150 gross tonnage and above certified to carry noxious liquid substances in bulk shall carry on board a shipboard marine pollution emergency plan for noxious liquid substances approved by the Administration. This requirement shall apply to all such ships not later than 1 January 2003.	MARPOL 73/78, Annex II, reg. 16
5 In addition to the certificates listed in sections 1 and 3 above, where applicable, any chemical tanker shall carry:	
Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk A certificate called a Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, the model form of which is set out in the appendix to the Bulk Chemical Code, should be issued after an initial or periodical survey to a chemical tanker engaged in international voyages which complies with the relevant requirements of the Code.	BCH Code, section 1.6; BCH Code as modified by resolution MSC.18(58) section 1.6
Note: The Code is mandatory under Annex II of MARPOL 73/78 for chemical tankers constructed before 1 July 1986.	
or	
International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk A certificate called an International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, the model form of which is set out in the appendix to the International Bulk Chemical Code, should be issued after an initial or periodical survey to a chemical tanker engaged in international voyages which complies with the relevant requirements of the Code.	IBC Code, section 1.5; IBC Code as modified by resolutions MSC.16(58) and MEPC.40(29), section 1.5

	Reference
Note: The Code is mandatory under both chapter VII of SOLAS 1974 and Annex II of MARPOL 73/78 for chemical tankers constructed on or after 1 July 1986.	
6 In addition to the certificates listed in sections 1 and 3 above, where applicable, any gas carrier shall carry:	
Certificate of Fitness for the Carriage of Liquefied Gases in Bulk A certificate called a Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, the model form of which is set out in the appendix to the Gas Carrier Code, should be issued after an initial or periodical survey to a gas carrier which complies with the relevant requirements of the Code.	GC Code, section 1.6
or	
International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk A certificate called an International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, the model form of which is set out in the appendix to the International Gas Carrier Code, should be issued after an initial or periodical survey to a gas carrier which complies with the relevant requirements of the Code.	IGC Code, section 1.5; IGC Code as modified by resolution MSC.17(58), section 1.5
Note: The Code is mandatory under chapter VII of SOLAS 1974 for gas carriers constructed on or after 1 July 1986.	
7 In addition to the certificates listed in sections 1 and 3 above, where applicable, high-speed craft shall carry:	
High-Speed Craft Safety Certificate A certificate called a High-Speed Craft Safety Certificate should be issued after completion of an initial or renewal survey to a craft which complies with the requirements of the High-Speed Craft (HSC) Code in its entirety.	SOLAS 1974, reg. X/3; HSC Code, paragraph 1.8

	Reference
Permit to Operate High-Speed Craft A certificate called a Permit to Operate High-Speed Craft should be issued to a craft which complies with the requirements set out in paragraphs 1.2.2 to 1.2.7 and 1.8 of the HSC Code.	HSC Code, paragraph 1.9
8 In addition to the certificates listed in sections 1 and 3 above, where applicable, any ship carrying INF cargo shall carry:	
*International Certificate of Fitness for the Carriage of INF Cargo** A ship carrying INF cargo shall comply with the requirements of the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code) in addition to any other applicable requirements of the SOLAS regulations and shall be surveyed and be provided with the International Certificate of Fitness for the Carriage of INF Cargo.	SOLAS 1974 (1999 amdts), reg. 16; INF Code (resolution MSC88(71)), paragraph 1.3
Other miscellaneous certificates	
Special purpose ships	
Special Purpose Ship Safety Certificate In addition to SOLAS certificates as specified in paragraph 7 of the Preamble of the Code of Safety for Special Purpose Ships, a Special Purpose Ship Safety Certificate shall be issued after survey in accordance with the provisions of paragraph 1.6 of the Code of Safety for Special Purpose Ships.The duration and validity of the certificate should be governed by the respective provisions for cargo ships in SOLAS 1974. If a certificate is issued for a special purpose ship of less than 500 gross tonnage, this certificate should indicate to what extent relaxations in accordance with 1.2 were accepted.	Resolution A.534(13) as amended by MSC/Circ.739; SOLAS 1974, reg. I/12; 1988 SOLAS Protocol, reg. I/12

* Subject to anticipated entry into force (1 January 2001) of the amendments to SOLAS 1974, adopted by resolution MSC.87(71) on 27 May 1999.

Offshore support vessels

Certificate of Fitness for Offshore Support Vessels When carrying such cargoes, offshore support vessels should carry a Certificate of Fitness issued under the "Guidelines for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk on offshore support vessels".	Resolution A.673(16); MARPOL 73/78, Annex II, reg. 13(4)
If an offshore support vessel carries only noxious liquid substances, a suitably endorsed International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk may be issued instead of the above Certificate of Fitness.	

Diving systems

Diving System Safety Certificate A certificate should be issued either by the Administration or any person or organization duly authorized by it after survey or inspection to a diving system which complies with the requirements of the Code of Safety for Diving Systems. In every case, the Administration should assume full responsibility for the certificate.	Resolution A.536(13), section 1.6

Dynamically supported craft

Dynamically Supported Craft Construction and Equipment Certificate To be issued after survey carried out in accordance with paragraph 1.5.1(a) of the Code of Safety for Dynamically Supported Craft.	Resolution A.373(X), section 1.6

Mobile offshore drilling units

Mobile Offshore Drilling Unit Safety Certificate To be issued after survey carried out in accordance with the provisions of the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 1979, or, for units constructed on or after 1 May 1991, the Code for the Construction and Equipment of Mobile Offshore Drilling Units, 1989.	Resolution A.414(XI), section 1.6; resolution A.649(16), section 1.6; resolution A.649(16) as modified by resolution MSC.38(63), section 1.6

	Reference
Noise levels	
Noise Survey Report A noise survey report should be made for each ship in accordance with the Code on Noise Levels on Board Ships.	Resolution A.468(XII), section 4.3

Annex 3
List of resolutions adopted by the SOLAS Conferences

International Conference on Safety of Life at Sea, 1974 *(October 1974)*

Resolution 1 – Comprehensive revision of the International Convention for the Safety of Life at Sea, 1974

Resolution 2 – Rapid amendment procedure and entry into force of the International Convention for the Safety of Life at Sea, 1974

Resolution 3 – Voting rights in the Maritime Safety Committee for the adoption of amendments

Resolution 4 – Recommendations of the 1960 Safety Conference and resolutions of the Assembly of the Organization related to regulations of the International Convention for the Safety of Life at Sea, 1974

Resolution 5 – Recommendations on the use of a system of units in the International Convention for the Safety of Life at Sea, 1974

Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 *(May 1994)*

Resolution 1 – Adoption of amendments to the annex to the International Convention for the Safety of Life at Sea, 1974

Resolution 2 – Implementation of chapter IX of the 1974 SOLAS Convention on management for the safe operation of ships

Resolution 3 – Implementation of the International Safety Management (ISM) Code for cargo ships of less than 500 gross tonnage

Resolution 4 – Accelerated tacit acceptance procedure under the 1974 SOLAS Convention in exceptional circumstances

Resolution 5 – Future amendments to chapter XI of the 1974 SOLAS Convention on special measures to enhance maritime safety

Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 *(November 1995)*

Resolution 1 – Adoption of amendments to the annex to the International Convention for the Safety of Life at Sea, 1974

Resolution 2 – Fire-extinguishing arrangements in machinery spaces of passenger ships

Resolution 3 – Escape arrangements in ships constructed before 1 July 1997

Resolution 4 – Maximum evacuation time for new ro–ro passenger ships

Resolution 5 – Amendments to chapter III of the 1974 SOLAS Convention

Resolution 6 – Low-powered radio homing devices for liferafts on ro–ro passenger ships

Resolution 7 – Development of requirements, guidelines and performance standards

Resolution 8 – Distress messages: obligations and procedures

Resolution 9 – Automatic ship identification transponder/transceiver systems

Resolution 10 – Establishment of working languages on ships

Resolution 11 – Operational limitations on passenger ships

Resolution 12 – Voyage data recorders

Resolution 13 – Cargo securing equipment

Resolution 14 – Regional agreements on specific stability requirements for ro–ro passenger ships

Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 *(November 1997)*

Resolution 1 – Adoption of amendments to the annex to the International Convention for the Safety of Life at Sea, 1974

Resolution 2 – Adoption of amendments to the Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers (resolution A.744(18))

Resolution 3 – Recommendation on compliance with SOLAS regulation XII/5

Resolution 4 – Standards for the evaluation of scantlings of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds and for the evaluation of allowable hold loading of the foremost cargo hold

Resolution 5 – Recommendation on loading instruments

Resolution 6 – Interpretation of the definition of "bulk carrier", as given in chapter IX of SOLAS 1974, as amended in 1994

Resolution 7 – Enhanced surveys carried out prior to entry into force of the amendments

Resolution 8 – Further work on the safety of bulk carriers

Resolution 9 – Implementation of the International Safety Management (ISM) Code