



IMO

**International Convention for the Prevention
of Pollution from Ships**

MARPOL

Version 1.0 April 2000

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Introduction (page 1/3)

The International Convention for the Prevention of Pollution from Ships, 1973, was adopted by the International Conference on Marine Pollution convened by IMO from 8 October to 2 November 1973. This Convention was subsequently modified by the Protocol of 1978 relating thereto, which was adopted by the International Conference on Tanker Safety and Pollution Prevention convened by IMO from 6 to 17 February 1978. The Convention, as modified by the Protocol, is known as the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, or, in short form, MARPOL 73/78. Regulations covering the various sources of ship-generated pollution are contained in the six Annexes of the Convention.

The Marine Environment Protection Committee (MEPC), since its inception in 1974, has reviewed various provisions of MARPOL 73/78 which have been found to require clarification or have given rise to difficulties in implementation. In order to resolve such ambiguities and difficulties in a uniform manner, the MEPC agreed that it was desirable to develop unified interpretations. In certain cases, the MEPC recognized that there was a need to amend existing regulations or to introduce new regulations with the aim of reducing even further operational and accidental pollution from ships. These activities by the MEPC have resulted in a number of unified interpretations and amendments to the Convention.

The purpose of this CD-ROM is to provide an easy reference to the up-to-date provisions and unified interpretations of the articles, protocols and Annexes of MARPOL 73/78, including the incorporation of all of the amendments which have been adopted and have entered into force up to 1 January 2000.

Annex I -- Regulations for the Prevention of Pollution by Oil

Annex I entered into force on 2 October 1983 and, as between the Parties to MARPOL 73/78, supersedes the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended in 1962 and 1969, which was then in force. A number of amendments to Annex I have been adopted and have entered into force as summarized below:

- * 1984 amendments (resolution MEPC.14(20)) on control of discharge of oil; retention of oil on board; pumping, piping and discharge arrangements of oil tankers; subdivision and stability: entered into force on 7 January 1986;
- * 1987 amendments (resolution MEPC.29(25)) on designation of the Gulf of Aden as a special area: entered into force on 1 April 1989;
- * 1990 amendments (resolution MEPC.42(30)): designation of the Antarctic area as a special area. Entered into force on 17 March 1992;
- * 1991 amendments (resolution MEPC.47(31)): new regulation 26, Shipboard Oil Pollution Emergency Plan, and other amendments to Annex I. Entered into force on 4 April 1993;
- * 1992 amendments (resolution MEPC.51(32)): discharge criteria of Annex I. Entered into force on 6 July 1993;
- * 1992 amendments (resolution MEPC.52(32)): new regulations 13F and 13G and related amendments to Annex I. Entered into force on 6 July 1993;
- * 1994 amendments (resolution 1 of the 1994 MARPOL Conference): port State control on operational requirements. Entered into force on 3 March 1996;
- * 1997 amendments (resolution MEPC.75(40)): intact stability criteria for double-hull tankers (new regulation 25A) and designation of North-West European waters as a special area. Entered into force on 1 February 1999.

Annex II -- Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk

To facilitate implementation of the Annex, the original text underwent amendments in 1985, by resolution MEPC.16(22), in respect of pumping, piping and control requirements. At its twenty-second session, the MEPC also decided that, in accordance with article II of the 1978 Protocol, "Parties shall be bound by the provisions of Annex II of MARPOL 73/78 as amended from 6 April 1987" (resolution MEPC.17(22)). Subsequent amendments have been adopted by the MEPC and have entered into force as summarized below:

- * 1989 amendments (resolution MEPC.34(27)): updates to appendices II and III to make them compatible with chapters 17/VI and 18/VII of the IBC Code and BCH Code, respectively. Entered into force on 13 October 1990;
- * 1992 amendments (resolution MEPC.57(33)): designation of the Antarctic area as a special area and lists of liquid substances in Annex II. Entered into force on 1 July 1994;
- * 1994 amendments (resolution 1 of the 1994 MARPOL Conference): port State control on operational requirements. Entered into force on 3 March 1996.

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Annex III -- Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form
Annex III entered into force on 1 July 1992. However, long before this entry into force date, the MEPC, with the concurrence of the Maritime Safety Committee (MSC), agreed that the Annex should be implemented through the International Maritime Dangerous Goods (IMDG) Code. The IMDG Code had amendments covering marine pollution prepared by the MSC (Amendment 25-89) and these amendments were implemented from 1 January 1991. Subsequent amendments have been adopted by the MEPC and have entered into force as summarized below:

* 1992 amendments (resolution MEPC.58(33)): totally revised Annex III as a clarification of the requirements in the original version of Annex III rather than a change of substance, and incorporated the reference to the IMDG Code. Entered into force on 28 February 1994;

* 1994 amendments (resolution 2 of the 1994 MARPOL Conference): port State control on operational requirements. Entered into force on 3 March 1996.

Annex IV -- Regulations for the Prevention of Pollution by Sewage from Ships

Annex IV is not yet in force. As of 30 April 2000, the Annex has been ratified by 77 States, the combined merchant fleet of which represents approximately 43.4% of the gross tonnage of the world's merchant fleet. Therefore, ratification by States covering an additional 6.6% of the gross tonnage of the world's merchant fleet is required before the entry into force requirements of article 16(2)(f) of the Convention are satisfied.

Annex V -- Regulations for the Prevention of Pollution by Garbage from Ships

Annex V entered into force on 31 December 1988. Subsequent amendments have been adopted by the MEPC and have entered into force as summarized below:

* 1989 amendments (resolution MEPC.36(28)): designation of the North Sea as a special area and amendment of regulation 6, Exceptions. Entered into force on 18 February 1991;

* 1990 amendments (resolution MEPC.42(30)): designation of the Antarctic area as a special area. Entered into force on 17 March 1992;

* 1991 amendments (resolution MEPC.48(31)): designation of the Wider Caribbean area as a special area. Entered into force on 4 April 1993;

* 1994 amendments (resolution 3 of the 1994 MARPOL Conference): port State control on operational requirements. Entered into force on 3 March 1996;

* 1995 amendments (resolution MEPC.65(37)): amendment of regulation 2 and the addition of a new regulation 9, Placards, Garbage Management Plans and Garbage Record-Keeping. Entered into force on 1 July 1997.

Annex VI - Regulations for the Prevention of Air Pollution from Ships

Annex VI comprises the annex to the Protocol of 1997 to amend MARPOL 73/78, which was adopted by an international conference of Parties to the Convention held in September 1997. It is not yet in force.

The 1997 MARPOL Conference also adopted the related Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines (NOx Technical Code), which is included in this CD-ROM.

Introduction (page 3/3)

Some amendments to the Convention and its Annexes have been adopted but were not in force as of 1 January 2000. For completeness, cross-references to them have been included in this CD-ROM but they have not been incorporated into the text.

The amendments to Annexes I and II to introduce the harmonized system of survey and certification, for example, were adopted on 16 March 1990 by resolution MEPC.39(29). Their entry into force, however, was dependent on the entry into force of the Protocol of 1988 to the 1974 SOLAS and 1966 Load Line Conventions, the criteria for which had not been met as of 1 January 2000.

Likewise, the amendments adopted on 1 July 1999 by resolution MEPC.78(43), which make changes to regulations 13G and 26 of Annex I and to the IOPP Certificate, as well as adding a new regulation 16 to Annex II, are expected to enter into force on 1 January 2001.

Various non-mandatory guidelines are also included in this CD-ROM:

- * General principles for ship reporting systems and ship reporting requirements, including guidelines for reporting incidents involving dangerous goods, harmful substances and/or marine pollutants
- * Guidelines for the provisional assessment of liquids transported in bulk
- * Guidelines for the implementation of Annex V of MARPOL 73/78

In addition, the complete texts of all IMO Assembly resolutions referred to in the Convention and its Annexes are included.

Note: The Secretariat of IMO has no intention of changing the authentic texts editorially or otherwise. For legal purposes, therefore, the authentic texts of the provisions of MARPOL 73/78 should always be consulted.

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, for 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.

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List of forms from MARPOL 73/78

The following forms are available as ASCII Text (extension .TXT) and as MS Word for Windows (extension .DOC)*:

Form of Cargo Record Book for ships carrying noxious liquid substances in bulk	CARGREC.*
Form of Garbage Record Book	GARBAGE.*
Form of IAPP Certificate	IAPPCE.*
Form of IOPP Certificate	IOPPCE.*
NLS Certificate	NLSCE.*
Oil Record Book	OILRECBK.*
Form of Sewage Certificate	SEWAGE.*

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

See also: **Information about forms from MARPOL 73/78**

Information about forms from MARPOL 73/78

So that users can readily make use of some of the many models of forms 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 are available:

- 1) Form of Cargo Record Book for ships carrying noxious liquid substances in bulk** - Annex II Appendix IV
- 2) Form of Garbage Record Book** - Appendix to Annex V
- 3) Form of IAPP Certificate** - International Air Pollution Prevention Certificate, Appendix I to Annex VI
- 4) Form of IOPP Certificate** - International Oil Pollution Prevention Certificate, Annex I Appendix II
- 5) NLS Certificate** - International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk, Annex II Appendix V
- 6) Oil Record Book** - Annex I Appendix III
- 7) Form of Sewage Certificate** - International Sewage Pollution Prevention Certificate, Appendix to Annex IV

For exact file names and location see*: List of forms from MARPOL 73/78

* The forms are also available in French and Spanish in sub-directories off:

<CDROM Drive>:\FRANCAIS and

<CDROM Drive>:\ESPAGNOL

How to Search MARPOL (page 1 of 4)

Brief explanation of the program for searching and displaying MARPOL 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 MARPOL 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 MARPOL plus the menus for finding these are stored in three PDF (Acrobat portable document files) on this CDROM, one each for English, French and Spanish. The installation program asks you which language you prefer to use.

























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- 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**
- 7. Notes and Links**

In MARPOL you will find Notes. These are visible as small blue ‘pages’. If you doubleclick on them they will give you information about Amendments. Directly below will be a small rectangle - if you click on this you will be taken to the relevant amendment text.

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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
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-  Search Results - lists the result of a search
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-  Next Highlight - displays the next found page

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Searching and displaying MARPOL 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 MARPOL) - 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 MARPOL) - 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 MARPOL"

How to Search MARPOL (page 4 of 4)

Searching and displaying MARPOL 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 MARPOL 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 MARPOL automatically open at 'page width' zoom factor, others have a zoom factor so that the user can immediately 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 MARPOL"

**International Convention
for the
Prevention of Pollution
from Ships, 1973**

International Convention for the Prevention of Pollution from Ships, 1973

THE PARTIES TO THE CONVENTION,

BEING CONSCIOUS of the need to preserve the human environment in general and the marine environment in particular,

RECOGNIZING that deliberate, negligent or accidental release of oil and other harmful substances from ships constitutes a serious source of pollution,

RECOGNIZING ALSO the importance of the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as being the first multilateral instrument to be concluded with the prime objective of protecting the environment, and appreciating the significant contribution which that Convention has made in preserving the seas and coastal environment from pollution,

DESIRING to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances,

CONSIDERING that this object may best be achieved by establishing rules not limited to oil pollution having a universal purport,

HAVE AGREED as follows:

Article 1

General obligations under the Convention

- (1) The Parties to the Convention undertake to give effect to the provisions of the present Convention and those Annexes thereto by which they are bound, in order to prevent the pollution of the marine environment by the discharge of harmful substances or effluents containing such substances in contravention of the Convention.
- (2) Unless expressly provided otherwise, a reference to the present Convention constitutes at the same time a reference to its Protocols and to the Annexes.

Article 2

Definitions

For the purposes of the present Convention, unless expressly provided otherwise:

- (1) *Regulation* means the regulations contained in the Annexes to the present Convention.
- (2) *Harmful substance* means any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea, and includes any substance subject to control by the present Convention.
- (3) (a) *Discharge*, in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying;
(b) *Discharge* does not include:
 - (i) dumping within the meaning of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, done at London on 13 November 1972; or
 - (ii) release of harmful substances directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources; or
 - (iii) release of harmful substances for purposes of legitimate scientific research into pollution abatement or control.
- (4) *Ship* means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms.
- (5) *Administration* means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of any State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.
- (6) *Incident* means an event involving the actual or probable discharge into the sea of a harmful substance, or effluents containing such a substance.

- (7) *Organization* means the Inter-Governmental Maritime Consultative Organization.*

Article 3

Application

- (1) The present Convention shall apply to:
 - (a) ships entitled to fly the flag of a Party to the Convention; and
 - (b) ships not entitled to fly the flag of a Party but which operate under the authority of a Party.
- (2) Nothing in the present article shall be construed as derogating from or extending the sovereign rights of the Parties under international law over the sea-bed and subsoil thereof adjacent to their coasts for the purposes of exploration and exploitation of their natural resources.
- (3) The present Convention shall not apply to any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. However, each Party shall ensure by the adoption of appropriate measures not impairing the operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with the present Convention.

Article 4

Violation

- (1) Any violation of the requirements of the present Convention shall be prohibited and sanctions shall be established therefor under the law of the Administration of the ship concerned wherever the violation occurs. If the Administration is informed of such a violation and is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken as soon as possible, in accordance with its law.
- (2) Any violation of the requirements of the present Convention within the jurisdiction of any Party to the Convention shall be prohibited and sanctions shall be established therefor under the law of that Party. Whenever such a violation occurs, that Party shall either:
 - (a) cause proceedings to be taken in accordance with its law; or

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

- (b) furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.
- (3) Where information or evidence with respect to any violation of the present Convention by a ship is furnished to the Administration of that ship, the Administration shall promptly inform the Party which has furnished the information or evidence, and the Organization, of the action taken.
- (4) The penalties specified under the law of a Party pursuant to the present article shall be adequate in severity to discourage violations of the present Convention and shall be equally severe irrespective of where the violations occur.

Article 5

Certificates and special rules on inspection of ships

- (1) Subject to the provisions of paragraph (2) of the present article a certificate issued under the authority of a Party to the Convention in accordance with the provisions of the regulations shall be accepted by the other Parties and regarded for all purposes covered by the present Convention as having the same validity as a certificate issued by them.
- (2) A ship required to hold a certificate in accordance with the provisions of the regulations is subject, while in the ports or offshore terminals under the jurisdiction of a Party, to inspection by officers duly authorized by that Party. Any such inspection shall be limited to verifying that there is on board a valid certificate, unless there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of that certificate. In that case, or if the ship does not carry a valid certificate, the Party carrying out the inspection shall take such steps as will ensure that the ship shall not sail until it can proceed to sea without presenting an unreasonable threat of harm to the marine environment. That Party may, however, grant such a ship permission to leave the port or offshore terminal for the purpose of proceeding to the nearest appropriate repair yard available.
- (3) If a Party denies a foreign ship entry to the ports or offshore terminals under its jurisdiction or takes any action against such a ship for the reason that the ship does not comply with the provisions of the present Convention, the Party shall immediately inform the consul or diplomatic representative of the Party whose flag the ship is entitled to fly, or if this is not possible, the Administration of the ship concerned. Before denying entry or taking such action the Party may request consultation with the Administration of the ship concerned.

Information shall also be given to the Administration when a ship does not carry a valid certificate in accordance with the provisions of the regulations.

- (4) With respect to the ship of non-Parties to the Convention, Parties shall apply the requirements of the present Convention as may be necessary to ensure that no more favourable treatment is given to such ships.

Article 6

Detection of violations and enforcement of the Convention

- (1) Parties to the Convention shall co-operate in the detection of violations and the enforcement of the provisions of the present Convention, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.
- (2) A ship to which the present Convention applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has discharged any harmful substances in violation of the provisions of the regulations. If an inspection indicates a violation of the Convention, a report shall be forwarded to the Administration for any appropriate action.
- (3) Any Party shall furnish to the Administration evidence, if any, that the ship has discharged harmful substances or effluents containing such substances in violation of the provisions of the regulations. If it is practicable to do so, the competent authority of the former Party shall notify the master of the ship of the alleged violation.
- (4) Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the other Party to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with its law as soon as possible. The Administration shall promptly inform the Party which has reported the alleged violation, as well as the Organization, of the action taken.
- (5) A Party may also inspect a ship to which the present Convention applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party together with sufficient evidence that the ship has discharged harmful substances or effluents containing such substances in any place. The

report of such investigation shall be sent to the Party requesting it and to the Administration so that the appropriate action may be taken under the present Convention.

Article 7

Undue delay to ships

- (1) All possible efforts shall be made to avoid a ship being unduly detained or delayed under articles 4, 5 or 6 of the present Convention.
- (2) When a ship is unduly detained or delayed under articles 4, 5 or 6 of the present Convention, it shall be entitled to compensation for any loss or damage suffered.

Article 8

Reports on incidents involving harmful substances

- (1) A report of an incident shall be made without delay to the fullest extent possible in accordance with the provisions of Protocol I to the present Convention.
- (2) Each Party to the Convention shall:
 - (a) make all arrangements necessary for an appropriate officer or agency to receive and process all reports on incidents; and
 - (b) notify the Organization with complete details of such arrangements for circulation to other Parties and Member States of the Organization.
- (3) Whenever a Party receives a report under the provisions of the present article, that Party shall relay the report without delay to:
 - (a) the Administration of the ship involved; and
 - (b) any other State which may be affected.
- (4) Each Party to the Convention undertakes to issue instructions to its maritime inspection vessels and aircraft and to other appropriate services, to report to its authorities any incident referred to in Protocol I to the present Convention. That Party shall, if it considers it appropriate, report accordingly to the Organization and to any other Party concerned.

Article 9

Other treaties and interpretation

- (1) Upon its entry into force, the present Convention supersedes the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended, as between Parties to that Convention.

- (2) Nothing in the present Convention shall prejudice the codification and development of the law of the sea by the United Nations Conference on the Law of the Sea convened pursuant to resolution 2750 C(XXV) of the General Assembly of the United Nations nor the present or future claims and legal views of any State concerning the law of the sea and the nature and extent of coastal and flag State jurisdiction.
- (3) The term “jurisdiction” in the present Convention shall be construed in the light of international law in force at the time of application or interpretation of the present Convention.

Article 10

Settlement of disputes

Any dispute between two or more Parties to the Convention concerning the interpretation or application of the present Convention shall, if settlement by negotiation between the Parties involved has not been possible, and if these Parties do not otherwise agree, be submitted upon request of any of them to arbitration as set out in Protocol II to the present Convention.

Article 11

Communication of information

- (1) The Parties to the Convention undertake to communicate to the Organization:
 - (a) the text of laws, orders, decrees and regulations and other instruments which have been promulgated on the various matters within the scope of the present Convention;
 - (b) a list of non-governmental agencies which are authorized to act on their behalf in matters relating to the design, construction and equipment of ships carrying harmful substances in accordance with the provisions of the regulations;*
 - (c) a sufficient number of specimens of their certificates issued under the provisions of the regulations;
 - (d) a list of reception facilities including their location, capacity and available facilities and other characteristics;
 - (e) official reports or summaries of official reports in so far as they show the results of the application of the present Convention; and

* The text of this subparagraph is replaced by that contained in article III of the 1978 Protocol.

- (f) an annual statistical report, in a form standardized by the Organization, of penalties actually imposed for infringement of the present Convention.
- (2) The Organization shall notify Parties of the receipt of any communications under the present article and circulate to all Parties any information communicated to it under subparagraphs (1)(b) to (f) of the present article.

Article 12

Casualties to ships

- (1) Each Administration undertakes to conduct an investigation of any casualty occurring to any of its ships subject to the provisions of the regulations if such casualty has produced a major deleterious effect upon the marine environment.
- (2) Each Party to the Convention undertakes to supply the Organization with information concerning the findings of such investigation, when it judges that such information may assist in determining what changes in the present Convention might be desirable.

Article 13

Signature, ratification, acceptance, approval and accession

- (1) The present Convention shall remain open for signature at the Headquarters of the Organization from 15 January 1974 until 31 December 1974 and shall thereafter remain open for accession. States may become Parties to the present Convention 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 Secretary-General of the Organization shall inform all States which have signed the present Convention or acceded to it of any signature or of the deposit of any new instrument of ratification, acceptance, approval or accession and the date of its deposit.

Article 14

Optional annexes

- (1) A State may at the time of signing, ratifying, accepting, approving or acceding to the present Convention declare that it does not accept any one or all of Annexes III, IV and V (hereinafter referred to as “Optional Annexes”) of the present Convention. Subject to the above, Parties to the Convention shall be bound by any Annex in its entirety.
- (2) A State which has declared that it is not bound by an Optional Annex may at any time accept such Annex by depositing with the Organization an instrument of the kind referred to in article 13(2).
- (3) A State which makes a declaration under paragraph (1) of the present article in respect of an Optional Annex and which has not subsequently accepted that Annex in accordance with paragraph (2) of the present article shall not be under any obligation nor entitled to claim any privileges under the present Convention in respect of matters related to such Annex and all references to Parties in the present Convention shall not include that State in so far as matters related to such Annex are concerned.
- (4) The Organization shall inform the States which have signed or acceded to the present Convention of any declaration under the present article as well as the receipt of any instrument deposited in accordance with the provisions of paragraph (2) of the present article.

Article 15

Entry in force

- (1) The present Convention shall enter into force 12 months after the date on which not less than 15 States, the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world’s merchant shipping, have become parties to it in accordance with article 13.
- (2) An Optional Annex shall enter into force 12 months after the date on which the conditions stipulated in paragraph (1) of the present article have been satisfied in relation to that Annex.
- (3) The Organization shall inform the States which have signed the present Convention or acceded to it of the date on which it enters into force and of the date on which an Optional Annex enters into force in accordance with paragraph (2) of the present article.
- (4) For States which have deposited an instrument of ratification, acceptance, approval or accession in respect of the present Convention

or any Optional Annex after the requirements 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 Convention or such Annex or three months after the date of deposit of the instrument whichever is the later date.

- (5) For States which have deposited an instrument of ratification, acceptance, approval or accession after the date on which the Convention or an Optional Annex entered into force, the Convention or the Optional Annex shall become effective three months after the date of deposit of the instrument.
- (6) After the date on which all the conditions required under article 16 to bring an amendment to the present Convention or an Optional Annex into force have been fulfilled, any instrument of ratification, acceptance, approval or accession deposited shall apply to the Convention or Annex as amended.

Article 16

Amendments

- (1) The present Convention may be amended by any of the procedures specified in the following paragraphs.
- (2) Amendments after consideration by the Organization:
 - (a) any amendment proposed by a Party to the Convention shall be submitted to the Organization and circulated by its Secretary-General to all Members of the Organization and all Parties at least six months prior to its consideration;
 - (b) any amendment proposed and circulated as above shall be submitted to an appropriate body by the Organization for consideration;
 - (c) Parties to the Convention, whether or not Members of the Organization, shall be entitled to participate in the proceedings of the appropriate body;
 - (d) amendments shall be adopted by a two-thirds majority of only the Parties to the Convention present and voting;
 - (e) if adopted in accordance with subparagraph (d) above, amendments shall be communicated by the Secretary-General of the Organization to all the Parties to the Convention for acceptance;
 - (f) an amendment shall be deemed to have been accepted in the following circumstances:

- (i) an amendment to an article of the Convention shall be deemed to have been accepted on the date on which it is accepted by two thirds of the Parties, the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet;
- (ii) an amendment to an Annex to the Convention shall be deemed to have been accepted in accordance with the procedure specified in subparagraph (f)(iii) unless the appropriate body, at the time of its adoption, determines that the amendment shall be deemed to have been accepted on the date on which it is accepted by two thirds of the Parties, the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet. Nevertheless, at any time before the entry into force of an amendment to an Annex to the Convention, a Party may notify the Secretary-General of the Organization that its express approval will be necessary before the amendment enters into force for it. The latter shall bring such notification and the date of its receipt to the notice of Parties;
- (iii) an amendment to an appendix to an Annex to the Convention shall be deemed to have been accepted at the end of a period to be determined by the appropriate body at the time of its adoption, which period shall be not less than ten months, unless within that period an objection is communicated to the Organization by not less than one third of the Parties or by the Parties the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant fleet whichever condition is fulfilled;
- (iv) an amendment to Protocol I to the Convention shall be subject to the same procedures as for the amendments to the Annexes to the Convention, as provided for in subparagraphs (f)(ii) or (f)(iii) above;
- (v) an amendment to Protocol II to the Convention shall be subject to the same procedures as for the amendments to an article of the Convention, as provided for in subparagraph (f)(i) above;
- (g) the amendment shall enter into force under the following conditions:
 - (i) in the case of an amendment to an article of the Convention, to Protocol II, or to Protocol I or to an Annex to the Convention not under the procedure specified in subparagraph (f)(iii), the amendment accepted

in conformity with the foregoing provisions shall enter into force six months after the date of its acceptance with respect to the Parties which have declared that they have accepted it;

- (ii) in the case of an amendment to Protocol I, to an appendix to an Annex or to an Annex to the Convention under the procedure specified in subparagraph (f)(iii), the amendment deemed to have been accepted in accordance with the foregoing conditions shall enter into force six months after its acceptance for all the Parties with the exception of those which, before that date, have made a declaration that they do not accept it or a declaration under subparagraph (f)(ii), that their express approval is necessary.

(3) Amendment by a Conference:

- (a) Upon the request of a Party, concurred in by at least one third of the Parties, the Organization shall convene a Conference of Parties to the Convention to consider amendments to the present Convention.
 - (b) Every amendment adopted by such a Conference by a two-thirds majority of those present and voting of the Parties shall be communicated by the Secretary-General of the Organization to all Contracting Parties for their acceptance.
 - (c) Unless the Conference decides otherwise, the amendment shall be deemed to have been accepted and to have entered into force in accordance with the procedures specified for that purpose in paragraph (2)(f) and (g) above.
- (4)
- (a) In the case of an amendment to an Optional Annex, a reference in the present article to a “Party to the Convention” shall be deemed to mean a reference to a Party bound by that Annex.
 - (b) Any Party which has declined to accept an amendment to an Annex shall be treated as a non-Party only for the purpose of application of that amendment.
- (5) The adoption and entry into force of a new annex shall be subject to the same procedures as for the adoption and entry into force of an amendment to an article of the Convention.
- (6) 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 for which the building contract is placed, or in the absence of a building contract, the keel of which is laid, on or after the date on which the amendment comes into force.

- (7) Any amendment to a Protocol or to an Annex shall relate to the substance of that Protocol or Annex and shall be consistent with the articles of the present Convention.
- (8) The Secretary-General of the Organization shall inform all Parties of any amendments which enter into force under the present article, together with the date on which each such amendment enters into force.
- (9) Any declaration of acceptance or of objection to an amendment under the present article shall be notified in writing to the Secretary-General of the Organization. The latter shall bring such notification and the date of its receipt to the notice of the Parties to the Convention.

Article 17

Promotion of technical co-operation

The Parties to the Convention shall promote, in consultation with the Organization and other international bodies, with assistance and co-ordination by the Executive Director of the United Nations Environment Programme, support for those Parties which request technical assistance for:

- (a) the training of scientific and technical personnel;
- (b) the supply of necessary equipment and facilities for reception and monitoring;
- (c) the facilitation of other measures and arrangements to prevent or mitigate pollution of the marine environment by ships; and
- (d) the encouragement of research;

preferably within the countries concerned, so furthering the aims and purposes of the present Convention.

Article 18

Denunciation

- (1) The present Convention or any Optional Annex may be denounced by any Parties to the Convention at any time after the expiry of five years from the date on which the Convention or such Annex enters into force for that Party.
- (2) Denunciation shall be effected by notification in writing to the Secretary-General of the Organization who shall inform all the other Parties of any such notification received and of the date of its receipt as well as the date on which such denunciation takes effect.
- (3) A denunciation shall take effect 12 months after receipt of the notification of denunciation by the Secretary-General of the

Organization or after the expiry of any other longer period which may be indicated in the notification.

Article 19

Deposit and registration

- (1) The present Convention shall be deposited with the Secretary-General of the Organization who shall transmit certified true copies thereof to all States which have signed the present Convention or acceded to it.
- (2) 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 20

Languages

The present Convention is established in a single copy in the English, French, Russian and Spanish languages, each text being equally authentic. Official translations in the Arabic, German, Italian and Japanese 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 second day of November, one thousand nine hundred and seventy-three.

* Signatures omitted.

**Protocol of 1978
relating to the
International Convention
for the
Prevention of Pollution
from Ships, 1973**

Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973

THE PARTIES TO THE PRESENT PROTOCOL,

RECOGNIZING the significant contribution which can be made by the International Convention for the Prevention of Pollution from Ships, 1973, to the protection of the marine environment from pollution from ships,

RECOGNIZING ALSO the need to improve further the prevention and control of marine pollution from ships, particularly oil tankers,

RECOGNIZING FURTHER the need for implementing the Regulations for the Prevention of Pollution by Oil contained in Annex I of that Convention as early and as widely as possible,

ACKNOWLEDGING HOWEVER the need to defer the application of Annex II of that Convention until certain technical problems have been satisfactorily resolved,

CONSIDERING that these objectives may best be achieved by the conclusion of a Protocol relating to the International Convention for the Prevention of Pollution from Ships, 1973,

HAVE AGREED as follows:

Article I

General obligations

- 1 The Parties to the present Protocol undertake to give effect to the provisions of:
 - (a) the present Protocol and the Annex hereto which shall constitute an integral part of the present Protocol; and
 - (b) the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as “the Convention”), subject to the modifications and additions set out in the present Protocol.
- 2 The provisions of the Convention and the present Protocol shall be read and interpreted together as one single instrument.

- 3 Every reference to the present Protocol constitutes at the same time a reference to the Annex hereto.

Article II

Implementation of Annex II of the Convention

- 1 Notwithstanding the provisions of article 14(1) of the Convention, the Parties to the present Protocol agree that they shall not be bound by the provisions of Annex II of the Convention for a period of three years from the date of entry into force of the present Protocol or for such longer period as may be decided by a two-thirds majority of the Parties to the present Protocol in the Marine Environment Protection Committee (hereinafter referred to as “the Committee”) of the Inter-Governmental Maritime Consultative Organization (hereinafter referred to as “the Organization”).*
- 2 During the period specified in paragraph 1 of this article, the Parties to the present Protocol shall not be under any obligations nor entitled to claim any privileges under the Convention in respect of matters relating to Annex II of the Convention and all reference to Parties in the Convention shall not include the Parties to the present Protocol in so far as matters relating to that Annex are concerned.

Article III

Communication of information

The text of article 11(1)(b) of the Convention is replaced by the following:

“a list of nominated surveyors or recognized organizations which are authorized to act on their behalf in the administration of matters relating to the design, construction, equipment and operation of ships carrying harmful substances in accordance with the provisions of the regulations for circulation to the Parties for information of their officers. The Administration shall therefore notify the Organization of the specific responsibilities and conditions of the authority delegated to nominated surveyors or recognized organizations.”

* The name of the Organization was changed to “International Maritime Organization” by virtue of amendments to the Organization’s Convention which entered into force on 22 May 1982.

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 June 1978 to 31 May 1979 and shall thereafter remain open for accession. States may become Parties to 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.

Article V

Entry into force

- 1 The present Protocol shall enter into force 12 months after the date on which not less than 15 States, the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant shipping, have become Parties to it in accordance with article IV of the present Protocol.
- 2 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.
- 3 After the date on which an amendment to the present Protocol is deemed to have been accepted in accordance with article 16 of the Convention, 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 16 of the Convention in respect of amendments to the articles, an Annex and an appendix to an Annex of the Convention shall apply respectively to amendments to the articles, the Annex and an appendix to the Annex of the present Protocol.

Article VII

Denunciation

- 1 The present Protocol may be denounced by any Party to the present Protocol at any time after the expiry of five years from the date on which the 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 12 months after receipt of the notification by the Secretary-General of the Organization or after the expiry of any other longer period which may be indicated in the notification.

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 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;
 - (iv) any decision made in accordance with article II(1) of the present Protocol;
 - (b) transmit certified true copies of the present Protocol to 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 English, French, Russian and Spanish languages, each text being equally authentic. Official translations in the Arabic, German, Italian and Japanese 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 Protocol.

DONE AT LONDON this seventeenth day of February one thousand nine hundred and seventy-eight.

* Signatures omitted.

Protocol I

*Provisions concerning
Reports on Incidents
Involving Harmful Substances*

Protocol I

Provisions concerning Reports on Incidents Involving Harmful Substances

(in accordance with article 8 of the Convention)

Article I

Duty to report

- (1) The master or other person having charge of any ship involved in an incident referred to in article II of this Protocol shall report the particulars of such incident without delay and to the fullest extent possible in accordance with the provisions of this Protocol.
- (2) In the event of the ship referred to in paragraph (1) of this article 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 agent shall, to the fullest extent possible, assume the obligations placed upon the master under the provisions of this Protocol.

Article II

When to make reports

- (1) The report shall be made when an incident involves:
 - (a) a discharge above the permitted level or probable discharge of oil or of noxious liquid substances for whatever reason including those for the purpose of securing the safety of the ship or for saving life at sea; or
 - (b) a discharge or probable discharge of harmful substances in packaged form, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges; or

- (c) damage, failure or breakdown of a ship of 15 metres in length or above which:
 - (i) affects the safety of the ship; including but not limited to collision, grounding, fire, explosion, structural failure, flooding and cargo shifting; or
 - (ii) results in impairment of the safety of navigation; including but not limited to, failure or breakdown of steering gear, propulsion plant, electrical generating system, and essential shipborne navigational aids; or
 - (d) a discharge during the operation of the ship of oil or noxious liquid substances in excess of the quantity or instantaneous rate permitted under the present Convention.
- (2) For the purposes of this Protocol:
- (a) *Oil* referred to in subparagraph 1(a) of this article means oil as defined in regulation 1(1) of Annex I of the Convention.
 - (b) *Noxious liquid substances* referred to in subparagraph 1(a) of this article means noxious liquid substances as defined in regulation 1(6) of Annex II of the Convention.
 - (c) *Harmful substances* in packaged form referred to in subparagraph 1(b) of this article means substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code).

Article III

Contents of report

Reports shall in any case include:

- (a) identity of ships involved;
- (b) time, type and location of incident;
- (c) quantity and type of harmful substance involved;
- (d) assistance and salvage measures.

Article IV

Supplementary report

Any person who is obliged under the provisions of this Protocol to send a report shall, when possible:

- (a) supplement the initial report, as necessary, and provide information concerning further developments; and
- (b) comply as fully as possible with requests from affected States for additional information.

Article V

Reporting procedures

- (1) Reports shall be made by the fastest telecommunications channels available with the highest possible priority to the nearest coastal State.
- (2) In order to implement the provisions of this Protocol, Parties to the present Convention shall issue, or cause to be issued, regulations or instructions on the procedures to be followed in reporting incidents involving harmful substances, based on guidelines developed by the Organization.*

* 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); see IMO sales publication IMO-516E.

Protocol II

Arbitration

Protocol II

Arbitration

(in accordance with article 10 of the Convention)

Article I

Arbitration procedure, unless the Parties to the dispute decide otherwise, shall be in accordance with the rules set out in this Protocol.

Article II

- (1) An Arbitration Tribunal shall be established upon the request of one Party to the Convention addressed to another in application of article 10 of the present Convention. The request for arbitration shall consist of a statement of the case together with any supporting documents.
- (2) The requesting Party shall inform the Secretary-General of the Organization of the fact that it has applied for the establishment of a Tribunal, of the names of the Parties to the dispute, and of the articles of the Convention or Regulations over which there is in its opinion disagreement concerning their interpretation or application. The Secretary-General shall transmit this information to all Parties.

Article III

The Tribunal shall consist of three members: one Arbitrator nominated by each Party to the dispute and a third Arbitrator who shall be nominated by agreement between the two first named, and shall act as its Chairman.

Article IV

- (1) If, at the end of a period of 60 days from the nomination of the second Arbitrator, the Chairman of the Tribunal shall not have been nominated, the Secretary-General of the Organization upon request of either Party shall within a further period of 60 days proceed to such nomination, selecting him from a list of qualified persons previously drawn up by the Council of the Organization.
- (2) If, within a period of 60 days from the date of the receipt of the request, one of the Parties shall not have nominated the member of

the Tribunal for whose designation it is responsible, the other Party may directly inform the Secretary-General of the Organization who shall nominate the Chairman of the Tribunal within a period of 60 days, selecting him from the list prescribed in paragraph (1) of the present article.

- (3) The Chairman of the Tribunal shall, upon nomination, request the Party which has not provided an Arbitrator, to do so in the same manner and under the same conditions. If the Party does not make the required nomination, the Chairman of the Tribunal shall request the Secretary-General of the Organization to make the nomination in the form and conditions prescribed in the preceding paragraph.
- (4) The Chairman of the Tribunal, if nominated under the provisions of the present article, shall not be or have been a national of one of the Parties concerned, except with the consent of the other Party.
- (5) In the case of the decease or default of an Arbitrator for whose nomination one of the Parties is responsible, the said Party shall nominate a replacement within a period of 60 days from the date of decease or default. Should the said Party not make the nomination, the arbitration shall proceed under the remaining Arbitrators. In case of the decease or default of the Chairman of the Tribunal, a replacement shall be nominated in accordance with the provisions of article III above, or in the absence of agreement between the members of the Tribunal within a period of 60 days of the decease or default, according to the provisions of the present article.

Article V

The Tribunal may hear and determine counter-claims arising directly out of the subject matter of the dispute.

Article VI

Each Party shall be responsible for the remuneration of its Arbitrator and connected costs and for the costs entailed by the preparation of its own case. The remuneration of the Chairman of the Tribunal and of all general expenses incurred by the Arbitration shall be borne equally by the Parties. The Tribunal shall keep a record of all its expenses and shall furnish a final statement thereof.

Article VII

Any Party to the Convention which has an interest of a legal nature and which may be affected by the decision in the case may, after giving written

notice to the Parties which have originally initiated the procedure, join in the arbitration procedure with the consent of the Tribunal.

Article VIII

Any Arbitration Tribunal established under the provisions of the present Protocol shall decide its own rules of procedure.

Article IX

- (1) Decisions of the Tribunal both as to its procedure and its place of meeting and as to any question laid before it, shall be taken by majority votes of its members; the absence or abstention of one of the members of the Tribunal for whose nomination the Parties were responsible, shall not constitute an impediment to the Tribunal reaching a decision. In cases of equal voting, the vote of the Chairman shall be decisive.
- (2) The Parties shall facilitate the work of the Tribunal and in particular, in accordance with their legislation, and using all means at their disposal:
 - (a) provide the Tribunal with the necessary documents and information;
 - (b) enable the Tribunal to enter their territory, to hear witnesses or experts, and to visit the scene.
- (3) Absence or default of one Party shall not constitute an impediment to the procedure.

Article X

- (1) The Tribunal shall render its award within a period of five months from the time it is established unless it decides, in the case of necessity, to extend the time limit for a further period not exceeding three months. The award of the Tribunal shall be accompanied by a statement of reasons. It shall be final and without appeal and shall be communicated to the Secretary-General of the Organization. The Parties shall immediately comply with the award.
- (2) Any controversy which may arise between the Parties as regards interpretation or execution of the award may be submitted by either Party for judgment to the Tribunal which made the award, or, if it is not available to another Tribunal constituted for this purpose, in the same manner as the original Tribunal.

**Protocol of 1997
to amend the
International Convention
for the
Prevention of Pollution
from Ships, 1973,
as modified by the
Protocol of 1978
relating thereto**

Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto

THE PARTIES TO THE PRESENT PROTOCOL,

BEING Parties to the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973,

RECOGNIZING the need to prevent and control air pollution from ships,

RECALLING Principle 15 of the Rio Declaration on Environment and Development which calls for the application of a precautionary approach,

CONSIDERING that this objective could best be achieved by the conclusion of a Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto,

HAVE AGREED as follows:

Article 1

Instrument to be amended

The instrument which the present Protocol amends is the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as the “Convention”).

Article 2

Addition of Annex VI to the Convention

Annex VI entitled Regulations for the Prevention of Air Pollution from Ships, the text of which is set out in the annex to the present Protocol, is added.

Article 3

General obligations

1 The Convention and the present Protocol shall, as between the Parties to the present Protocol, be read and interpreted together as one single instrument.

2 Every reference to the present Protocol constitutes at the same time a reference to the annex hereto.

Article 4

Amendment procedure

In applying article 16 of the Convention to an amendment to Annex VI and its appendices, the reference to “a Party to the Convention” shall be deemed to mean the reference to a Party bound by that Annex.

FINAL CLAUSES

Article 5

Signature, ratification, acceptance, approval and accession

1 The present Protocol shall be open for signature at the Headquarters of the International Maritime Organization (hereinafter referred to as the “Organization”) from 1 January 1998 until 31 December 1998 and shall thereafter remain open for accession. Only Contracting States to the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1978 Protocol”) may become Parties to 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 (hereinafter referred to as the “Secretary-General”).

Article 6

Entry into force

1 The present Protocol shall enter into force twelve months after the date on which not less than fifteen States, the combined merchant fleets of which constitute not less than 50 per cent of the gross tonnage of the world's merchant shipping, have become Parties to it in accordance with article 5 of the present Protocol.

2 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.

3 After the date on which an amendment to the present Protocol is deemed to have been accepted in accordance with article 16 of the Convention, any instrument of ratification, acceptance, approval or accession deposited shall apply to the present Protocol as amended.

Article 7

Denunciation

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

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

3 A denunciation shall take effect twelve months after receipt of the notification by the Secretary-General or after the expiry of any other longer period which may be indicated in the notification.

4 A denunciation of the 1978 Protocol in accordance with article VII thereof shall be deemed to include a denunciation of the present Protocol in accordance with this article. Such denunciation shall take effect on the date on which denunciation of the 1978 Protocol takes effect in accordance with article VII of that Protocol.

Article 8

Depositary

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

- 2 The Depositary shall:
- (a) inform 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; and
 - (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; and
 - (b) transmit certified true copies of the present Protocol to 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 9

Languages

The present Protocol is established in a single copy in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic.

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

DONE AT LONDON this twenty-sixth day of September, one thousand nine hundred and ninety-seven.

* Signatures omitted.

**Annex I of MARPOL 73/78
(including amendments)**

*Regulations for the Prevention
of Pollution by Oil*

Annex I of MARPOL 73/78 (including amendments*)

Regulations for the Prevention of Pollution by Oil

Chapter I – General

Regulation 1

Definitions

For the purposes of this Annex:

- (1) *Oil* means petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products (other than petrochemicals which are subject to the provisions of Annex II of the present Convention) and, without limiting the generality of the foregoing, includes the substances listed in appendix I to this Annex.

SEE INTERPRETATION 1A.0

- (2) *Oily mixture* means a mixture with any oil content.
- (3) *Oil fuel* means any oil used as fuel in connection with the propulsion and auxiliary machinery of the ship in which such oil is carried.
- (4) *Oil tanker* means a ship constructed or adapted primarily to carry oil in bulk in its cargo spaces and includes combination carriers and any “chemical tanker” as defined in Annex II of the present Convention when it is carrying a cargo or part cargo of oil in bulk.

SEE INTERPRETATIONS 1.0 AND 6.1

- (5) *Combination carrier* means a ship designed to carry either oil or solid cargoes in bulk.

* As of the publication of this Consolidated Edition, the 1990 Amendments on the harmonized system of surveys and certification had not entered into force. For information purposes only, refer to resolution MEPC.39(29) on the introduction of the harmonized system of survey and certification to Annexes I and II of MARPOL 73/78 adopted on 16 March 1990 by the Marine Environment Protection Committee, as set out in the Additional Information section of the present publication.

- (6) *New ship* means a ship:
- (a) for which the building contract is placed after 31 December 1975; or
 - (b) in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction after 30 June 1976; or
 - (c) the delivery of which is after 31 December 1979; or
 - (d) which has undergone a major conversion:
 - (i) for which the contract is placed after 31 December 1975; or
 - (ii) in the absence of a contract, the construction work of which is begun after 30 June 1976; or
 - (iii) which is completed after 31 December 1979.

SEE INTERPRETATIONS 1.1 AND 1.2

- (7) *Existing ship* means a ship which is not a new ship.
- (8) (a) *Major conversion* means a conversion of an existing ship:
- (i) which substantially alters the dimensions or carrying capacity of the ship; or
 - (ii) which changes the type of the ship; or
 - (iii) the intent of which in the opinion of the Administration is substantially to prolong its life; or
 - (iv) which otherwise so alters the ship that, if it were a new ship, it would become subject to relevant provisions of the present Convention not applicable to it as an existing ship.

SEE INTERPRETATION 1.3

- (b) Notwithstanding the provisions of subparagraph (a) of this paragraph, conversion of an existing oil tanker of 20,000 tons deadweight and above to meet the requirements of regulation 13 of this Annex shall not be deemed to constitute a major conversion for the purposes of this Annex.
- (c) Notwithstanding the provisions of subparagraph (a) of this paragraph, conversion of an existing oil tanker to meet the requirements of regulation 13F or 13G of this Annex shall not be deemed to constitute a major conversion for the purpose of this Annex.
- (9) *Nearest land*. The term “from the nearest land” means from the baseline from which the territorial sea of the territory in question is established in accordance with international law, except that, for the purposes of the present Convention “from the nearest land” off the

north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in

latitude 11°00' S, longitude 142°08' E
to a point in latitude 10°35' S, longitude 141°55' E,
thence to a point latitude 10°00' S, longitude 142°00' E,
thence to a point latitude 9°10' S, longitude 143°52' E,
thence to a point latitude 9°00' S, longitude 144°30' E,
thence to a point latitude 13°00' S, longitude 144°00' E,
thence to a point latitude 15°00' S, longitude 146°00' E,
thence to a point latitude 18°00' S, longitude 147°00' E,
thence to a point latitude 21°00' S, longitude 153°00' E,
thence to a point on the coast of Australia
in latitude 24°42' S, longitude 153°15' E.

- (10) *Special area* means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by oil is required. Special areas shall include those listed in regulation 10 of this Annex.
- (11) *Instantaneous rate of discharge of oil content* means the rate of discharge of oil in litres per hour at any instant divided by the speed of the ship in knots at the same instant.
- (12) *Tank* means an enclosed space which is formed by the permanent structure of a ship and which is designed for the carriage of liquid in bulk.
- (13) *Wing tank* means any tank adjacent to the side shell plating.
- (14) *Centre tank* means any tank inboard of a longitudinal bulkhead.
- (15) *Slop tank* means a tank specifically designated for the collection of tank drainings, tank washings and other oily mixtures.
- (16) *Clean ballast* means the ballast in a tank which since oil was last carried therein, has been so cleaned that effluent therefrom if it were discharged from a ship which is stationary into clean calm water on a clear day would not produce visible traces of oil on the surface of the water or on adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. If the ballast is discharged through an oil discharge monitoring and control system approved by the Administration, evidence based on such a system to the effect that the oil content of the effluent did not exceed 15 parts per million shall be determinative that the ballast was clean, notwithstanding the presence of visible traces.
- (17) *Segregated ballast* means the ballast water introduced into a tank which is completely separated from the cargo oil and oil fuel system and which is permanently allocated to the carriage of ballast or to the

carriage of ballast or cargoes other than oil or noxious substances as variously defined in the Annexes of the present Convention.

SEE INTERPRETATION 1.4

- (18) *Length (L)* means 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 foreside 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 length is measured shall be parallel to the designed waterline. The length (*L*) shall be measured in metres.
- (19) *Forward and after perpendiculars* shall be taken at the forward and after ends of the length (*L*). The forward perpendicular shall coincide with the foreside of the stem on the waterline on which the length is measured.
- (20) *Amidships* is at the middle of the length (*L*).
- (21) *Breadth (B)* means the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material. The breadth (*B*) shall be measured in metres.
- (22) *Deadweight (DW)* means the difference in metric tons between the displacement of a ship in water of a specify gravity of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship.
- (23) *Lightweight* means the displacement of a ship in metric tons without cargo, fuel, lubricating oil, ballast water, fresh water and feed water in tanks, consumable stores, and passengers and crew and their effects.
- (24) *Permeability* of a space means the ratio of the volume within that space which is assumed to be occupied by water to the total volume of that space.
- (25) *Volumes* and *areas* in a ship shall be calculated in all cases to moulded lines.
- (26) Notwithstanding the provisions of paragraph (6) of this regulation, for the purposes of regulations 13, 13B, 13E and 18(4) of this Annex, *new oil tanker* means an oil tanker:
- (a) for which the building contract is placed after 1 June 1979; or
 - (b) in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction after 1 January 1980; or
 - (c) the delivery of which is after 1 June 1982; or

- (d) which has undergone a major conversion:
 - (i) for which the contract is placed after 1 June 1979; or
 - (ii) in the absence of a contract, the construction work of which is begun after 1 January 1980; or
 - (iii) which is completed after 1 June 1982;

except that, for oil tankers of 70,000 tons deadweight and above, the definition in paragraph (6) of this regulation shall apply for the purposes of regulation 13(1) of this Annex.

SEE INTERPRETATIONS 1.1 AND 1.2

- (27) Notwithstanding the provisions of paragraph (7) of this regulation, for the purposes of regulations 13, 13A, 13B, 13C, 13D, 18(5) and 18(6)(c) of this Annex, *existing oil tanker* means an oil tanker which is not a new oil tanker as defined in paragraph (26) of this regulation.
- (28) *Crude oil* means any liquid hydrocarbon mixture occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:
 - (a) crude oil from which certain distillate fractions may have been removed; and
 - (b) crude oil to which certain distillate fractions may have been added.
- (29) *Crude oil tanker* means an oil tanker engaged in the trade of carrying crude oil.
- (30) *Product carrier* means an oil tanker engaged in the trade of carrying oil other than crude oil.

Regulation 2

Application

- (1) Unless expressly provided otherwise, the provisions of this Annex shall apply to all ships.
- (2) In ships other than oil tankers fitted with cargo spaces which are constructed and utilized to carry oil in bulk of an aggregate capacity of 200 cubic metres or more, the requirements of regulations 9, 10, 14, 15(1), (2) and (3), 18, 20 and 24(4) of this Annex for oil tankers shall also apply to the construction and operation of those spaces, except that where such aggregate capacity is less than 1,000 cubic metres the requirements of regulation 15(4) of this Annex may apply in lieu of regulation 15(1), (2) and (3).
- (3) Where a cargo subject to the provisions of Annex II of the present Convention is carried in a cargo space of an oil tanker, the appropriate requirements of Annex II of the present Convention shall also apply.

- (4) (a) Any hydrofoil, air-cushion vehicle and other new type of vessel (near-surface craft, submarine craft, etc.) whose constructional features are such as to render the application of any of the provisions of chapters II and III of this Annex relating to construction and equipment unreasonable or impracticable may be exempted by the Administration from such provisions, provided that the construction and equipment of that ship provides equivalent protection against pollution by oil, having regard to the service for which it is intended.
- (b) Particulars of any such exemption granted by the Administration shall be indicated in the Certificate referred to in regulation 5 of this Annex.
- (c) The Administration which allows any such exemption shall, as soon as possible, but not more than 90 days thereafter, communicate to the Organization particulars of same and the reasons therefor, which the Organization shall circulate to the Parties to the Convention for their information and appropriate action, if any.

Regulation 3

Equivalents

SEE INTERPRETATION 1.5

- (1) The Administration may allow any fitting, material, appliance or apparatus to be fitted in a ship as an alternative to that required by this Annex if such fitting, material, appliance or apparatus is at least as effective as that required by this Annex. This authority of the Administration shall not extend to substitution of operational methods to effect the control of discharge of oil as equivalent to those design and construction features which are prescribed by regulations in this Annex.
- (2) The Administration which allows a fitting, material, appliance or apparatus, as an alternative to that required by this Annex shall communicate to the Organization for circulation to the Parties to the Convention particulars thereof, for their information and appropriate action, if any.



Regulation 4

Surveys and inspections

- (1) Every oil tanker of 150 tons gross tonnage and above, and every other ship of 400 tons gross tonnage and above shall be subject to the surveys specified below:

- (a) An initial survey before the ship is put in service or before the Certificate required under regulation 5 of this Annex is issued for the first time, which shall include a complete survey of its structure, equipment, systems, fittings, arrangements and material in so far as the ship is covered by this Annex. This survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex.
- (b) Periodical surveys at intervals specified by the Administration but not exceeding five years, which shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the requirements of this Annex.
- (c) A minimum of one intermediate survey during the period of validity of the Certificate which shall be such as to ensure that the equipment and associated pump and piping systems, including oil discharge monitoring and control systems, crude oil washing systems, oily-water separating equipment and oil filtering systems, fully comply with the applicable requirements of this Annex and are in good working order. In cases where only one such intermediate survey is carried out in any one Certificate validity period, it shall be held not before six months prior to, nor later than six months after the half-way date of the Certificate's period of validity. Such intermediate surveys shall be endorsed on the Certificate issued under regulation 5 of this Annex.

SEE INTERPRETATION 1A.1

- (2) The Administration shall establish appropriate measures for ships which are not subject to the provisions of paragraph (1) of this regulation in order to ensure that the applicable provisions of this Annex are complied with.
- (3)
 - (a) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.
 - (b) The Administration shall institute arrangements for unscheduled inspections to be carried out during the period of validity of the Certificate. Such inspections shall ensure that the ship and its equipment remain in all respects satisfactory for the service for which the ship is intended. These inspections may be carried out by their own inspection services, or by nominated surveyors or by recognized organizations, or by other Parties upon request of the Administration. Where the Administration, under the

provisions of paragraph (1) of this regulation, establishes mandatory annual surveys, the above unscheduled inspections shall not be obligatory.

SEE INTERPRETATION 1A.1

- (c) An Administration nominating surveyors or recognizing organizations to conduct surveys and inspections as set forth in subparagraphs (a) and (b) of this paragraph, shall as a minimum empower any nominated surveyor or recognized organization to:
- (i) require repairs to a ship; and
 - (ii) carry out surveys and inspections 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 the nominated surveyors or recognized organizations, for circulation to Parties to the present Protocol for the information of their officers.

- (d) 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 presenting an unreasonable threat of harm to the marine environment, 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 Certificate should be withdrawn and the Administration shall be notified immediately; and if the ship is in a 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 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 applicable, the Government of the port State concerned shall take such steps as will ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without presenting an unreasonable threat of harm to the marine environment.
- (e) In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and inspection and shall undertake to ensure the necessary arrangements to satisfy this obligation.

- (4) (a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment.
- (b) After any survey of the ship under paragraph (1) of this regulation has been completed, no change shall be made in the structure, equipment, systems, fittings, arrangements or material covered by the survey, without the sanction of the Administration, except the direct replacement of such equipment and fittings.
- (c) Whenever an accident occurs to a ship or a defect is discovered which substantially affects the integrity of the ship or the efficiency or completeness of its equipment covered by this Annex the master or owner of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph (1) of this regulation is necessary. If the ship is in a port of another Party, 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 report has been made.



Regulation 5

Issue of certificate

SEE INTERPRETATIONS 2.0 and 2.1

- (1) An International Oil Pollution Prevention Certificate shall be issued, after survey in accordance with the provisions of regulation 4 of this Annex, to any oil tanker of 150 tons gross tonnage and above and any other ships of 400 tons gross tonnage and above which are engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention. In the case of existing ships this requirement shall apply 12 months after the date of entry into force of the present Convention.

SEE INTERPRETATIONS 2.2, 2.3, 2.4

- (2) Such certificate shall be issued either by the Administration or by any persons or organization duly authorized by it. In every case the Administration assumes full responsibility for the certificate.



Regulation 6

Issue of a certificate by another Government

- (1) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Oil Pollution Prevention Certificate to the ship in accordance with this Annex.
- (2) A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.
- (3) A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the certificate issued under regulation 5 of this Annex.
- (4) No International Oil Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.



Regulation 7

Form of certificate

SEE INTERPRETATION 2.4A

The International Oil Pollution Prevention Certificate shall be drawn up in an official language of the issuing country in the form corresponding to the model given in appendix II to this Annex. If the language used is neither English nor French, the text shall include a translation into one of these languages.



Regulation 8

Duration of certificate

SEE INTERPRETATION 2.5

- (1) An International Oil Pollution Prevention Certificate shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue, provided that in the case of an oil tanker operating with dedicated clean ballast tanks for a limited period specified in regulation 13(9) of this Annex, the period of validity of the certificate shall not exceed such specified period.
- (2) A certificate shall cease to be valid if significant alterations have taken place in the construction, equipment, systems, fittings, arrangements or material required without the sanction of the Administration,

except the direct replacement of such equipment or fittings, or if intermediate surveys as specified by the Administration under regulation 4(1)(c) of this Annex are not carried out.

- (3) A certificate issued to a ship shall also cease to be valid 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 full compliance with the requirements of regulation 4(4)(a) and (b) of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall transmit as soon as possible to the Administration a copy of the certificate carried by the ship before the transfer and, if available, a copy of the relevant survey report.

Regulation 8A

*Port State control on operational requirements**

- (1) A ship when in a port or an offshore terminal of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by oil.
- (2) In the circumstances given in paragraph (1) of this regulation, the Party 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 this Annex.
- (3) Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
- (4) Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

* Refer to the procedures for port State control adopted by the Organization by resolution A.787(19); see IMO sales publication IMO-650E.

Chapter II – Requirements for control of operational pollution

Regulation 9

Control of discharge of oil

- (1) Subject to the provisions of regulations 10 and 11 of this Annex and paragraph (2) of this regulation, any discharge into the sea of oil or oily mixtures from ships to which this Annex applies shall be prohibited except when all the following conditions are satisfied:
- (a) for an oil tanker, except as provided for in subparagraph (b) of this paragraph:
 - (i) the tanker is not within a special area;
 - (ii) the tanker is more than 50 nautical miles from the nearest land;
 - (iii) the tanker is proceeding *en route*;
 - (iv) the instantaneous rate of discharge of oil content does not exceed 30 litres per nautical mile;
 - (v) the total quantity of oil discharged into the sea does not exceed for existing tankers 1/15,000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers 1/30,000 of the total quantity of the particular cargo of which the residue formed a part; and

SEE INTERPRETATION 3.2

- (vi) the tanker has in operation an oil discharge monitoring and control system and a slop tank arrangement as required by regulation 15 of this Annex.
- (b) from a ship of 400 tons gross tonnage and above other than an oil tanker and from machinery space bilges excluding cargo pump-room bilges of an oil tanker unless mixed with oil cargo residue:
- (i) the ship is not within a special area;
 - (ii) the ship is proceeding *en route*;
 - (iii) the oil content of the effluent without dilution does not exceed 15 parts per million; and
 - (iv) the ship has in operation equipment as required by regulation 16 of this Annex.

SEE INTERPRETATION 3.1

- (2) In the case of a ship of less than 400 tons gross tonnage other than an oil tanker whilst outside the special area, the Administration shall ensure that it is equipped as far as practicable and reasonable with installations to ensure the storage of oil residues on board and their discharge to reception facilities or into the sea in compliance with the requirements of paragraph (1)(b) of this regulation.
- (3) Whenever visible traces of oil are observed on or below the surface of the water in the immediate vicinity of a ship or its wake, Governments of Parties to the Convention should, to the extent they are reasonably able to do so, promptly investigate the facts bearing on the issue of whether there has been a violation of the provisions of this regulation or regulation 10 of this Annex. The investigation should include, in particular, the wind and sea conditions, the track and speed of the ship, other possible sources of the visible traces in the vicinity, and any relevant oil discharge records.
- (4) The provisions of paragraph (1) of this regulation shall not apply to the discharge of clean or segregated ballast or unprocessed oily mixtures which without dilution have an oil content not exceeding 15 parts per million and which do not originate from cargo pump-room bilges and are not mixed with oil cargo residues.
- (5) No discharge into the sea shall contain chemicals or other substances in quantities or concentrations which are hazardous to the marine environment or chemicals or other substances introduced for the purpose of circumventing the conditions of discharge specified in this regulation.
- (6) The oil residues which cannot be discharged into the sea in compliance with paragraphs (1), (2) and (4) of this regulation shall be retained on board or discharged to reception facilities.
- (7) In the case of a ship, referred to in regulation 16(6) of this Annex, not fitted with equipment as required by regulation 16(1) or 16(2) of this Annex, the provisions of paragraph (1)(b) of this regulation will not apply until 6 July 1998 or the date on which the ship is fitted with such equipment, whichever is the earlier. Until this date any discharge from machinery space bilges into the sea of oil or oily mixtures from such a ship shall be prohibited except when all the following conditions are satisfied:
 - (a) the oily mixture does not originate from the cargo pump-room bilges;
 - (b) the oily mixture is not mixed with oil cargo residues;
 - (c) the ship is not within a special area;
 - (d) the ship is more than 12 nautical miles from the nearest land;
 - (e) the ship is proceeding *en route*;

- (f) the oil content of the effluent is less than 100 parts per million; and
- (g) the ship has in operation oily-water separating equipment of a design approved by the Administration, taking into account the specification recommended by the Organization.*

Regulation 10

Methods for the prevention of oil pollution from ships while operating in special areas

- (1) For the purpose of this Annex, the special areas are the Mediterranean Sea area, the Baltic Sea area, the Black Sea area, the Red Sea area, the “Gulfs area”, the Gulf of Aden area, the Antarctic area and the North-West European waters, which are defined as follows:
 - (a) The *Mediterranean Sea area* means the Mediterranean Sea proper including the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41°N parallel and bounded to the west by the Straits of Gibraltar at the meridian of 5°36' W.
 - (b) The *Baltic Sea area* means the Baltic Sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57°44.8' N.
 - (c) The *Black Sea area* means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41°N.
 - (d) The *Red Sea area* means the Red Sea proper including the Gulfs of Suez and Aqaba bounded at the south by the rhumb line between Ras si Ane (12°28.5' N, 43°19.6' E) and Husn Murad (12°40.4' N, 43°30.2' E).
 - (e) The *Gulfs area* means the sea area located north-west of the rhumb line between Ras al Hadd (22°30' N, 59°48' E) and Ras al Fasteh (25°04' N, 61°25' E).
 - (f) The *Gulf of Aden area* means that part of the Gulf of Aden between the Red Sea and the Arabian Sea bounded to the west by the rhumb line between Ras si Ane (12°28.5' N, 43°19.6' E) and Husn Murad (12°40.4' N, 43°30.2' E) and to the east by the rhumb line between Ras Asir (11°50' N, 51°16.9' E) and Ras Fartak (15°35' N, 52°13.8' E).

* Refer to the Guidelines and specifications for pollution prevention equipment for machinery space bilges of ships adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33); see IMO sales publication IMO-646E.

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- (g) The *Antarctic area* means the sea area south of latitude 60° S.
- (h) The *North-West European waters* include the North Sea and its approaches, the Irish Sea and its approaches, the Celtic Sea, the English Channel and its approaches and part of the North-East Atlantic immediately to the west of Ireland. The area is bounded by lines joining the following points:
- (i) 48°27' N on the French coast;
 - (ii) 48°27' N, 6°25' W;
 - (iii) 49°52' N, 7°44' W;
 - (iv) 50°30' N, 12° W;
 - (v) 56°30' N, 12° W;
 - (vi) 62° N, 3° W;
 - (vii) 62° N on the Norwegian coast;
 - (viii) 57°44.8' N on the Danish and Swedish coasts.
- (2) Subject to the provisions of regulation 11 of this Annex:
- (a) Any discharge into the sea of oil or oily mixture from any oil tanker and any ship of 400 tons gross tonnage and above other than an oil tanker shall be prohibited while in a special area. In respect of the Antarctic area, any discharge into the sea of oil or oily mixture from any ship shall be prohibited.
 - (b) Except as provided for in respect of the Antarctic area under subparagraph 2(a) of this regulation, any discharge into the sea of oil or oily mixture from a ship of less than 400 tons gross tonnage, other than an oil tanker, shall be prohibited while in a special area, except when the oil content of the effluent without dilution does not exceed 15 parts per million.
- (3) (a) The provisions of paragraph (2) of this regulation shall not apply to the discharge of clean or segregated ballast.
- (b) The provisions of subparagraph (2)(a) of this regulation shall not apply to the discharge of processed bilge water from machinery spaces, provided that all of the following conditions are satisfied:
- (i) the bilge water does not originate from cargo pump-room bilges;
 - (ii) the bilge water is not mixed with oil cargo residues;
 - (iii) the ship is proceeding *en route*;
 - (iv) the oil content of the effluent without dilution does not exceed 15 parts per million;
 - (v) the ship has in operation oil filtering equipment complying with regulation 16(5) of this Annex; and

- (vi) the filtering system is equipped with a stopping device which will ensure that the discharge is automatically stopped when the oil content of the effluent exceeds 15 parts per million.

SEE INTERPRETATION 3.4

- (4)
 - (a) No discharge into the sea shall contain chemicals or other substances in quantities or concentrations which are hazardous to the marine environment or chemicals or other substances introduced for the purpose of circumventing the conditions of discharge specified in this regulation.
 - (b) The oil residues which cannot be discharged into the sea in compliance with paragraph (2) or (3) of this regulation shall be retained on board or discharged to reception facilities.
- (5) Nothing in this regulation shall prohibit a ship on a voyage only part of which is in a special area from discharging outside the special area in accordance with regulation 9 of this Annex.
- (6) Whenever visible traces of oil are observed on or below the surface of the water in the immediate vicinity of a ship or its wake, the Governments of Parties to the Convention should, to the extent they are reasonably able to do so, promptly investigate the facts bearing on the issue of whether there has been a violation of the provisions of this regulation or regulation 9 of this Annex. The investigation should include, in particular, the wind and sea conditions, the track and speed of the ship, other possible sources of the visible traces in the vicinity, and any relevant oil discharge records.
- (7) Reception facilities within special areas:
 - (a) Mediterranean Sea, Black Sea and Baltic Sea areas:
 - (i) The Government of each Party to the Convention the coastline of which borders on any given special area undertakes to ensure that not later than 1 January 1977 all oil loading terminals and repair ports within the special area are provided with facilities adequate for the reception and treatment of all the dirty ballast and tank washing water from oil tankers. In addition all ports within the special area shall be provided with adequate reception facilities for other residues and oily mixtures from all ships. Such facilities shall have adequate capacity to meet the needs of the ships using them without causing undue delay.

- (ii) The Government of each Party having under its jurisdiction entrances to seawater courses with low depth contour which might require a reduction of draught by the discharge of ballast undertakes to ensure the provision of the facilities referred to in subparagraph (a)(i) of this paragraph but with the proviso that ships required to discharge slops or dirty ballast could be subject to some delay.
 - (iii) During the period between the entry into force of the present Convention (if earlier than 1 January 1977) and 1 January 1977 ships while navigating in the special areas shall comply with the requirements of regulation 9 of this Annex. However, the Governments of Parties the coastlines of which border any of the special areas under this subparagraph may establish a date earlier than 1 January 1977, but after the date of entry in force of the present Convention, from which the requirements of this regulation in respect of the special areas in question shall take effect:
 - (1) if all the reception facilities required have been provided by the date so established; and
 - (2) provided that the Parties concerned notify the Organization of the date so established at least six months in advance, for circulation to other Parties.
 - (iv) After 1 January 1977, or the date established in accordance with subparagraph (a)(iii) of this paragraph if earlier, each Party shall notify the Organization for transmission to the Contracting Governments concerned of all cases where the facilities are alleged to be inadequate.
- (b) Red Sea area, Gulfs area, Gulf of Aden area and North-West European waters:
- (i) The Government of each Party the coastline of which borders on the special areas undertakes to ensure that as soon as possible all oil loading terminals and repair ports within these special areas are provided with facilities adequate for the reception and treatment of all the dirty ballast and tank washing water from tankers. In addition all ports within the special area shall be provided with adequate reception facilities for other residues and oily mixtures from all ships. Such facilities shall have adequate capacity to meet the needs of the ships using them without causing undue delay.

- (ii) The Government of each Party having under its jurisdiction entrances to seawater courses with low depth contour which might require a reduction of draught by the discharge of ballast shall undertake to ensure the provision of the facilities referred to in subparagraph (b)(i) of this paragraph but with the proviso that ships required to discharge slops or dirty ballast could be subject to some delay.
 - (iii) Each Party concerned shall notify the Organization of the measures taken pursuant to provisions of subparagraph (b)(i) and (ii) of this paragraph. Upon receipt of sufficient notifications the Organization shall establish a date from which the requirements of this regulation in respect of the area in question shall take effect. The Organization shall notify all Parties of the date so established no less than twelve months in advance of that date.
 - (iv) During the period between the entry into force of the present Convention and the date so established, ships while navigating in the special area shall comply with the requirements of regulation 9 of this Annex.
 - (v) After such date oil tankers loading in ports in these special areas where such facilities are not yet available shall also fully comply with the requirements of this regulation. However, oil tankers entering these special areas for the purpose of loading shall make every effort to enter the area with only clean ballast on board.
 - (vi) After the date on which the requirements for the special area in question take effect, each Party shall notify the Organization for transmission to the Parties concerned of all cases where the facilities are alleged to be inadequate.
 - (vii) At least the reception facilities as prescribed in regulation 12 of this Annex shall be provided by 1 January 1977 or one year after the date of entry into force of the present Convention, whichever occurs later.
- (8) Notwithstanding paragraph (7) of this regulation, the following rules apply to the Antarctic area:
- (a) The Government of each Party to the Convention at whose ports ships depart *en route* to or arrive from the Antarctic area undertakes to ensure that as soon as practicable adequate facilities are provided for the reception of all sludge, dirty ballast, tank washing water, and other oily residues and mixtures from all ships, without causing undue delay, and according to the needs of the ships using them.

- (b) The Government of each Party to the Convention shall ensure that all ships entitled to fly its flag, before entering the Antarctic area, are fitted with a tank or tanks of sufficient capacity on board for the retention of all sludge, dirty ballast, tank washing water and other oily residues and mixtures while operating in the area and have concluded arrangements to discharge such oily residues at a reception facility after leaving the area.

Regulation 11

Exceptions

Regulations 9 and 10 of this Annex shall not apply to:

- (a) the discharge into the sea of oil or oily mixture necessary for the purpose of securing the safety of a ship or saving life at sea; or
- (b) the discharge into the sea of oil or oily mixture resulting from damage to a ship or its equipment:
 - (i) provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimizing the discharge; and
 - (ii) except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or
- (c) the discharge into the sea of substances containing oil, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution. Any such discharge shall be subject to the approval of any Government in whose jurisdiction it is contemplated the discharge will occur.

Regulation 12

Reception facilities

- (1) Subject to the provisions of regulation 10 of this Annex, the Government of each Party undertakes to ensure the provision at oil loading terminals, repair ports, and in other ports in which ships have oily residues to discharge, of facilities for the reception of such residues and oily mixtures as remain from oil tankers and other ships adequate to meet the needs of the ships using them without causing undue delay to ships.
- (2) Reception facilities in accordance with paragraph (1) of this regulation shall be provided in:

- (a) all ports and terminals in which crude oil is loaded into oil tankers where such tankers have immediately prior to arrival completed a ballast voyage of not more than 72 hours or not more than 1,200 nautical miles;
- (b) all ports and terminals in which oil other than crude oil in bulk is loaded at an average quantity of more than 1,000 metric tons per day;
- (c) all ports having ship repair yards or tank cleaning facilities;
- (d) all ports and terminals which handle ships provided with the sludge tank(s) required by regulation 17 of this Annex;
- (e) all ports in respect of oily bilge waters and other residues, which cannot be discharged in accordance with regulation 9 of this Annex; and
- (f) all loading ports for bulk cargoes in respect of oil residues from combination carriers which cannot be discharged in accordance with regulation 9 of this Annex.

SEE INTERPRETATION 3.5

- (3) The capacity for the reception facilities shall be as follows:
 - (a) Crude oil loading terminals shall have sufficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with the provisions of regulation 9(1)(a) of this Annex from all oil tankers on voyages as described in paragraph (2)(a) of this regulation.
 - (b) Loading ports and terminals referred to in paragraph (2)(b) of this regulation shall have sufficient reception facilities to receive oil and oily mixtures which cannot be discharged in accordance with the provisions of regulation 9(1)(a) of this Annex from oil tankers which load oil other than crude oil in bulk.
 - (c) All ports having ship repair yards or tank cleaning facilities shall have sufficient reception facilities to receive all residues and oily mixtures which remain on board for disposal from ships prior to entering such yards or facilities.
 - (d) All facilities provided in ports and terminals under paragraph (2)(d) of this regulation shall be sufficient to receive all residues retained according to regulation 17 of this Annex from all ships that may reasonably be expected to call at such ports and terminals.
 - (e) All facilities provided in ports and terminals under this regulation shall be sufficient to receive oily bilge waters and other residues which cannot be discharged in accordance with regulation 9 of this Annex.

- (f) The facilities provided in loading ports for bulk cargoes shall take into account the special problems of combination carriers as appropriate.
- (4) The reception facilities prescribed in paragraphs (2) and (3) of this regulation shall be made available no later than one year from the date of entry into force of the present Convention or by 1 January 1977, whichever occurs later.
- (5) Each Party shall notify the Organization for transmission to the Parties concerned of all cases where the facilities provided under this regulation are alleged to be inadequate.

Regulation 13

Segregated ballast tanks, dedicated clean ballast tanks and crude oil washing

SEE INTERPRETATIONS 2.1 AND 4.6

Subject to the provisions of regulations 13C and 13D of this Annex, oil tankers shall comply with the requirements of this regulation.

New oil tankers of 20,000 tons deadweight and above

- (1) Every new crude oil tanker of 20,000 tons deadweight and above and every new product carrier of 30,000 tons deadweight and above shall be provided with segregated ballast tanks and shall comply with paragraphs (2), (3) and (4), or paragraph (5) as appropriate, of this regulation.
- (2) The capacity of the segregated ballast tanks shall be so determined that the ship may operate safely on ballast voyages without recourse to the use of cargo tanks for water ballast except as provided for in paragraphs (3) or (4) of this regulation. In all cases, however, the capacity of segregated ballast tanks shall be at least such that, in any ballast condition at any part of the voyage, including the conditions consisting of lightweight plus segregated ballast only, the ship's draughts and trim can meet each of the following requirements:
- (a) the moulded draught amidships (d_m) in metres (without taking into account any ship's deformation) shall not be less than:
- $$d_m = 2.0 + 0.02L;$$
- (b) the draughts at the forward and after perpendiculars shall correspond to those determined by the draught amidships (d_m) as specified in subparagraph (a) of this paragraph, in association with the trim by the stern of not greater than $0.015L$; and

- (c) in any case the draught at the after perpendicular shall not be less than that which is necessary to obtain full immersion of the propeller(s).
- (3) In no case shall ballast water be carried in cargo tanks, except:
- (a) on those rare voyages when weather conditions are so severe that, in the opinion of the master, it is necessary to carry additional ballast water in cargo tanks for the safety of the ship; and
 - (b) in exceptional cases where the particular character of the operation of an oil tanker renders it necessary to carry ballast water in excess of the quantity required under paragraph (2) of this regulation, provided that such operation of the oil tanker falls under the category of exceptional cases as established by the Organization.

Such additional ballast water shall be processed and discharged in compliance with regulation 9 of this Annex and in accordance with the requirements of regulation 15 of this Annex and an entry shall be made in the Oil Record Book referred to in regulation 20 of this Annex.

SEE INTERPRETATION 4.1

- (4) In the case of new crude oil tankers, the additional ballast permitted in paragraph (3) of this regulation shall be carried in cargo tanks only if such tanks have been crude oil washed in accordance with regulation 13B of this Annex before departure from an oil unloading port or terminal.
-

SEE INTERPRETATION 4.2

- (5) Notwithstanding the provisions of paragraph (2) of this regulation, the segregated ballast conditions for oil tankers less than 150 metres in length shall be to the satisfaction of the Administration.
-

SEE INTERPRETATION 4.3

- (6) Every new crude oil tanker of 20,000 tons deadweight and above shall be fitted with a cargo tank cleaning system using crude oil washing. The Administration shall undertake to ensure that the system fully complies with the requirements of regulation 13B of this Annex within one year after the tanker was first engaged in the trade of carrying crude oil or by the end of the third voyage carrying crude oil suitable for crude oil washing, whichever occurs later. Unless such oil tanker carries crude oil which is not suitable for crude oil washing, the

oil tanker shall operate the system in accordance with the requirements of that regulation.

Existing crude oil tankers of 40,000 tons deadweight and above

- (7) Subject to the provisions of paragraphs (8) and (9) of this regulation every existing crude oil tanker of 40,000 tons deadweight and above shall be provided with segregated ballast tanks and shall comply with the requirements of paragraphs (2) and (3) of this regulation from the date of entry into force of the present Convention.
- (8) Existing crude oil tankers referred to in paragraph (7) of this regulation may, in lieu of being provided with segregated ballast tanks, operate with a cargo tank cleaning procedure using crude oil washing in accordance with regulation 13B of this Annex unless the crude oil tanker is intended to carry crude oil which is not suitable for crude oil washing.

SEE INTERPRETATION 4.4

- (9) Existing crude oil tankers referred to in paragraphs (7) or (8) of this regulation may, in lieu of being provided with segregated ballast tanks or operating with a cargo tank cleaning procedure using crude oil washing, operate with dedicated clean ballast tanks in accordance with the provisions of regulation 13A of this Annex for the following period:
 - (a) for crude oil tankers of 70,000 tons deadweight and above, until two years after the date of entry into force of the present Convention; and
 - (b) for crude oil tankers of 40,000 tons deadweight and above but below 70,000 tons deadweight, until four years after the date of entry into force of the present Convention.

SEE INTERPRETATION 4.5

Existing product carriers of 40,000 tons deadweight and above

- (10) From the date of entry into force of the present Convention, every existing product carrier of 40,000 tons deadweight and above shall be provided with segregated ballast tanks and shall comply with the requirements of paragraphs (2) and (3) of this regulation, or, alternatively, operate with dedicated clean ballast tanks in accordance with the provisions of regulation 13A of this Annex.

SEE INTERPRETATION 4.5

An oil tanker qualified as a segregated ballast oil tanker

- (11) Any oil tanker which is not required to be provided with segregated ballast tanks in accordance with paragraphs (1), (7) or (10) of this regulation may, however, be qualified as a segregated ballast tanker, provided that it complies with the requirements of paragraphs (2) and (3), or paragraph (5) as appropriate, of this regulation.

Regulation 13A

Requirements for oil tankers with dedicated clean ballast tanks

SEE INTERPRETATION 4.6

- (1) An oil tanker operating with dedicated clean ballast tanks in accordance with the provisions of regulation 13(9) or (10) of this Annex, shall have adequate tank capacity, dedicated solely to the carriage of clean ballast as defined in regulation 1(16) of this Annex, to meet the requirements of regulation 13(2) and (3) of this Annex.
- (2) The arrangements and operational procedures for dedicated clean ballast tanks shall comply with the requirements established by the Administration. Such requirements shall contain at least all the provisions of the Specifications for Oil Tankers with Dedicated Clean Ballast Tanks adopted by the International Conference on Tanker Safety and Pollution Prevention, 1978, in resolution 14 and as may be revised by the Organization.*
- (3) An oil tanker operating with dedicated clean ballast tanks shall be equipped with an oil content meter, approved by the Administration on the basis of specifications recommended by the Organization,[†] to enable supervision of the oil content in ballast water being discharged. The oil content meter shall be installed no later than at the first scheduled shipyard visit of the tanker following the entry into force of the present Convention. Until such time as the oil content meter is installed, it shall immediately before discharge of ballast be established

* Refer to the Revised specifications for oil tankers with dedicated clean ballast tanks adopted by the Organization by resolution A.495(XII); see IMO sales publication IMO-619E.

[†] For oil content meters installed on oil tankers built prior to 2 October 1986, refer to the Recommendation on international performance and test specifications for oily-water separating equipment and oil content meters adopted by the Organization by resolution A.393(X). For oil content meters as part of discharge monitoring and control systems installed on oil tankers built on or after 2 October 1986, refer to the Guidelines and specifications for oil discharge monitoring and control systems for oil tankers adopted by the Organization by resolution A.586(14); see IMO sales publications IMO-608E and IMO-646E, respectively.

by examination of the ballast water from dedicated tanks that no contamination with oil has taken place.

SEE INTERPRETATIONS 4.7 AND 4.8

- (4) Every oil tanker operating with dedicated clean ballast tanks shall be provided with a Dedicated Clean Ballast Tank Operation Manual* detailing the system and specifying operational procedures. Such a Manual shall be to the satisfaction of the Administration and shall contain all the information set out in the Specifications referred to in paragraph (2) of this regulation. If an alteration affecting the dedicated clean ballast tank system is made, the Operation Manual shall be revised accordingly.

Regulation 13B

Requirements for crude oil washing

SEE INTERPRETATIONS 4.6 AND 4.9

- (1) Every crude oil washing system required to be provided in accordance with regulation 13(6) and (8) of this Annex shall comply with the requirements of this regulation.
- (2) The crude oil washing installation and associated equipment and arrangements shall comply with the requirements established by the Administration. Such requirements shall contain at least all the provisions of the Specifications for the Design, Operation and Control of Crude Oil Washing Systems adopted by the International Conference on Tanker Safety and Pollution Prevention, 1978, in resolution 15 and as may be revised by the Organization.†
- (3) An inert gas system shall be provided in every cargo tank and slop tank in accordance with the appropriate regulations of chapter II-2 of the International Convention for the Safety of Life at Sea, 1974, as modified and added to by the Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974 and as may be further amended.
- (4) With respect to the ballasting of cargo tanks, sufficient cargo tanks shall be crude oil washed prior to each ballast voyage in order that, taking into account the tanker's trading pattern and expected weather

* See resolution A.495(XII) for the standard format of the Manual; see IMO sales publication IMO-619E.

† Refer to the Revised specifications for the design, operation and control of crude oil washing systems adopted by the Organization by resolution A.446(XI) and amended by the Organization by resolution A.497(XII); see IMO sales publication IMO-617E.

conditions, ballast water is put only into cargo tanks which have been crude oil washed.

- (5) Every oil tanker operating with crude oil washing systems shall be provided with an Operations and Equipment Manual* detailing the system and equipment and specifying operational procedures. Such a Manual shall be to the satisfaction of the Administration and shall contain all the information set out in the Specifications referred to in paragraph (2) of this regulation. If an alteration affecting the crude oil washing system is made, the Operations and Equipment Manual shall be revised accordingly.

Regulation 13C

Existing tankers engaged in specific trades

SEE INTERPRETATION 4.6

- (1) Subject to the provisions of paragraph (2) of this regulation, regulation 13(7) to (10) of this Annex shall not apply to an existing oil tanker solely engaged in specific trades between:
 - (a) ports or terminals within a State Party to the present Convention; or
 - (b) ports or terminals of States Parties to the present Convention, where:
 - (i) the voyage is entirely within a special area as defined in regulation 10(1) of this Annex; or
 - (ii) the voyage is entirely within other limits designated by the Organization.
- (2) The provisions of paragraph (1) of this regulation shall only apply when the ports or terminals where cargo is loaded on such voyages are provided with reception facilities adequate for the reception and treatment of all the ballast and tank washing water from oil tankers using them and all the following conditions are complied with:
 - (a) subject to the exceptions provided for in regulation 11 of this Annex, all ballast water, including clean ballast water, and tank washing residues are retained on board and transferred to the reception facilities and the appropriate entry in the Oil Record Book referred to in regulation 20 of this Annex is endorsed by the competent port State authority;

* Refer to the Standard format of the Crude Oil Washing Operation and Equipment Manual adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.3(XII); see IMO sales publication IMO-617E.

- (b) agreement has been reached between the Administration and the Governments of the port States referred to in subparagraph (1)(a) or (b) of this regulation concerning the use of an existing oil tanker for a specific trade;
- (c) the adequacy of the reception facilities in accordance with the relevant provisions of this Annex at the ports or terminals referred to above, for the purpose of this regulation, is approved by the Governments of the States Parties to the present Convention within which such ports or terminals are situated; and
- (d) the International Oil Pollution Prevention Certificate is endorsed to the effect that the oil tanker is solely engaged in such specific trade.

Regulation 13D

Existing oil tankers having special ballast arrangements

SEE INTERPRETATION 4.6

- (1) Where an existing oil tanker is so constructed or operates in such a manner that it complies at all times with the draught and trim requirements set out in regulation 13(2) of this Annex without recourse to the use of ballast water, it shall be deemed to comply with the segregated ballast tank requirements referred to in regulation 13(7) of this Annex, provided that all of the following conditions are complied with:
 - (a) operational procedures and ballast arrangements are approved by the Administration;
 - (b) agreement is reached between the Administration and the Governments of the port States Parties to the present Convention concerned when the draught and trim requirements are achieved through an operational procedure; and
 - (c) the International Oil Pollution Prevention Certificate is endorsed to the effect that the oil tanker is operating with special ballast arrangements.
- (2) In no case shall ballast water be carried in oil tanks except on those rare voyages when weather conditions are so severe that, in the opinion of the master, it is necessary to carry additional ballast water in cargo tanks for the safety of the ship. Such additional ballast water shall be processed and discharged in compliance with regulation 9 of this Annex and in accordance with the requirements of regulation 15 of this Annex, and entry shall be made in the Oil Record Book referred to in regulation 20 of this Annex.

- (3) An Administration which has endorsed a Certificate in accordance with subparagraph (1)(c) of this regulation shall communicate to the Organization the particulars thereof for circulation to the Parties to the present Convention.

Regulation 13E

Protective location of segregated ballast spaces

SEE INTERPRETATIONS 2.1, 4.6, 4.10 AND 4.11

- (1) In every new crude oil tanker of 20,000 tons deadweight and above and every new product carrier of 30,000 tons deadweight and above, the segregated ballast tanks required to provide the capacity to comply with the requirements of regulation 13 of this Annex which are located within the cargo tank length, shall be arranged in accordance with the requirements of paragraphs (2), (3) and (4) of this regulation to provide a measure of protection against oil outflow in the event of grounding or collision.
- (2) Segregated ballast tanks and spaces other than oil tanks within the cargo tank length (L_t) shall be so arranged as to comply with the following requirement:

$$\Sigma PA_c + \Sigma PA_s \geq J[L_t(B + 2D)]$$

where: PA_c = the side shell area in square metres for each segregated ballast tank or space other than an oil tank based on projected moulded dimensions,

PA_s = the bottom shell area in square metres for each such tank or space based on projected moulded dimensions,

L_t = length in metres between the forward and after extremities of the cargo tanks,

B = maximum breadth of the ship in metres as defined in regulation 1(21) of this Annex,

D = moulded depth in metres measured vertically from the top of the keel to the top of the freeboard deck beam at side amidships. 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,

J = 0.45 for oil tankers of 20,000 tons deadweight, 0.30 for oil tankers of 200,000 tons deadweight and above, subject to the provisions of paragraph (3) of this regulation.

For intermediate values of deadweight the value of J shall be determined by linear interpolation.

Whenever symbols given in this paragraph appear in this regulation, they have the meaning as defined in this paragraph.

- (3) For tankers of 200,000 tons deadweight and above the value of J may be reduced as follows:

$$J_{\text{reduced}} = \left[J - \left(a - \frac{O_c + O_s}{4O_A} \right) \right] \text{ or } 0.2 \text{ whichever is greater}$$

where: a = 0.25 for oil tankers of 200,000 tons deadweight,

a = 0.40 for oil tankers of 300,000 tons deadweight,

a = 0.50 for oil tankers of 420,000 tons deadweight and above.

For intermediate values of deadweight the value of a shall be determined by linear interpolation.

O_c = as defined in regulation 23(1)(a) of this Annex,

O_s = as defined in regulation 23(1)(b) of this Annex,

O_A = the allowable oil outflow as required by regulation 24(2) of this Annex.

- (4) In the determination of PA_c and PA_s , for segregated ballast tanks and spaces other than oil tanks the following shall apply:

(a) the minimum width of each wing tank or space either of which extends for the full depth of the ship's side or from the deck to the top of the double bottom shall be not less than 2 metres. The width shall be measured inboard from the ship's side at right angles to the centreline. Where a lesser width is provided the wing tank or space shall not be taken into account when calculating the protecting area PA_c ; and

(b) the minimum vertical depth of each double bottom tank or space shall be $B/15$ or 2 metres, whichever is the lesser. Where a lesser depth is provided the bottom tank or space shall not be taken into account when calculating the protecting area PA_s .

The minimum width and depth of wing tanks and double bottom tanks shall be measured clear of the bilge area and, in the case of minimum width, shall be measured clear of any rounded gunwale area.

Regulation 13F

Prevention of oil pollution in the event of collision or stranding

SEE INTERPRETATION 4.6

- (1) This regulation shall apply to oil tankers of 600 tons deadweight and above:
- (a) for which the building contract is placed on or after 6 July 1993, or
 - (b) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 6 January 1994, or
 - (c) the delivery of which is on or after 6 July 1996, or
 - (d) which have undergone a major conversion:
 - (i) for which the contract is placed after 6 July 1993; or
 - (ii) in the absence of a contract, the construction work of which is begun after 6 January 1994; or
 - (iii) which is completed after 6 July 1996.
-

SEE INTERPRETATION 1.2

- (2) Every oil tanker of 5,000 tons deadweight and above shall:
- (a) in lieu of regulation 13E, as applicable, comply with the requirements of paragraph (3) unless it is subject to the provisions of paragraphs (4) and (5); and
 - (b) comply, if applicable, with the requirements of paragraph (6).
- (3) The entire cargo tank length shall be protected by ballast tanks or spaces other than cargo and fuel oil tanks as follows:
- (a) *Wing tanks or spaces*

Wing tanks or spaces shall extend either for the full depth of the ship's side or from the top of the double bottom to the uppermost deck, disregarding a rounded gunwale where fitted. They shall be arranged such that the cargo tanks are located inboard of the moulded line of the side shell plating, nowhere less than the distance w which, as shown in figure 1, is measured at any cross-section at right angles to the side shell, as specified below:

$$w = 0.5 + \frac{DW}{20,000} \text{ (m) or}$$

$w = 2.0$ m, whichever is the lesser.

The minimum value of $w = 1.0$ m.

(b) *Double bottom tanks or spaces*

At any cross-section the depth of each double bottom tank or space shall be such that the distance h between the bottom of the cargo tanks and the moulded line of the bottom shell plating measured at right angles to the bottom shell plating as shown in figure 1 is not less than specified below:

$$h = B/15 \text{ (m) or}$$

$$h = 2.0 \text{ m, whichever is the lesser.}$$

The minimum value of $h = 1.0 \text{ m}$.

(c) *Turn of the bilge area or at locations without a clearly defined turn of the bilge*

When the distances h and w are different, the distance w shall have preference at levels exceeding $1.5h$ above the baseline as shown in figure 1.

(d) *The aggregate capacity of ballast tanks*

On crude oil tankers of 20,000 tons deadweight and above and product carriers of 30,000 tons deadweight and above, the aggregate capacity of wing tanks, double bottom tanks, forepeak tanks and afterpeak tanks shall not be less than the capacity of segregated ballast tanks necessary to meet the requirements of regulation 13. Wing tanks or spaces and double bottom tanks used to meet the requirements of regulation 13 shall be located as uniformly as practicable along the cargo tank length. Additional segregated ballast capacity provided for reducing longitudinal hull girder bending stress, trim, etc., may be located anywhere within the ship.

SEE INTERPRETATION 4.12

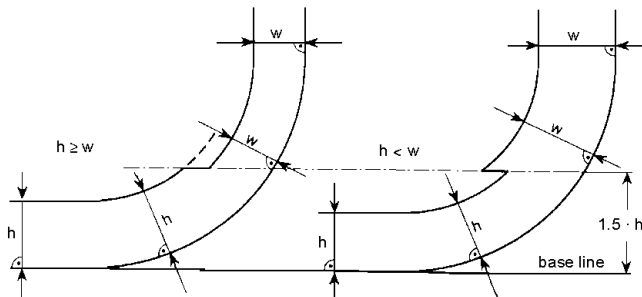


Figure 1 – Cargo tank boundary lines for the purpose of paragraph (3)

(e) *Suction wells in cargo tanks*

Suction wells in cargo tanks may protrude into the double bottom below the boundary line defined by the distance h provided that such wells are as small as practicable and the distance between the well bottom and bottom shell plating is not less than $0.5h$.

(f) *Ballast and cargo piping*

Ballast piping and other piping such as sounding and vent piping to ballast tanks shall not pass through cargo tanks. Cargo piping and similar piping to cargo tanks shall not pass through ballast tanks. Exemptions to this requirement may be granted for short lengths of piping, provided that they are completely welded or equivalent.

- (4) (a) Double bottom tanks or spaces as required by paragraph (3)(b) may be dispensed with, provided that the design of the tanker is such that the cargo and vapour pressure exerted on the bottom shell plating forming a single boundary between the cargo and the sea does not exceed the external hydrostatic water pressure, as expressed by the following formula:

$$f \times h_c \times \rho_c \times g + 100\Delta p \leq d_n \times \rho_s \times g$$

where:

h_c = height of cargo in contact with the bottom shell plating in metres

ρ_c = maximum cargo density in t/m^3

d_n = minimum operating draught under any expected loading condition in metres

ρ_s = density of seawater in t/m^3

Δp = maximum set pressure of pressure/vacuum valve provided for the cargo tank in bars

f = safety factor = 1.1

g = standard acceleration of gravity (9.81 m/s^2).

- (b) Any horizontal partition necessary to fulfil the above requirements shall be located at a height of not less than $B/6$ or 6 m, whichever is the lesser, but not more than $0.6D$, above the baseline where D is the moulded depth amidships.

- (c) The location of wing tanks or spaces shall be as defined in paragraph (3)(a) except that, below a level $1.5h$ above the baseline where h is as defined in paragraph (3)(b), the cargo tank boundary line may be vertical down to the bottom plating, as shown in figure 2.

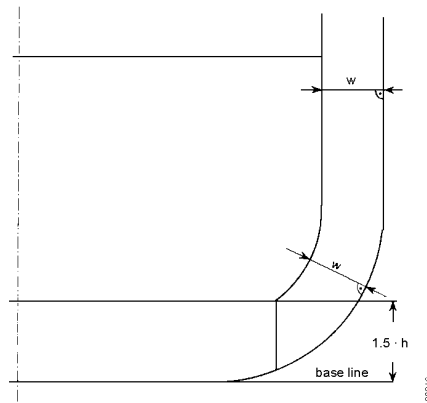


Figure 2 – Cargo tank boundary lines for the purpose of paragraph (4)

- (5) Other methods of design and construction of oil tankers may also be accepted as alternatives to the requirements prescribed in paragraph (3), provided that such methods ensure at least the same level of protection against oil pollution in the event of collision or stranding and are approved in principle by the Marine Environment Protection Committee based on guidelines developed by the Organization.*
- (6) For oil tankers of 20,000 tons deadweight and above the damage assumptions prescribed in regulation 25(2)(b) shall be supplemented by the following assumed bottom raking damage:
- (a) longitudinal extent:
 - (i) ships of 75,000 tons deadweight and above:
 $0.6L$ measured from the forward perpendicular;
 - (ii) ships of less than 75,000 tons deadweight:
 $0.4L$ measured from the forward perpendicular;
 - (b) transverse extent: $B/3$ anywhere in the bottom;
 - (c) vertical extent: breach of the outer hull.

* Refer to the Interim guidelines for the approval of alternative methods of design and construction of oil tankers under regulation 13F(5) of Annex I of MARPOL 73/78 adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.66(37); see appendix 8 to Unified Interpretations of Annex I.

(7) Oil tankers of less than 5,000 tons deadweight shall:

(a) at least be fitted with double bottom tanks or spaces having such a depth that the distance h specified in paragraph (3)(b) complies with the following:

$$h = B/15 \text{ (m)}$$

with a minimum value of $h = 0.76 \text{ m}$;

in the turn of the bilge area and at locations without a clearly defined turn of the bilge, the cargo tank boundary line shall run parallel to the line of the midship flat bottom as shown in figure 3; and

(b) be provided with cargo tanks so arranged that the capacity of each cargo tank does not exceed 700 m^3 unless wing tanks or spaces are arranged in accordance with paragraph (3)(a) complying with the following:

$$w = 0.4 + \frac{2.4DW}{20,000} \text{ (m)}$$

with a minimum value of $w = 0.76 \text{ m}$.

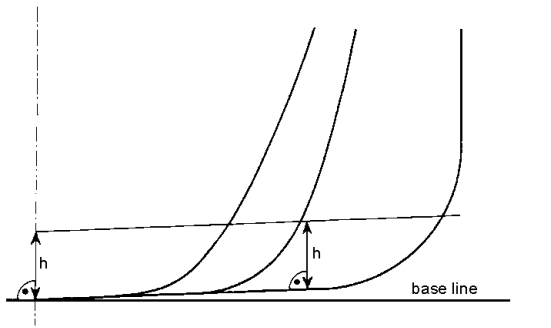


Figure 3 – Cargo tank boundary lines for the purpose of paragraph (7)

(8) Oil shall not be carried in any space extending forward of a collision bulkhead located in accordance with regulation II-1/11 of the International Convention for the Safety of Life at Sea, 1974, as amended. An oil tanker that is not required to have a collision bulkhead in accordance with that regulation shall not carry oil in any space extending forward of the transverse plane perpendicular to the centreline that is located as if it were a collision bulkhead located in accordance with that regulation.

(9) In approving the design and construction of oil tankers to be built in accordance with the provisions of this regulation, Administrations

shall have due regard to the general safety aspects including the need for the maintenance and inspections of wing and double bottom tanks or spaces.

Regulation 13G

Prevention of oil pollution in the event of collision or stranding – Measures for existing tankers

SEE INTERPRETATION 4.6



- (1) This regulation shall:
- (a) apply to crude oil tankers of 20,000 tons deadweight and above and to product carriers of 30,000 tons deadweight and above, which are contracted, the keels of which are laid, or which are delivered before the dates specified in regulation 13F(1) of this Annex; and
 - (b) not apply to oil tankers complying with regulation 13F of this Annex, which are contracted, the keels of which are laid, or are delivered before the dates specified in regulation 13F(1) of this Annex; and
 - (c) not apply to oil tankers covered by subparagraph (a) above which comply with regulation 13F(3)(a) and (b) or 13F(4) or 13F(5) of this Annex, except that the requirement for minimum distances between the cargo tank boundaries and the ship side and bottom plating need not be met in all respects. In that event, the side protection distances shall not be less than those specified in the International Bulk Chemical Code for type 2 cargo tank location and the bottom protection distances shall comply with regulation 13E(4)(b) of this Annex.



- (2) The requirements of this regulation shall take effect as from 6 July 1995.
- (3) (a) An oil tanker to which this regulation applies shall be subject to an enhanced programme of inspections during periodical, intermediate and annual surveys, the scope and frequency of which shall at least comply with the guidelines developed by the Organization.*
- (b) An oil tanker over five years of age to which this regulation applies shall have on board, available to the competent authority of any Government of a State Party to the present Convention, a

* Refer to the Guidelines on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers adopted by the Organization by resolution A.744(18), as amended; see IMO sales publication IMO-180E.

complete file of the survey reports, including the results of all scantling measurement required, as well as the statement of structural work carried out.

- (c) This file shall be accompanied by a condition evaluation report, containing conclusions on the structural condition of the ship and its residual scantlings, endorsed to indicate that it has been accepted by or on behalf of the flag Administration. This file and condition evaluation report shall be prepared in a standard format as contained in the guidelines developed by the Organization.
- (4) An oil tanker not meeting the requirements of a new oil tanker as defined in regulation 1(26) of this Annex shall comply with the requirements of regulation 13F of this Annex not later than 25 years after its date of delivery, unless wing tanks or double bottom spaces, not used for the carriage of oil and meeting the width and height requirements of regulation 13E(4), cover at least 30% of L_t for the full depth of the ship on each side or at least 30% of the projected bottom shell area within the length L_t , where L_t is as defined in regulation 13E(2), in which case compliance with regulation 13F is required not later than 30 years after its date of delivery.

SEE INTERPRETATION 4.13

- (5) An oil tanker meeting the requirements of a new oil tanker as defined in regulation 1(26) of this Annex shall comply with the requirements of regulation 13F of this Annex not later than 30 years after its date of delivery.
- (6) Any new ballast and load conditions resulting from the application of paragraph (4) of this regulation shall be subject to approval of the Administration which shall have regard, in particular, to longitudinal and local strength, intact stability and, if applicable, damage stability.
- (7) Other structural or operational arrangements such as hydrostatically balanced loading may be accepted as alternatives to the requirements prescribed in paragraph (4), provided that such alternatives ensure at least the same level of protection against oil pollution in the event of collision or stranding and are approved by the Administration based on guidelines developed by the Organization.*

* Refer to the Guidelines for approval of alternative structural or operational arrangements as called for in regulation 13G(7) of Annex I of MARPOL 73/78 adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.64(36); see appendix 7 to Unified Interpretations of Annex I.

Regulation 14

Segregation of oil and water ballast and carriage of oil in forepeak tanks

- (1) Except as provided in paragraph (2) of this regulation, in new ships of 4,000 tons gross tonnage and above other than oil tankers, and in new oil tankers of 150 tons gross tonnage and above, no ballast water shall be carried in any oil fuel tank.
- (2) Where abnormal conditions or the need to carry large quantities of oil fuel render it necessary to carry ballast water which is not a clean ballast in any oil fuel tank, such ballast water shall be discharged to reception facilities or into the sea in compliance with regulation 9 using the equipment specified in regulation 16(2) of this Annex, and an entry shall be made in the Oil Record Book to this effect.

SEE INTERPRETATION 5.1

- (3) All other ships shall comply with the requirements of paragraph (1) of this regulation as far as is reasonable and practicable.

SEE INTERPRETATION 5.2

- (4) In a ship of 400 tons gross tonnage and above, for which the building contract is placed after 1 January 1982 or, in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction after 1 July 1982, oil shall not be carried in a forepeak tank or a tank forward of the collision bulkhead.
- (5) All ships other than those subject to paragraph (4) of this regulation shall comply with the provisions of that paragraph, as far as is reasonable and practicable.

Regulation 15

Retention of oil on board

- (1) Subject to the provisions of paragraphs (5) and (6) of this regulation, oil tankers of 150 tons gross tonnage and above shall be provided with arrangements in accordance with the requirements of paragraphs (2) and (3) of this regulation, provided that in the case of existing tankers the requirements for oil discharge monitoring and control systems and slop tank arrangements shall apply three years after the date of entry into force of the present Convention.
- (2) (a) Adequate means shall be provided for cleaning the cargo tanks and transferring the dirty ballast residue and tank washings from

the cargo tanks into a slop tank approved by the Administration. In existing oil tankers, any cargo tank may be designated as a slop tank.

- (b) In this system arrangements shall be provided to transfer the oily waste into a slop tank or combination of slop tanks in such a way that any effluent discharged into the sea will be such as to comply with the provisions of regulation 9 of this Annex.
- (c) The arrangements of the slop tank or combination of slop tanks shall have a capacity necessary to retain the slop generated by tank washings, oil residues and dirty ballast residues. The total capacity of the slop tank or tanks shall not be less than 3% of the oil carrying capacity of the ship, except that the Administration may accept:
 - (i) 2% for such oil tankers where the tank washing arrangements are such that once the slop tank or tanks are charged with washing water, this water is sufficient for tank washing and, where applicable, for providing the driving fluid for eductors, without the introduction of additional water into the system;
 - (ii) 2% where segregated ballast tanks or dedicated clean ballast tanks are provided in accordance with regulation 13 of this Annex, or where a cargo tank cleaning system using crude oil washing is fitted in accordance with regulation 13B of this Annex. This capacity may be further reduced to 1.5% for such oil tankers where the tank washing arrangements are such that once the slop tank or tanks are charged with washing water, this water is sufficient for tank washing and, where applicable, for providing the driving fluid for eductors, without the introduction of additional water into the system;
 - (iii) 1% for combination carriers where oil cargo is only carried in tanks with smooth walls. This capacity may be further reduced to 0.8% where the tank washing arrangements are such that once the slop tank or tanks are charged with washing water, this water is sufficient for tank washing and, where applicable, for providing the driving fluid for eductors, without the introduction of additional water into the system.

SEE INTERPRETATION 6.2

New oil tankers of 70,000 tons deadweight and above shall be provided with at least two slop tanks.

- (d) Slop tanks shall be so designed particularly in respect of the position of inlets, outlets, baffles or weirs where fitted, so as to avoid excessive turbulence and entrainment of oil or emulsion with the water.

SEE INTERPRETATION 6.1

- (3) (a) An oil discharge monitoring and control system approved by the Administration shall be fitted. In considering the design of the oil content meter to be incorporated in the system, the Administration shall have regard to the specification recommended by the Organization.* 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. The oil discharge monitoring and control system shall come into operation when there is any discharge of effluent into the sea and shall be such as will ensure that any discharge of oily mixture is automatically stopped when the instantaneous rate of discharge of oil exceeds that permitted by regulation 9(1)(a) of this Annex. Any failure of this monitoring and control system shall stop the discharge and be noted in the Oil Record Book. A manually operated alternative method shall be provided and may be used in the event of such failure, but the defective unit shall be made operable as soon as possible. The port State authority may allow the tanker with a defective unit to undertake one ballast voyage before proceeding to a repair port. The oil discharge monitoring and control system shall be designed and installed in compliance with the guidelines and specifications for oil discharge monitoring and control systems for oil tankers developed by the Organization.* Administrations may accept such specific arrangements as detailed in the Guidelines and Specifications.
- (b) Effective oil/water interface detectors[†] approved by the Administration shall be provided for a rapid and accurate determination of the oil/water interface in slop tanks and shall be available for

* For oil content meters installed on tankers built prior to 2 October 1986, refer to the Recommendation on international performance and test specifications for oily-water separating equipment and oil content meters adopted by the Organization by resolution A.393(X). For oil content meters as part of discharge monitoring and control systems installed on tankers built on or after 2 October 1986, refer to the Revised guidelines and specifications for oil discharge monitoring and control systems for oil tankers, adopted by the Organization by resolution A.586(14); see IMO sales publications IMO-608E and IMO-646E, respectively.

[†] Refer to the Specifications for oil/water interface detectors adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.5(XIII); see IMO sales publication IMO-646E.

use in other tanks where the separation of oil and water is effected and from which it is intended to discharge effluent direct to the sea.

SEE INTERPRETATIONS 6.1 AND 6.3

- (c) Instructions as to the operation of the system shall be in accordance with an operational manual approved by the Administration. They shall cover manual as well as automatic operations and shall be intended to ensure that at no time shall oil be discharged except in compliance with the conditions specified in regulation 9 of this Annex.*
- (4) The requirements of paragraphs (1), (2) and (3) of this regulation shall not apply to oil tankers of less than 150 tons gross tonnage, for which the control of discharge of oil under regulation 9 of this Annex shall be effected by the retention of oil on board with subsequent discharge of all contaminated washings to reception facilities. The total quantity of oil and water used for washing and returned to a storage tank shall be recorded in the Oil Record Book. This total quantity shall be discharged to reception facilities unless adequate arrangements are made to ensure that any effluent which is allowed to be discharged into the sea is effectively monitored to ensure that the provisions of regulation 9 of this Annex are complied with.
- (5) (a) The Administration may waive the requirements of paragraphs (1), (2) and (3) of this regulation for any oil tanker which engages exclusively on voyages both of 72 hours or less in duration and within 50 miles from the nearest land, provided that the oil tanker is engaged exclusively in trades between ports or terminals within a State Party to the present Convention. Any such waiver shall be subject to the requirement that the oil tanker shall retain on board all oily mixtures for subsequent discharge to reception facilities and to the determination by the Administration that facilities available to receive such oily mixtures are adequate.
- (b) The Administration may waive the requirements of paragraph (3) of this regulation for oil tankers other than those referred to in subparagraph (a) of this paragraph in cases where:
- (i) the tanker is an existing oil tanker of 40,000 tons deadweight or above, as referred to in regulation 13C(1) of this Annex, engaged in specific trades, and the conditions specified in regulation 13C(2) are complied with; or

* Refer to *Clean Seas Guide for Oil Tankers*, published by the International Chamber of Shipping and the Oil Companies International Marine Forum.

- (ii) the tanker is engaged exclusively in one or more of the following categories of voyages:
 - (1) voyages within special areas; or
 - (2) voyages within 50 miles from the nearest land outside special areas where the tanker is engaged in:
 - (aa) trades between ports or terminals of a State Party to the present Convention; or
 - (bb) restricted voyages as determined by the Administration, and of 72 hours or less in duration;provided that all of the following conditions are complied with:
 - (3) all oily mixtures are retained on board for subsequent discharge to reception facilities;
 - (4) for voyages specified in subparagraph (b)(ii)(2) of this paragraph, the Administration has determined that adequate reception facilities are available to receive such oily mixtures in those oil loading ports or terminals the tanker calls at;
 - (5) the International Oil Pollution Prevention Certificate, when required, is endorsed to the effect that the ship is exclusively engaged in one or more of the categories of voyages specified in subparagraphs (b)(ii)(1) and (b)(ii)(2)(bb) of this paragraph; and
 - (6) the quantity, time, and port of discharge are recorded in the Oil Record Book.

SEE INTERPRETATION 6.4

- (6) Where in the view of the Organization equipment required by regulation 9(1)(a)(vi) of this Annex and specified in subparagraph (3)(a) of this regulation is not obtainable for the monitoring of discharge of light refined products (white oils), the Administration may waive compliance with such requirement, provided that discharge shall be permitted only in compliance with procedures established by the Organization which shall satisfy the conditions of regulation 9(1)(a) of this Annex except the obligation to have an oil discharge monitoring and control system in operation. The Organization shall review the availability of equipment at intervals not exceeding twelve months.
- (7) The requirements of paragraphs (1), (2) and (3) of this regulation shall not apply to oil tankers carrying asphalt or other products subject to the provisions of this Annex, which through their physical properties inhibit effective product/water separation and monitoring, for which

the control of discharge under regulation 9 of this Annex shall be effected by the retention of residues on board with discharge of all contaminated washings to reception facilities.

SEE INTERPRETATION 6.5

Regulation 16

Oil discharge monitoring and control system and oil filtering equipment

- (1) Any ship of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage shall be fitted with oil filtering equipment complying with paragraph (4) this regulation. Any such ship which carries large quantities of oil fuel shall comply with paragraph (2) of this regulation or paragraph (1) of regulation 14.
-

SEE INTERPRETATIONS 7.1 AND 7.2

- (2) Any ship of 10,000 tons gross tonnage and above shall be provided with oil filtering equipment, and with arrangements for an alarm and for automatically stopping any discharge of oily mixture when the oil content in the effluent exceeds 15 parts per million.
-

SEE INTERPRETATION 7.2

- (3) (a) The Administration may waive the requirements of paragraphs (1) and (2) of this regulation for any ship engaged exclusively on voyages within special areas provided that all of the following conditions are complied with:
- (i) the ship is fitted with a holding tank having a volume adequate, to the satisfaction of the Administration, for the total retention on board of the oily bilge water;
 - (ii) all oily bilge water is retained on board for subsequent discharge to reception facilities;
 - (iii) the Administration has determined that adequate reception facilities are available to receive such oily bilge water in a sufficient number of ports or terminals the ship calls at;
 - (iv) the International Oil Pollution Prevention Certificate, when required, is endorsed to the effect that the ship is exclusively engaged on the voyages within special areas; and
 - (v) the quantity, time, and port of the discharge are recorded in the Oil Record Book.

SEE INTERPRETATIONS 6.4 AND 7.3

- (b) The Administration shall ensure that ships of less than 400 tons gross tonnage are equipped, as far as practicable, to retain on board oil or oily mixtures or discharge them in accordance with the requirements of regulation 9(1)(b) of this Annex.
- (4) Oil filtering equipment referred to in paragraph (1) of this regulation shall be of a design approved by the Administration and shall be such as will ensure that any oily mixture discharged into the sea after passing through the system has an oil content not exceeding 15 parts per million. In considering the design of such equipment, the Administration shall have regard to the specification recommended by the Organization.*
- (5) Oil filtering equipment referred to in paragraph (2) of this regulation shall be of a design approved by the Administration and shall be such as will ensure that any oily mixture discharged into the sea after passing through the system or systems has an oil content not exceeding 15 parts per million. It shall be provided with alarm arrangements to indicate when this level cannot be maintained. The system shall also be provided with arrangements such as will ensure that any discharge of oily mixtures is automatically stopped when the oil content of the effluent exceeds 15 parts per million. In considering the design of such equipment and arrangements, the Administration shall have regard to the specification recommended by the Organization.*
- (6) For ships delivered before 6 July 1993 the requirements of this regulation shall apply by 6 July 1998, provided that these ships can operate with oily-water separating equipment (100 ppm equipment).

SEE INTERPRETATION 7.4

Regulation 17

Tanks for oil residues (sludge)

- (1) Every ship of 400 tons gross tonnage and above shall be provided with a tank or tanks of adequate capacity, having regard to the type of machinery and length of voyage, to receive the oil residues (sludge) which cannot be dealt with otherwise in accordance with the requirements of this Annex, such as those resulting from the

* Refer to the Guidelines and specifications for pollution prevention equipment for machinery space bilges of ships adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33); see IMO sales publication IMO-646E.

purification of fuel and lubricating oils and oil leakages in the machinery spaces.

SEE INTERPRETATION 8.1

- (2) In new ships, such tanks shall be designed and constructed so as to facilitate their cleaning and the discharge of residues to reception facilities. Existing ships shall comply with this requirement as far as is reasonable and practicable.

SEE INTERPRETATION 8.2

- (3) Piping to and from sludge tanks shall have no direct connection overboard, other than the standard discharge connection referred to in regulation 19.

SEE INTERPRETATION 8.3

Regulation 18

Pumping, piping and discharge arrangements of oil tankers

- (1) In every oil tanker, a discharge manifold for connection to reception facilities for the discharge of dirty ballast water or oil contaminated water shall be located on the open deck on both sides of the ship.
- (2) In every oil tanker, pipelines for the discharge to the sea of ballast water or oil contaminated water from cargo tank areas which may be permitted under regulation 9 or regulation 10 of this Annex shall be led to the open deck or to the ship's side above the waterline in the deepest ballast condition. Different piping arrangements to permit operation in the manner permitted in subparagraphs (6)(a) to (e) of this regulation may be accepted.

SEE INTERPRETATION 9.1

- (3) In new oil tankers means shall be provided for stopping the discharge into the sea of ballast water or oil contaminated water from cargo tank areas, other than those discharges below the waterline permitted under paragraph (6) of this regulation, from a position on the upper deck or above located so that the manifold in use referred to in paragraph (1) of this regulation and the discharge to the sea from the pipelines referred to in paragraph (2) of this regulation may be visually observed. Means for stopping the discharge need not be provided at the observation position if a positive communication system such as a telephone or radio system is provided between the observation position and the discharge control position.
- (4) Every new oil tanker required to be provided with segregated ballast tanks or fitted with a crude oil washing system shall comply with the following requirements:
 - (a) it shall be equipped with oil piping so designed and installed that oil retention in the lines is minimized; and
 - (b) means shall be provided to drain all cargo pumps and all oil lines at the completion of cargo discharge, where necessary by connection to a stripping device. The line and pump drainings shall be capable of being discharged both ashore and to a cargo tank or a slop tank. For discharge ashore a special small diameter line shall be provided and shall be connected outboard of the ship's manifold valves.

SEE INTERPRETATIONS 9.2 AND 9.3

- (5) Every existing crude oil tanker required to be provided with segregated ballast tanks, or to be fitted with a crude oil washing system, or to operate with dedicated clean ballast tanks, shall comply with the provisions of paragraph (4)(b) of this regulation.
- (6) On every oil tanker the discharge of ballast water or oil contaminated water from cargo tank areas shall take place above the waterline, except as follows:
 - (a) Segregated ballast and clean ballast may be discharged below the waterline:
 - (i) in ports or at offshore terminals, or
 - (ii) at sea by gravity,provided that the surface of the ballast water has been examined immediately before the discharge to ensure that no contamination with oil has taken place.
 - (b) Existing oil tankers which, without modification, are not capable of discharging segregated ballast above the waterline may discharge segregated ballast below the waterline at sea,

- provided that the surface of the ballast water has been examined immediately before the discharge to ensure that no contamination with oil has taken place.
- (c) Existing oil tankers operating with dedicated clean ballast tanks, which without modification are not capable of discharging ballast water from dedicated clean ballast tanks above the waterline, may discharge this ballast below the waterline provided that the discharge of the ballast water is supervised in accordance with regulation 13A(3) of this Annex.
 - (d) On every oil tanker at sea, dirty ballast water or oil contaminated water from tanks in the cargo area, other than slop tanks, may be discharged by gravity below the waterline, provided that sufficient time has elapsed in order to allow oil/water separation to have taken place and the ballast water has been examined immediately before the discharge with an oil/water interface detector referred to in regulation 15(3)(b) of this Annex, in order to ensure that the height of the interface is such that the discharge does not involve any increased risk of harm to the marine environment.
 - (e) On existing oil tankers at sea, dirty ballast water or oil contaminated water from cargo tank areas may be discharged below the waterline, subsequent to or in lieu of the discharge by the method referred to in subparagraph (d) of this paragraph, provided that:
 - (i) a part of the flow of such water is led through permanent piping to a readily accessible location on the upper deck or above where it may be visually observed during the discharge operation; and
 - (ii) such part flow arrangements comply with the requirements established by the Administration, which shall contain at least all the provisions of the Specifications for the Design, Installation and Operation of a Part Flow System for Control of Overboard Discharges adopted by the Organization.*

SEE INTERPRETATION 9.4

Regulation 19

Standard discharge connection

To enable pipes of reception facilities to be connected with the ship's

* See appendix 5 to Unified Interpretations for Annex I.

discharge pipeline for residues from machinery bilges, both lines shall be fitted with a standard discharge connection in accordance with the following table:

Standard dimensions of flanges for discharge connections

Description	Dimension
Outside diameter	215 mm
Inner diameter	According to pipe outside diameter
Bolt circle diameter	183 mm
Slots in flange	6 holes 22 mm in diameter equidistantly placed on a bolt circle of the above diameter, slotted to the flange periphery. The slot width to be 22 mm
Flange thickness	20 mm
Bolts and nuts: quantity, diameter	6, each of 20 mm in diameter and of suitable length
The flange is designed to accept pipes up to a maximum internal diameter of 125 mm and shall be of steel or other equivalent material having a flat face. This flange, together with a gasket of oil-proof material, shall be suitable for a service pressure of 6 kg/cm ² .	

Regulation 20

Oil Record Book

- (1) Every oil tanker of 150 tons gross tonnage and above and every ship of 400 tons 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 tons gross tonnage and above shall also be provided with an Oil Record Book Part II (Cargo/Ballast Operations). The Oil Record Book(s), whether as a part of the ship's official log-book or otherwise, shall be in the form(s) specified in appendix III to this Annex.
- (2) The Oil Record Book shall be completed on each occasion, on a tank-to-tank basis if appropriate, whenever any of the following operations take place in the ship:
 - (a) for machinery space operations (all ships):
 - (i) ballasting or cleaning of oil fuel tanks;
 - (ii) discharge of dirty ballast or cleaning water from tanks referred to under (i) of the subparagraph;

- (iii) disposal of oily residues (sludge);
- (iv) discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces;
- (b) for cargo/ballast operations (oil tankers):
 - (i) loading of oil cargo;
 - (ii) internal transfer of oil cargo during voyage;
 - (iii) unloading of oil cargo;
 - (iv) ballasting of cargo tanks and dedicated clean ballast tanks;
 - (v) cleaning of cargo tanks including crude oil washing;
 - (vi) discharge of ballast except from segregated ballast tanks;
 - (vii) discharge of water from slop tanks;
 - (viii) closing of all applicable valves or similar devices after slop tank discharge operations;
 - (ix) closing of valves necessary for isolation of dedicated clean ballast tanks from cargo and stripping lines after slop tank discharge operations;
 - (x) disposal of residues.
- (3) In the event of such discharge of oil or oily mixture as is referred to in regulation 11 of this Annex or in the event of accidental or other exceptional discharge of oil not excepted by that regulation, a statement shall be made in the Oil Record Book of the circumstances of, and the reasons for, the discharge.
- (4) Each operation described in paragraph (2) of this regulation shall be fully recorded without delay in the Oil Record Book so that all entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the officer or officers in charge of the operations concerned and each completed page shall be signed by the master of ship. The entries in the Oil Record Book shall be in an official language of the State whose flag the ship is entitled to fly, and, for ships holding an International Oil Pollution Prevention Certificate, in English or French. The entries in an official national language of the State whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy.
- (5) The Oil Record Book shall be kept in such a place as to be readily available for inspection at all reasonable times and, except in the case of unmanned ships under tow, shall be kept on board the ship. It shall be preserved for a period of three years after the last entry has been made.
- (6) The competent authority of the Government of a Party to the Convention may inspect the Oil Record Book on board any ship to which this Annex applies while the ship is in its port or offshore

terminals and may make a copy of any entry in that book and may require the master of the ship to certify that the copy is a true copy of such entry. Any copy so made which has been certified by the master of the ship as a true copy of an entry in the ship's Oil Record Book shall be made admissible in any judicial proceedings as evidence of the facts stated in the entry. The inspection of an Oil Record Book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

- (7) For oil tankers of less than 150 tons gross tonnage operating in accordance with regulation 15(4) of this Annex an appropriate Oil Record Book should be developed by the Administration.

Regulation 21

Special requirements for drilling rigs and other platforms

SEE INTERPRETATION 10

Fixed and floating drilling rigs when engaged in the exploration, exploitation and associated offshore processing of sea-bed mineral resources and other platforms shall comply with the requirements of this Annex applicable to ships of 400 tons gross tonnage and above other than oil tankers, except that:

- (a) they shall be equipped as far as practicable with the installations required in regulations 16 and 17 of this Annex;
- (b) they shall keep a record of all operations involving oil or oily mixture discharges, in a form approved by the Administration; and
- (c) subject to the provisions of regulation 11 of this Annex, the discharge into the sea of oil or oily mixture shall be prohibited except when the oil content of the discharge without dilution does not exceed 15 parts per million.

Chapter III – Requirements for minimizing oil pollution from oil tankers due to side and bottom damages

Regulation 22

Damage assumptions

(1) For the purpose of calculating hypothetical oil outflow from oil tankers, three dimensions of the extent of damage of a parallelepiped on the side and bottom of the ship are assumed as follows. In the case of bottom damages two conditions are set forth to be applied individually to the stated portions of the oil tanker.

- | | | |
|--|---|---|
| (a) Side damage | | |
| (i) Longitudinal extent (l_c): | | $\frac{1}{3}L^{\frac{2}{3}}$ or 14.5 metres,
whichever is less |
| (ii) Transverse extent (t_c)
(inboard from the ship's side at
right angles to the centreline at
the level corresponding to the
assigned summer freeboard): | | $\frac{B}{5}$ or 11.5 metres,
whichever is less |
| (iii) Vertical extent (v_c): | | From the base line
upwards without limit |
| (b) Bottom damage | | |
| | <i>For 0.3L from
the forward
perpendicular
of the ship</i> | <i>Any other part
of the ship</i> |
| (i) Longitudinal
extent (l_s): | $\frac{L}{10}$ | $\frac{L}{10}$ or 5 metres,
whichever is less |
| (ii) Transverse
extent (t_s): | $\frac{B}{6}$ or 10 metres,
whichever is less
but not less than
5 metres | 5 metres |
| (iii) Vertical extent
from the base-
line (v_s): | | $\frac{B}{15}$ or 6 metres, whichever is less |

SEE INTERPRETATION 11.1

- (2) Wherever the symbols given in this regulation appear in this chapter, they have the meaning as defined in this regulation.

Regulation 23

Hypothetical outflow of oil

SEE INTERPRETATION 11.2

- (1) The hypothetical outflow of oil in the case of side damage (O_c) and bottom damage (O_s) shall be calculated by the following formulae with respect to compartments breached by damage to all conceivable locations along the length of the ship to the extent as defined in regulation 22 of this Annex.

- (a) For side damages:

$$O_c = \Sigma W_i + \Sigma K_i C_i \quad (\text{I})$$

- (b) For bottom damages:

$$O_s = \frac{1}{3}(\Sigma Z_i W_i + \Sigma Z_i C_i) \quad (\text{II})$$

where: W_i = volume of a wing tank in cubic metres assumed to be breached by the damage as specified in regulation 22 of this Annex; W_i for a segregated ballast tank may be taken equal to zero.

C_i = volume of a centre tank in cubic metres assumed to be breached by the damage as specified in regulation 22 of this Annex; C_i for a segregated ballast tank may be taken equal to zero.

K_i = $1 - \frac{b_i}{t_c}$; when b_i is equal to or greater than t_c , K_i shall be taken equal to zero.

Z_i = $1 - \frac{h_i}{v_s}$; when h_i is equal to or greater than v_s , Z_i shall be taken equal to zero.

b_i = width of wing tank in metres under consideration measured inboard from the ship's side at right angles to the centreline at the level corresponding to the assigned summer free-board.

h_i = minimum depth of the double bottom in metres under consideration; where no double bottom is fitted h_i shall be taken equal to zero.

Whenever symbols given in this paragraph appear in this chapter, they have the meaning as defined in this regulation.

SEE INTERPRETATION 11.3

- (2) If a void space or segregated ballast tank of a length less than l_c as defined in regulation 22 of this Annex is located between wing oil tanks, O_c in formula (I) may be calculated on the basis of volume W_i being the actual volume of one such tank (where they are of equal capacity) or the smaller of the two tanks (if they differ in capacity) adjacent to such space, multiplied by S_i as defined below and taking for all other wing tanks involved in such a collision the value of the actual full volume.

$$S_i = 1 - \frac{l_i}{l_c}$$

where l_i = length in metres of void space or segregated ballast tank under consideration.

- (3) (a) Credit shall only be given in respect of double bottom tanks which are either empty or carrying clean water when cargo is carried in the tanks above.
- (b) Where the double bottom does not extend for the full length and width of the tank involved, the double bottom is considered non-existent and the volume of the tanks above the area of the bottom damage shall be included in formula (II) even if the tank is not considered breached because of the installation of such a partial double bottom.
- (c) Suction wells may be neglected in the determination of the value h_i provided such wells are not excessive in area and extend below the tank for a minimum distance and in no case more than half the height of the double bottom. If the depth of such a well exceeds half the height of the double bottom, h_i shall be taken equal to the double bottom height minus the well height.
- Piping serving such wells if installed within the double bottom shall be fitted with valves or other closing arrangements located at the point of connection to the tank served to prevent oil outflow in the event of damage to the piping. Such piping shall be installed as high from the bottom shell as possible. These valves shall be kept closed at sea at any time when the tank contains oil cargo, except that they may be opened only for cargo transfer needed for the purpose of trimming of the ship.

- (4) In the case where bottom damage simultaneously involves four centre tanks, the value of O_s may be calculated according to the formula

$$O_s = \frac{1}{4}(\sum Z_i W_i + \sum Z_i C_i) \quad \text{(III)}$$

- (5) An Administration may credit as reducing oil outflow in case of bottom damage, an installed cargo transfer system having an emergency high suction in each cargo oil tank, capable of transferring from a breached tank or tanks to segregated ballast tanks or to available cargo tankage if it can be assured that such tanks will have sufficient ullage. Credit for such a system would be governed by ability to transfer in two hours of operation oil equal to one half of the largest of the breached tanks involved and by availability of equivalent receiving capacity in ballast or cargo tanks. The credit shall be confined to permitting calculation of O_s according to formula (III). The pipes for such suctions shall be installed at least at a height not less than the vertical extent of the bottom damage v_s . The Administration shall supply the Organization with the information concerning the arrangements accepted by it, for circulation to other Parties to the Convention.

Regulation 24

Limitation of size and arrangement of cargo tanks

SEE INTERPRETATION 1.2

- (1) Every new oil tanker shall comply with the provisions of this regulation. Every existing oil tanker shall be required, within two years after the date of entry into force of the present Convention, to comply with the provisions of this regulation if such a tanker falls into either of the following categories:
- (a) a tanker, the delivery of which is after 1 January 1977; or
 - (b) a tanker to which both the following conditions apply:
 - (i) delivery is not later than 1 January 1977; and
 - (ii) the building contract is placed after 1 January 1974, or in cases where no building contract has previously been placed, the keel is laid or the tanker is at a similar stage of construction after 30 June 1974.
- (2) Cargo tanks of oil tankers shall be of such size and arrangements that the hypothetical outflow O_c or O_s calculated in accordance with the provisions of regulation 23 of this Annex anywhere in the length of the ship does not exceed 30,000 m³ or 400 $\sqrt[3]{D\bar{W}}$, whichever is the greater, but subject to a maximum of 40,000 m³.
- (3) The volume of any one wing cargo oil tank of an oil tanker shall not exceed 75% of the limits of the hypothetical oil outflow referred to in paragraph (2) of this regulation. The volume of any one centre cargo oil tank shall not exceed 50,000 m³. However, in segregated ballast oil tankers as defined in regulation 13 of this Annex, the permitted

volume of a wing cargo oil tank situated between two segregated ballast tanks, each exceeding l_c in length, may be increased to the maximum limit of hypothetical oil outflow provided that the width of the wing tanks exceeds t_c .

- (4) The length of each cargo tank shall not exceed 10 m or one of the following values, whichever is the greater:
- (a) where no longitudinal bulkhead is provided inside the cargo tanks:
$$(0.5 \frac{b_i}{B} + 0.1)L$$
but not to exceed $0.2L$
 - (b) where a centreline longitudinal bulkhead is provided inside the cargo tanks:
$$(0.25 \frac{b_i}{B} + 0.15)L$$
 - (c) where two or more longitudinal bulkheads are provided inside the cargo tanks:
 - (i) for wing cargo tanks: $0.2L$
 - (ii) for centre cargo tanks:
 - (1) if $\frac{b_i}{B}$ is equal to or greater than one fifth: $0.2L$
 - (2) if $\frac{b_i}{B}$ is less than one fifth:
 - where no centreline longitudinal bulkhead is provided:
$$(0.5 \frac{b_i}{B} + 0.1)L$$
 - where a centreline longitudinal bulkhead is provided:
$$(0.25 \frac{b_i}{B} + 0.15)L$$
 - (d) b_i is the minimum distance from the ship's side to the outer longitudinal bulkhead of the tank in question measured inboard at right angles to the centreline at the level corresponding to the assigned summer freeboard.
- (5) In order not to exceed the volume limits established by paragraphs (2), (3) and (4) of this regulation and irrespective of the accepted type of cargo transfer system installed, when such system interconnects two or more cargo tanks, valves or other similar closing devices shall be provided for separating the tanks from each other. These valves or devices shall be closed when the tanker is at sea.

- (6) Lines of piping which run through cargo tanks in a position less than t_c from the ship's side or less than v_c from the ship's bottom shall be fitted with valves or similar closing devices at the point at which they open into any cargo tank. These valves shall be kept closed at sea at any time when the tanks contain cargo oil, except that they may be opened only for cargo transfer needed for the purpose of trimming of the ship.

Regulation 25

Subdivision and stability

- (1) Every new oil tanker shall comply with the subdivision and damage stability criteria as specified in paragraph (3) of this regulation, after the assumed side or bottom damage as specified in paragraph (2) of this regulation, for any operating draught reflecting actual partial or full load conditions consistent with trim and strength of the ship as well as specific gravities of the cargo. Such damage shall be applied to all conceivable locations along the length of the ship as follows:
- (a) in tankers of more than 225 m in length, anywhere in the ship's length;
 - (b) in tankers of more than 150 m, but not exceeding 225 m in length, anywhere in the ship's length except involving either after or forward bulkhead bounding the machinery space located aft. The machinery space shall be treated as a single floodable compartment; and
 - (c) in tankers not exceeding 150 m in length, anywhere in the ship's length between adjacent transverse bulkheads with the exception of the machinery space. For tankers of 100 m or less in length where all requirements of paragraph (3) of this regulation cannot be fulfilled without materially impairing the operational qualities of the ship, Administrations may allow relaxations from these requirements.

Ballast conditions where the tanker is not carrying oil in cargo tanks, excluding any oil residues, shall not be considered.

SEE INTERPRETATION 11.4

- (2) The following provisions regarding the extent and the character of the assumed damage shall apply:
- (a) Side damage
 - (i) Longitudinal extent: $\frac{1}{3}L^{\frac{2}{3}}$ or 14.5 metres, whichever is less

- | | | |
|-------|---|--|
| (ii) | Transverse extent
(inboard from the ship's side at right angles to the centreline at the level of the summer load line): | $\frac{B}{5}$ or 11.5 metres,
whichever is less |
| (iii) | Vertical extent: | From the moulded line of the bottom shell plating at centreline, upwards without limit |
- (b) Bottom damage
- | | | |
|-------|--|--|
| | <i>For 0.3L from the forward perpendicular of the ship</i> | <i>Any other part of the ship</i> |
| (i) | Longitudinal extent:
$\frac{1}{3}L^{\frac{2}{3}}$ or 14.5 metres,
whichever is less | $\frac{1}{3}L^{\frac{2}{3}}$ or 5 metres,
whichever is less |
| (ii) | Transverse extent:
$\frac{B}{6}$ or 10 metres,
whichever is less | $\frac{B}{6}$ or 5 metres,
whichever is less |
| (iii) | Vertical extent:
$\frac{B}{15}$ or 6 metres,
whichever is less
measured from the moulded line of the bottom shell plating at centreline | $\frac{B}{15}$ or 6 metres,
whichever is less
measured from the moulded line of the bottom shell plating at centreline |
- (c) If any damage of a lesser extent than the maximum extent of damage specified in subparagraphs (a) and (b) of this paragraph would result in a more severe condition, such damage shall be considered.
- (d) Where the damage involving transverse bulkheads is envisaged as specified in subparagraphs (1)(a) and (b) of this regulation, transverse watertight bulkheads shall be spaced at least at a distance equal to the longitudinal extent of assumed damage specified in subparagraph (a) of this paragraph in order to be considered effective. Where transverse bulkheads are spaced at a lesser distance, one or more of these bulkheads within such extent of damage shall be assumed as non-existent for the purpose of determining flooded compartments.

- (e) Where the damage between adjacent transverse watertight bulkheads is envisaged as specified in subparagraph (1)(c) of this regulation, no main transverse bulkhead or a transverse bulkhead bounding side tanks or double bottom tanks shall be assumed damaged, unless:
 - (i) the spacing of the adjacent bulkheads is less than the longitudinal extent of assumed damage specified in subparagraph (a) of this paragraph; or
 - (ii) there is a step or recess in a transverse bulkhead of more than 3.05 m in length, located within the extent of penetration of assumed damage. The step formed by the after peak bulkhead and after peak tank top shall not be regarded as a step for the purpose of this regulation.
- (f) If pipes, ducts or tunnels are situated within the assumed extent of damage, arrangements shall be made so that progressive flooding cannot thereby extend to compartments other than those assumed to be floodable for each case of damage.

SEE INTERPRETATION 11.5

- (3) Oil tankers shall be regarded as complying with the damage stability criteria if the following requirements are met:
 - (a) The final waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding may take place. Such openings shall include air-pipes and those 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 cargo tank hatch covers which maintain the high integrity of the deck, remotely operated watertight sliding doors, and sidescuttles of the non-opening type.
 - (b) In the final stage of flooding, the angle of heel due to unsymmetrical flooding shall not exceed 25°, provided that this angle may be increased up to 30° if no deck edge immersion occurs.
 - (c) The stability in the final stage of flooding shall be investigated and may be regarded as sufficient if the righting lever curve has at least a range of 20° beyond the position of equilibrium in association with a maximum residual righting lever of at least 0.1 m within the 20° range; the area under the curve within this range shall not be less than 0.0175 metre radian. Unprotected openings shall not be immersed within this range unless the space concerned is assumed to be flooded. Within this range, the

immersion of any of the openings listed in subparagraph (a) of this paragraph and other openings capable of being closed weathertight may be permitted.

- (d) The Administration shall be satisfied that the stability is sufficient during intermediate stages of flooding.
 - (e) Equalization arrangements requiring mechanical aids such as valves or cross-levelling pipes, if fitted, shall not be considered for the purpose of reducing an angle of heel or attaining the minimum range of residual stability to meet the requirements of subparagraphs (a), (b) and (c) of this paragraph and sufficient residual stability shall be maintained during all stages where equalization is used. Spaces which are linked by ducts of a large cross-sectional area may be considered to be common.
- (4) The requirements of paragraph (1) of this regulation shall be confirmed by calculations which take into consideration the design characteristics of the ship, the arrangements, configuration and contents of the damaged compartments; and the distribution, specific gravities and the free surface effect of liquids. The calculations shall be based on the following:

- (a) Account shall be taken of any empty or partially filled tank, the specific gravity of cargoes carried, as well as any outflow of liquids from damaged compartments.
- (b) The permeabilities assumed for spaces flooded as a result of damage shall be as follows:

<i>Spaces</i>	<i>Permeabilities</i>
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Voids	0.95
Intended for consumable liquids	0 to 0.95*
Intended for other liquids	0 to 0.95*

- (c) The buoyancy of any superstructure directly above the side damage shall be disregarded. The unflooded parts of superstructures beyond the extent of damage, however, may be taken into consideration provided that they are separated from the damaged space by watertight bulkheads and the requirements of

* The permeability of partially filled compartments shall be consistent with the amount of liquid carried in the compartment. Whenever damage penetrates a tank containing liquids, it shall be assumed that the contents are completely lost from that compartment and replaced by salt water up to the level of the final plane of equilibrium.

- subparagraph (3)(a) of this regulation in respect of these intact spaces are complied with. Hinged watertight doors may be acceptable in watertight bulkheads in the superstructure.
- (d) The free surface effect shall be calculated at an angle of heel of 5° for each individual compartment. The Administration may require or allow the free surface corrections to be calculated at an angle of heel greater than 5° for partially filled tanks.
 - (e) In calculating the effect of free surfaces of consumable liquids it shall be assumed that, for each type of liquid at least one transverse pair or a single centreline tank has a free surface and the tank or combination of tanks to be taken into account shall be those where the effect of free surfaces is the greatest.
- (5) The master of every new oil tanker and the person in charge of a new non-self-propelled oil tanker to which this Annex applies shall be supplied in an approved form with:
- (a) information relative to loading and distribution of cargo necessary to ensure compliance with the provisions of this regulation; and
 - (b) data on the ability of the ship to comply with damage stability criteria as determined by this regulation, including the effect of relaxations that may have been allowed under subparagraph (1)(c) of this regulation.

Regulation 25A

Intact stability

- (1) This regulation shall apply to oil tankers of 5,000 tons deadweight and above:
- (a) for which the building contract is placed on or after 1 February 1999; or
 - (b) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 August 1999; or
 - (c) the delivery of which is on or after 1 February 2002; or
 - (d) which have undergone a major conversion:
 - (i) for which the contract is placed after 1 February 1999; or
 - (ii) in the absence of a contract, the construction work of which is begun after 1 August 1999; or
 - (iii) which is completed after 1 February 2002.
- (2) Every oil tanker shall comply with the intact stability criteria specified in subparagraphs (a) and (b) of this paragraph, as appropriate, for any

operating draught under the worst possible conditions of cargo and ballast loading, consistent with good operational practice, including intermediate stages of liquid transfer operations. Under all conditions the ballast tanks shall be assumed slack.

SEE INTERPRETATION 11A.1

- (a) In port, the initial metacentric height GM_o , corrected for free surface measured at 0° heel, shall be not less than 0.15 m;
- (b) At sea, the following criteria shall be applicable:
 - (i) the area under the righting lever curve (GZ curve) shall be not less than 0.055 m-rad up to $\theta = 30^\circ$ angle of heel and not less than 0.09 m-rad up to $\theta = 40^\circ$ or other angle of flooding θ_f^* if this angle is less than 40° . Additionally, the area under the righting lever curve (GZ curve) between the angles of heel of 30° and 40° or between 30° and θ_f , if this angle is less than 40° , shall be not less than 0.03 m-rad;
 - (ii) the righting lever GZ shall be at least 0.20 m at an angle of heel equal to or greater than 30° ;
 - (iii) the maximum righting arm shall occur at an angle of heel preferably exceeding 30° but not less than 25° ; and
 - (iv) the initial metacentric height GM_o , corrected for free surface measured at 0° heel, shall be not less than 0.15 m.
- (3) The requirements of paragraph (2) shall be met through design measures. For combination carriers simple supplementary operational procedures may be allowed.
- (4) Simple supplementary operational procedures for liquid transfer operations referred to in paragraph (3) shall mean written procedures made available to the master which:
 - (i) are approved by the Administration;
 - (ii) indicate those cargo and ballast tanks which may, under any specific condition of liquid transfer and possible range of cargo densities, be slack and still allow the stability criteria to be met. The slack tanks may vary during the liquid transfer operations and be of any combination provided they satisfy the criteria;
 - (iii) will be readily understandable to the officer-in-charge of liquid transfer operations;

* θ_f is the angle of heel at which the openings in the hull, superstructures or deck-houses, which cannot be closed weathertight, immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open.

- (iv) provide for planned sequences of cargo/ballast transfer operations;
- (v) allow comparisons of attained and required stability using stability performance criteria in graphical or tabular form;
- (vi) require no extensive mathematical calculations by the officer-in-charge;
- (vii) provide for corrective actions to be taken by the officer-in-charge in case of departure from recommended values and in case of emergency situations; and
- (viii) are prominently displayed in the approved trim and stability booklet and at the cargo/ballast transfer control station and in any computer software by which stability calculations are performed.

Chapter IV – Prevention of pollution arising from an oil pollution incident

Regulation 26

Shipboard oil pollution emergency plan

- (1) Every oil tanker of 150 tons gross tonnage and above and every ship other than an oil tanker of 400 tons gross tonnage and above shall carry on board a shipboard oil pollution emergency plan approved by the Administration. In the case of ships built before 4 April 1993 this requirement shall apply 24 months after that date.

SEE INTERPRETATIONS 12.1 AND 12.2

- (2) Such a plan shall be in accordance with guidelines* developed by the Organization and written in the working language of the master and officers. The plan shall consist at least of:
- (a) the procedure to be followed by the master or other persons having charge of the ship to report an oil pollution incident, as required in article 8 and Protocol I of the present Convention, based on the guidelines developed by the Organization;†
 - (b) the list of authorities or persons to be contacted in the event of an oil pollution incident;
 - (c) a detailed description of the action to be taken immediately by persons on board to reduce or control the discharge of oil following the incident; and
 - (d) the procedures and point of contact on the ship for co-ordinating shipboard action with national and local authorities in combating the pollution.



* Refer to the Guidelines for the development of shipboard oil pollution emergency plans adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.54(32); see IMO sales publication IMO-586E.

† 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); see IMO sales publication IMO-516E.

Appendices to Annex I

Appendix I

List of oils*

Asphalt solutions
Blending stocks
Roofers flux
Straight run residue

Oils

Clarified
Crude oil
Mixtures containing crude oil
Diesel oil
Fuel oil no. 4
Fuel oil no. 5
Fuel oil no. 6
Residual fuel oil
Road oil
Transformer oil
Aromatic oil (excluding vegetable oil)
Lubricating oils and blending stocks
Mineral oil
Motor oil
Penetrating oil
Spindle oil
Turbine oil

Distillates

Straight run
Flashed feed stocks

Gas oil

Cracked

Gasoline blending stocks

Alkylates – fuel
Reformats
Polymer – fuel

Gasolines

Casinghead (natural)
Automotive
Aviation
Straight run
Fuel oil no. 1 (kerosene)
Fuel oil no. 1-D
Fuel oil no. 2
Fuel oil no. 2-D

Jet fuels

JP-1 (kerosene)
JP-3
JP-4
JP-5 (kerosene, heavy)
Turbo fuel
Kerosene
Mineral spirit

Naphtha

Solvent
Petroleum
Heartcut distillate oil

* This list of oils shall not necessarily be considered as comprehensive.



Appendix II

Form of IOPP Certificate

INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE

(Note: This certificate shall be supplemented by a Record of Construction and Equipment)

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

.....
(full designation of the country)

by.....
(full designation of the competent person or organization authorized under the provisions of the Convention)

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage

Type of ship:

Oil tanker*

Ship other than an oil tanker with cargo tanks coming under regulation 2(2) of Annex I of the Convention*

Ship other than any of the above*

* Delete as appropriate.

THIS IS TO CERTIFY:

1. That the ship has been surveyed in accordance with regulation 4 of Annex I of the Convention; and
2. That the survey shows that the structure, equipment, systems, fittings, arrangement and material of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the applicable requirements of Annex I of the Convention.

This certificate is valid until
subject to surveys in accordance with regulation 4 of Annex I of the Convention.

Issued at.
(Place of issue of certificate)

.....
(Date of issue)

.....
*(Signature of duly authorized official
issuing the certificate)*

(Seal or stamp of the authority, as appropriate)

Appendix

FORM A
(Revised 1991)

Supplement to the International Oil Pollution Prevention Certificate (IOPP Certificate)

RECORD OF CONSTRUCTION AND EQUIPMENT FOR SHIPS OTHER THAN OIL TANKERS

in respect of the provisions of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as "the Convention").

Notes:

- 1 This form is to be used for the third type of ships as categorized in the IOPP Certificate, i.e. "ships other than any of the above". For oil tankers and ships other than oil tankers with cargo tanks coming under regulation 2(2) of Annex I of the Convention, Form B shall be used.
- 2 This Record shall be permanently attached to the IOPP Certificate. The IOPP Certificate shall be available on board the ship at all times.
- 3 If the language of the original Record is neither English nor French, the text shall include a translation into one of these languages.
- 4 Entries in boxes shall be made by inserting either a cross (×) for the answers "yes" and "applicable" or a dash (-) for the answers "no" and "not applicable" as appropriate.
- 5 Regulations mentioned in this Record refer to regulations of Annex I of the Convention and resolutions refer to those adopted by the International Maritime Organization.

1 Particulars of ship

- 1.1 Name of ship
- 1.2 Distinctive number or letters
- 1.3 Port of registry.
- 1.4 Gross tonnage.

- 1.5 Date of build:
 - 1.5.1 Date of building contract
 - 1.5.2 Date on which keel was laid or ship was at a similar stage of construction
 - 1.5.3 Date of delivery
- 1.6 Major conversion (if applicable):
 - 1.6.1 Date of conversion contract
 - 1.6.2 Date on which conversion was commenced
 - 1.6.3 Date of completion of conversion
- 1.7 Status of ship:
 - 1.7.1 New ship in accordance with regulation 1(6)
 - 1.7.2 Existing ship in accordance with regulation 1(7)
 - 1.7.3 The ship has been accepted by the Administration as an "existing ship" under regulation 1(7) due to unforeseen delay in delivery

2 Equipment for the control of oil discharge from machinery space bilges and oil fuel tanks
(regulations 10 and 16)

- 2.1 Carriage of ballast water in oil fuel tanks:
 - 2.1.1 The ship may under normal conditions carry ballast water in oil fuel tanks
- 2.2 Type of oil filtering equipment fitted:
 - 2.2.1 Oil filtering (15 ppm) equipment (regulation 16(4))
 - 2.2.2 Oil filtering (15 ppm) equipment with alarm and automatic stopping device (regulation 16(5))
- 2.3 The ship is allowed to operate with the existing equipment until 6 July 1998 (regulation 16(6)) and fitted with:
 - 2.3.1 Oily-water separating (100 ppm) equipment
 - 2.3.2 Oil filtering (15 ppm) equipment without alarm
 - 2.3.3 Oil filtering (15 ppm) equipment with alarm and manual stopping device



2.4 Approval standards:*

2.4.1 The separating/filtering equipment:

- .1 has been approved in accordance with resolution A.393(X)
- .2 has been approved in accordance with resolution A.233(VII)
- .3 has been approved in accordance with national standards not based upon resolution A.393(X) or A.233(VII)
- .4 has not been approved

2.4.2 The process unit has been approved in accordance with resolution A.444(XI)

2.4.3 The oil content meter has been approved in accordance with resolution A.393(X)

2.5 Maximum throughput of the system is m³/h

2.6 Waiver of regulation 16:

2.6.1 The requirements of regulation 16(1) or (2) are waived in respect of the ship in accordance with regulation 16(3)(a). The ship is engaged exclusively on:

- .1 voyages within special area(s):
.
.
- .2 voyages within 12 miles of the nearest land outside special area(s) restricted to:
.
.

2.6.2 The ship is fitted with holding tank(s) having a volume of m³ for the total retention on board of all oily bilge water

* Refer to the Recommendation on international performance and test specifications of oily-water separating equipment and oil content meters adopted by the Organization on 14 November 1977 by resolution A.393(X), which superseded resolution A.233(VII); see IMO sales publication IMO-608E. Further reference is made to the Guidelines and specifications for pollution prevention equipment for machinery space bilges adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1993, superseded resolutions A.393(X) and A.444(XI); see IMO sales publication IMO-646E.

3 Means for retention and disposal of oil residues (sludge)
(regulation 17)

3.1 The ship is provided with oil residue (sludge) tanks as follows:

Tank identification	Tank location		Volume (m ³)
	Frames (from) – (to)	Lateral position	
Total volume: m ³			

3.2 Means for the disposal of residues in addition to the provisions of sludge tanks:

- 3.2.1 Incinerator for oil residues, capacity l/h
- 3.2.2 Auxiliary boiler suitable for burning oil residues
- 3.2.3 Tank for mixing oil residues with fuel oil, capacity m³
- 3.2.4 Other acceptable means:

4 Standard discharge connection
(regulation 19)

- 4.1 The ship is provided with a pipeline for the discharge of residues from machinery bilges to reception facilities, fitted with a standard discharge connection in accordance with regulation 19

5 Shipboard oil pollution emergency plan
(regulation 26)

- 5.1 The ship is provided with a shipboard oil pollution emergency plan in compliance with regulation 26

6 Exemption

- 6.1 Exemptions have been granted by the Administration from the requirements of chapter II of Annex I of the Convention in accordance with regulation 2(4)(a) on those items listed under paragraph(s)
 of this Record

7 Equivalentents (regulation 3)

7.1 Equivalentents have been approved by the Administration for certain requirements of Annex I on those items listed under paragraph(s) of this Record

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at.
(Place of issue of the Record)

.
*(Signature of duly authorized officer
issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

FORM B
(Revised 1991)

**Supplement to International Oil Pollution Prevention Certificate
(IOPP Certificate)**

RECORD OF CONSTRUCTION AND EQUIPMENT FOR OIL TANKERS


in respect of the provisions of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as "the Convention").

Notes:

- 1 This form is to be used for the first two types of ships as categorized in the IOPP Certificate, i.e. "oil tankers" and "ships other than oil tankers with cargo tanks coming under regulation 2(2) of Annex I of the Convention". For the third type of ships as categorized in the IOPP Certificate, Form A shall be used.
- 2 This Record shall be permanently attached to the IOPP Certificate. The IOPP Certificate shall be available on board the ship at all times.
- 3 If the language of the original Record is neither English nor French, the text shall include a translation into one of these languages.
- 4 Entries in boxes shall be made by inserting either a cross (×) for the answers "yes" and "applicable" or a dash (-) for the answers "no" and "not applicable" as appropriate.
- 5 Unless otherwise stated, regulations mentioned in this Record refer to regulations of Annex I of the Convention and resolutions refer to those adopted by the International Maritime Organization.

1 Particulars of ship

- 1.1 Name of ship
- 1.2 Distinctive number or letters
- 1.3 Port of registry
- 1.4 Gross tonnage
- 1.5 Carrying capacity of ship (m³)
- 1.6 Deadweight of ship (metric tons) (regulation 1(22))
- 1.7 Length of ship (m) (regulation 1(18))

- 1.8 Date of build:
 - 1.8.1 Date of building contract
 - 1.8.2 Date on which keel was laid or ship was at a similar stage of construction
 - 1.8.3 Date of delivery
- 1.9 Major conversion (if applicable):
 - 1.9.1 Date of conversion contract
 - 1.9.2 Date on which conversion was commenced
 - 1.9.3 Date of completion of conversion
- 1.10 Status of ship:
 - 1.10.1 New ship in accordance with regulation 1(6)
 - 1.10.2 Existing ship in accordance with regulation 1(7)
 - 1.10.3 New oil tanker in accordance with regulation 1(26)
 - 1.10.4 Existing oil tanker in accordance with regulation 1(27)
 - 1.10.5 The ship has been accepted by the Administration as an “existing ship” under regulation 1(7) due to unforeseen delay in delivery
 - 1.10.6 The ship has been accepted by the Administration as an “existing oil tanker” under regulation 1(27) due to unforeseen delay in delivery
 - 1.10.7 The ship is not required to comply with the provisions of regulation 24 due to unforeseen delay in delivery
- 1.11 Type of ship:
 - 1.11.1 Crude oil tanker
 -  1.11.2 Product carrier
 - 1.11.3 Crude oil/product carrier
 - 1.11.4 Combination carrier
 - 1.11.5 Ship, other than an oil tanker, with cargo tanks coming under regulation 2(2) of Annex I of the Convention
 - 1.11.6 Oil tanker dedicated to the carriage of products referred to in regulation 15(7)

- 1.11.7 The ship, being designated as a “crude oil tanker” operating with COW, is also designated as a “product carrier” operating with CBT, for which a separate IOPP Certificate has also been issued
- 1.11.8 The ship, being designated as a “product carrier” operating with CBT, is also designated as a “crude oil tanker” operating with COW, for which a separate IOPP Certificate has also been issued
- 1.11.9 Chemical tanker carrying oil

2 Equipment for the control of oil discharge from machinery space bilges and oil fuel tanks
(regulations 10 and 16)

2.1 Carriage of ballast water in oil fuel tanks:

- 2.1.1 The ship may under normal conditions carry ballast water in oil fuel tanks

2.2 Type of oil filtering equipment fitted:

- 2.2.1 Oil filtering (15 ppm) equipment (regulation 16(4))
- 2.2.2 Oil filtering (15 ppm) equipment with alarm and automatic stopping device (regulation 16(5))

2.3 The ship is allowed to operate with the existing equipment until 6 July 1998 (regulation 16(6)) and fitted with:

- 2.3.1 Oily-water separating (100 ppm) equipment
- 2.3.2 Oil filtering (15 ppm) equipment without alarm
- 2.3.3 Oil filtering (15 ppm) equipment with alarm and manual stopping device

2.4 Approval standards:*

- 2.4.1 The separating/filtering system:
 - .1 has been approved in accordance with resolution A.393(X)



* Refer to the Recommendation on international performance and test specifications of oily-water separating equipment and oil content meters adopted by the Organization on 14 November 1977 by resolution A.393(X), which superseded resolution A.233(VII); see IMO sales publication IMO-608E. Further reference is made to the Guidelines and specifications for pollution prevention equipment for machinery space bilges adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1993, superseded resolutions A.393(X) and A.444(XI); see IMO sales publication IMO-646E.

- .2 has been approved in accordance with resolution A.233(VII)
- .3 has been approved in accordance with national standards not based upon resolution A.393(X) or A.233(VII)
- .4 has not been approved
- 2.4.2 The process unit has been approved in accordance with resolution A.444(XI)
- 2.4.3 The oil content meter has been approved in accordance with resolution A.393(X)
- 2.5 Maximum throughput of the system is m³/h
- 2.6 Waiver of regulation 16:
 - 2.6.1 The requirements of regulation 16(1) or (2) are waived in respect of the ship in accordance with regulation 16(3)(a). The ship is engaged exclusively on:
 - .1 voyages within special area(s):
 - .2 voyages within 12 miles of the nearest land outside special area(s) restricted to:
 - 2.6.2 The ship is fitted with holding tank(s) having a volume of m³ for the total retention on board of all oily bilge water
 - 2.6.3 In lieu of the holding tank the ship is provided with arrangements to transfer bilge water to the slop tank

3 Means for retention and disposal of oil residues (sludge)
(regulation 17)

3.1 The ship is provided with oil residue (sludge) tanks as follows:

Tank identification	Tank location		Volume (m ³)
	Frames (from) - (to)	Lateral position	
Total volume: m ³			

3.2 Means for the disposal of residues in addition to the provisions of sludge tanks:

- 3.2.1 Incinerator for oil residues, capacity l/h
- 3.2.2 Auxiliary boiler suitable for burning oil residues
- 3.2.3 Tank for mixing oil residues with fuel oil, capacity m³
- 3.2.4 Other acceptable means:

4 Standard discharge connection (regulation 19)

4.1 The ship is provided with a pipeline for the discharge of residues from machinery bilges to reception facilities, fitted with a standard discharge connection in compliance with regulation 19

5 Construction (regulations 13, 24 and 25)

5.1 In accordance with the requirements of regulation 13, the ship is:

- 5.1.1 Required to be provided with SBT, PL and COW
- 5.1.2 Required to be provided with SBT and PL
- 5.1.3 Required to be provided with SBT
- 5.1.4 Required to be provided with SBT or COW
- 5.1.5 Required to be provided with SBT or CBT
- 5.1.6 Not required to comply with the requirements of regulation 13

5.2 Segregated ballast tanks (SBT):

- 5.2.1 The ship is provided with SBT in compliance with regulation 13
- 5.2.2 The ship is provided with SBT, in compliance with regulation 13, which are arranged in protective locations (PL) in compliance with regulation 13E
- 5.2.3 SBT are distributed as follows:

Tank	Volume (m ³)	Tank	Volume (m ³)
		Total volume m ³	

5.3 Dedicated clean ballast tanks (CBT):

5.3.1 The ship is provided with CBT in compliance with regulation 13A, and may operate as a product carrier

5.3.2 CBT are distributed as follows:

Tank	Volume (m ³)	Tank	Volume (m ³)
		Total volume .....m ³	

5.3.3 The ship has been supplied with a valid Dedicated Clean Ballast Tank Operation Manual, which is dated

5.3.4 The ship has common piping and pumping arrangements for ballasting the CBT and handling cargo oil

5.3.5 The ship has separate independent piping and pumping arrangements for ballasting the CBT

5.4 Crude oil washing (COW):

5.4.1 The ship is equipped with a COW system in compliance with regulation 13B

5.4.2 The ship is equipped with a COW system in compliance with regulation 13B except that the effectiveness of the system has not been confirmed in accordance with regulation 13(6) and paragraph 4.2.10 of the Revised COW Specifications (resolution A.446(XI)*)

5.4.3 The ship has been supplied with a valid Crude Oil Washing Operations and Equipment Manual, which is dated

5.4.4 The ship is not required to be but is equipped with COW in compliance with the safety aspects of the Revised COW Specifications (resolution A.446(XI)*)

5.5 Exemption from regulation 13:

5.5.1 The ship is solely engaged in trade between

 in accordance with regulation 13C and is therefore exempted from the requirements of regulation 13

* See IMO sales publication IMO-617E.

- 5.5.2 The ship is operating with special ballast arrangements in accordance with regulation 13D and is therefore exempted from the requirements of regulation 13
- 5.6 Limitation of size and arrangements of cargo tanks (regulation 24):
- 5.6.1 The ship is required to be constructed according to, and complies with, the requirements of regulation 24
- 5.6.2 The ship is required to be constructed according to, and complies with, the requirements of regulation 24(4) (see regulation 2(2))
- 5.7 Subdivision and stability (regulation 25):
- 5.7.1 The ship is required to be constructed according to, and complies with, the requirements of regulation 25
- 5.7.2 Information and data required under regulation 25(5) have been supplied to the ship in an approved form
- 5.8 Double-hull construction:
- 5.8.1 The ship is required to be constructed according to regulation 13F and complies with the requirements of:
- .1 paragraph (3) (double-hull construction)
 - .2 paragraph (4) (mid-height deck tankers with double side construction)
 - .3 paragraph (5) (alternative method approved by the Marine Environment Protection Committee)
- 5.8.2 The ship is required to be constructed according to and complies with the requirements of regulation 13F(7) (double bottom requirements)
- 5.8.3 The ship is not required to comply with the requirements of regulation 13F
- 5.8.4 The ship is subject to regulation 13G and:
- .1 is required to comply with regulation 13F not later than
 - .2 is so arranged that the following tanks or spaces are not used for the carriage of oil
- 5.8.5 The ship is not subject to regulation 13G

6 Retention of oil on board (regulation 15)

6.1 Oil discharge monitoring and control system:

- 6.1.1 The ship comes under category oil tanker as defined in resolution A.496(XII) or A.586(14)* (*delete as appropriate*)
- 6.1.2 The system comprises:
- .1 control unit
 - .2 computing unit
 - .3 calculating unit
- 6.1.3 The system is:
- .1 fitted with a starting interlock
 - .2 fitted with automatic stopping device
- 6.1.4 The oil content meter is approved under the terms of resolution A.393(X) or A.586(14)† (*delete as appropriate*) suitable for:
- .1 crude oil
 - .2 black products
 - .3 white products
 - .4 oil-like noxious liquid substances as listed in the attachment to the certificate
- 6.1.5 The ship has been supplied with an operations manual for the oil discharge monitoring and control system
- 6.2 Slop tanks:
- 6.2.1 The ship is provided with dedicated slop tank(s) with the total capacity of m³, which is. % of the oil carrying capacity, in accordance with:
- .1 regulation 15(2)(c)
 - .2 regulation 15(2)(c)(i)
 - .3 regulation 15(2)(c)(ii)
 - .4 regulation 15(2)(c)(iii)

* Oil tankers the keels of which are laid, or which are at a similar stage of construction, on or after 2 October 1986 should be fitted with a system approved under resolution A.586(14); see IMO sales publication IMO-646E.

† For oil content meters installed on tankers built prior to 2 October 1986, refer to the Recommendation on international performance and test specifications for oily-water separating equipment and oil content meters adopted by the Organization by resolution A.393(X). For oil content meters as part of discharge monitoring and control systems installed on tankers built on or after 2 October 1986, refer to the Guidelines and specifications for oil discharge monitoring and control systems for oil tankers adopted by the Organization by resolution A.586(14); see IMO sales publications IMO-608E and IMO-646E, respectively.

- 6.2.2 Cargo tanks have been designated as slop tanks
- 6.3 Oil/water interface detectors:
 - 6.3.1 The ship is provided with oil/water interface detectors approved under the terms of resolution MEPC.5(XIII)*
- 6.4 Exemptions from regulation 15:
 - 6.4.1 The ship is exempted from the requirements of regulation 15(1), (2) and (3) in accordance with regulation 15(7)
 - 6.4.2 The ship is exempted from the requirements of regulation 15(1), (2) and (3) in accordance with regulation 2(2)
- 6.5 Waiver of regulation 15:
 - 6.5.1 The requirements of regulation 15(3) are waived in respect of the ship in accordance with regulation 15(5)(b). The ship is engaged exclusively on:
 - .1 specific trade under regulation 13C:
 - .2 voyages within special area(s):
 - .3 voyages within 50 miles of the nearest land outside special area(s) of 72 hours or less in duration restricted to:

7 Pumping, piping and discharge arrangements
(regulation 18)

- 7.1 The overboard discharge outlets for segregated ballast are located:
 - 7.1.1 Above the waterline
 - 7.1.2 Below the waterline
- 7.2 The overboard discharge outlets, other than the discharge manifold, for clean ballast are located:[†]
 - 7.2.1 Above the waterline
 - 7.2.2 Below the waterline

* Refer to the Specification for oil/water interface detectors adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.5(XIII); see IMO sales publication IMO-646E.

[†] Only those outlets which can be monitored are to be indicated.

- 7.3 The overboard discharge outlets, other than the discharge manifold, for dirty ballast water or oil-contaminated water from cargo tank areas are located:*
- 7.3.1 Above the waterline
- 7.3.2 Below the waterline in conjunction with the part flow arrangements in compliance with regulation 18(6)(e)
- 7.3.3 Below the waterline
- 7.4 Discharge of oil from cargo pumps and oil lines (regulation 18(4) and (5)):
- 7.4.1 Means to drain all cargo pumps and oil lines at the completion of cargo discharge:
 - .1 drainings capable of being discharged to a cargo tank or slop tank
 - .2 for discharge ashore a special small-diameter line is provided

8 Shipboard oil pollution emergency plan (regulation 26)

- 8.1 The ship is provided with a shipboard oil pollution emergency plan in compliance with regulation 26

9 Equivalent arrangements for chemical tankers carrying oil

- 9.1 As equivalent arrangements for the carriage of oil by a chemical tanker, the ship is fitted with the following equipment in lieu of slop tanks (paragraph 6.2 above) and oil/water interface detectors (paragraph 6.3 above):
 - 9.1.1 Oily-water separating equipment capable of producing effluent with oil content less than 100 ppm, with the capacity ofm³/h
 - 9.1.2 A holding tank with the capacity ofm³
 - 9.1.3 A tank for collecting tank washings which is:
 - .1 a dedicated tank
 - .2 a cargo tank designated as a collecting tank

* Only those outlets which can be monitored are to be indicated.

- 9.1.4 A permanently installed transfer pump for overboard discharge of effluent containing oil through the oily-water separating equipment

- 9.2 The oily-water separating equipment has been approved under the terms of resolution A.393(X)* and is suitable for the full range of Annex I products

- 9.3 The ship holds a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk

10 Oil-like noxious liquid substances

- 10.1 The ship is permitted, in accordance with regulation 14 of Annex II of the Convention, to carry the oil-like noxious liquid substances specified in the list[†] attached

11 Exemption

- 11.1 Exemptions have been granted by the Administration from the requirements of chapters II and III of Annex I of the Convention in accordance with regulation 2(4)(a) on those items listed under paragraph(s)
.
. of this Record

12 Equivalentents (regulation 3)

- 12.1 Equivalentents have been approved by the Administration for certain requirements of Annex I on those items listed under paragraph(s)
. of this Record

* Refer to the Guidelines and specifications for pollution prevention equipment for machinery space bilges adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1993, superseded resolution A.393(X); see IMO sales publication IMO-646E.

† The list of oil-like noxious substances permitted for carriage, signed, dated and certified by a seal or a stamp of the issuing authority, shall be attached.

Appendices to Annex I

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at.
(Place of issue of the Record)

.
*(Signature of duly authorized officer
issuing the Record)*

(Seal or stamp of the issuing authority, as appropriate)

Introduction

The following pages of this section show a comprehensive list of items of machinery space operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items have been grouped into operational sections, each of which is denoted by a letter code.

When making entries in the Oil Record Book, the date, operational code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank spaces.

Each completed operation shall be signed for and dated by the officer or officers in charge. Each completed page shall be signed by the master of the ship.

The Oil Record Book contains many references to oil quantity. The limited accuracy of tank measurement devices, temperature variations and clingage will affect the accuracy of these readings. The entries in the Oil Record Book should be considered accordingly.

LIST OF ITEMS TO BE RECORDED

(A) Ballasting or cleaning of oil fuel tanks

1. Identity of tank(s) ballasted.
2. Whether cleaned since they last contained oil and, if not, type of oil previously carried.
3. Cleaning process:
 - .1 position of ship and time at the start and completion of cleaning;
 - .2 identify tank(s) in which one or another method has been employed (rinsing through, steaming, cleaning with chemicals; type and quantity of chemicals used);
 - .3 identity of tank(s) into which cleaning water was transferred.
4. Ballasting:
 - .1 position of ship and time at start and end of ballasting;
 - .2 quantity of ballast if tanks are not cleaned.

(B) Discharge of dirty ballast or cleaning water from oil fuel tanks referred to under section (A)

5. Identity of tank(s).
6. Position of ship at start of discharge.
7. Position of ship on completion of discharge.
8. Ship's speed(s) during discharge.
9. Method of discharge:
 - .1 through 100 ppm equipment;
 - .2 through 15 ppm equipment;
 - .3 to reception facilities.
10. Quantity discharged.

(C) Collection and disposal of oil residues (sludge)

11. Collection of oil residues.

Quantities of oil residues (sludge) retained on board at the end of a voyage, but not more frequently than once a week. When ships are on short voyages, the quantity should be recorded weekly:¹

¹ Only in tanks listed in item 3 of Forms A and B of the Supplement to the IOPP Certificate.

- .1 separated sludge (sludge resulting from purification of fuel and lubricating oils) and other residues, if applicable:
 - identity of tank(s)
 - capacity of tank(s) m³
 - total quantity of retention m³;
 - .2 other residues (such as oils residues resulting from drainages, leakages, exhausted oil, etc., in the machinery spaces), if applicable due to tank arrangement in addition to .1:
 - identity of tank(s)
 - capacity of tank(s) m³
 - total quantity of retention m³.
12. Methods of disposal of residue.
- State quantity of oil residues disposed of, the tank(s) emptied and the quantity of contents retained:
- .1 to reception facilities (identify port);²
 - .2 transferred to another (other) tank(s) (indicate tank(s) and the total content of tank(s));
 - .3 incinerated (indicate total time of operation);
 - .4 other method (state which).

(D) Non-automatic discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces

- 13. Quantity discharged or disposed of.
- 14. Time of discharge or disposal (start and stop).
- 15. Method of discharge or disposal:
 - .1 through 100 ppm equipment (state position at start and end);
 - .2 through 15 ppm equipment (state position at start and end);
 - .3 to reception facilities (identify port);²
 - .4 transfer to slop tank or holding tank (indicate tank(s); state quantity transferred and the total quantity retained in tank(s)).

² Ships' masters should obtain from the operator of the reception facilities, which include barges and tank trucks, a receipt or certificate detailing the quantity of tank washings, dirty ballast, residues or oily mixtures transferred, together with the time and date of the transfer. This receipt or certificate, if attached to the Oil Record Book, may aid the master of the ship in proving that his ship was not involved in an alleged pollution incident. The receipt or certificate should be kept together with the Oil Record Book.

(E) Automatic discharge overboard or disposal otherwise of bilge water which has accumulated in machinery spaces

16. Time and position of ship at which the system has been put into automatic mode of operation for discharge overboard.
17. Time when the system has been put into automatic mode of operation for transfer of bilge water to holding tank (identify tank).
18. Time when the system has been put into manual operation.
19. Method of discharge overboard:
 - .1 through 100 ppm equipment;
 - .2 through 15 ppm equipment.

(F) Condition of oil discharge monitoring and control system

20. Time of system failure.
21. Time when system has been made operational.
22. Reasons for failure.

(G) Accidental or other exceptional discharges of oil

23. Time of occurrence.
24. Place or position of ship at time of occurrence.
25. Approximate quantity and type of oil.
26. Circumstances of discharge or escape, the reasons therefor and general remarks.

(H) Bunkering of fuel or bulk lubricating oil

27. Bunkering:
 - .1 Place of bunkering.
 - .2 Time of bunkering.
 - .3 Type and quantity of fuel oil and identity of tank(s) (state quantity added and total content of tank(s)).
 - .4 Type and quantity of lubricating oil and identity of tank(s) (state quantity added and total content of tank(s)).

(I) Additional operational procedures and general remarks

Introduction

The following pages of this section show a comprehensive list of items of cargo and ballast operations which are, when appropriate, to be recorded in the Oil Record Book in accordance with regulation 20 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). The items have been grouped into operational sections, each of which is denoted by a code letter.

When making entries in the Oil Record Book, the date, operational code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank spaces.

Each completed operation shall be signed for and dated by the officer or officers in charge. Each completed page shall be countersigned by the master of the ship. In respect of the oil tankers engaged in specific trades in accordance with regulation 13C of Annex I of MARPOL 73/78, appropriate entry in the Oil Record Book shall be endorsed by the competent port State authority.*

The Oil Record Book contains many references to oil quantity. The limited accuracy of tank measurement devices, temperature variations and clingage will affect the accuracy of these readings. The entries in the Oil Record Book should be considered accordingly.

* This sentence should only be inserted for the Oil Record Book of a tanker engaged in a specific trade.

LIST OF ITEMS TO BE RECORDED

(A) Loading of oil cargo

1. Place of loading.
2. Type of oil loaded and identity of tank(s).
3. Total quantity of oil loaded (state quantity added and the total content of tank(s)).

(B) Internal transfer of oil cargo during voyage

4. Identity of tank(s):
 - .1 from:
 - .2 to: (state quantity transferred and total quantity of tank(s))
5. Was (were) the tank(s) in 4.1 emptied? (If not, state quantity retained.)

(C) Unloading of oil cargo

6. Place of unloading.
7. Identity of tank(s) unloaded.
8. Was (were) the tank(s) emptied? (If not, state quantity retained.)

(D) Crude oil washing (COW tankers only)

(To be completed for each tank being crude oil washed)

9. Port where crude oil washing was carried out or ship's position if carried out between two discharge ports.
10. Identity of tank(s) washed.¹
11. Number of machines in use.
12. Time of start of washing.
13. Washing pattern employed.²
14. Washing line pressure.
15. Time washing was completed or stopped.

¹ When an individual tank has more machines than can be operated simultaneously, as described in the Operations and Equipment Manual, then the section being crude oil washed should be identified, e.g. No. 2 centre, forward section.

² In accordance with the Operations and Equipment Manual, enter whether single-stage or multi-stage method of washing is employed. If multi-stage method is used, give the vertical arc covered by the machines and the number of times that arc is covered for that particular stage of the programme.

16. State method of establishing that tank(s) was (were) dry.
17. Remarks.³

(E) Ballasting of cargo tanks

18. Position of ship at start and end of ballasting.
19. Ballasting process:
 - .1 identity of tank(s) ballasted;
 - .2 time of start and end;
 - .3 quantity of ballast received. Indicate total quantity of ballast for each tank involved in the operation.

(F) Ballasting of dedicated clean ballast tanks (CBT tankers only)

20. Identity of tank(s) ballasted.
21. Position of ship when water intended for flushing, or port ballast was taken to dedicated clean ballast tank(s).
22. Position of ship when pump(s) and lines were flushed to slop tank.
23. Quantity of the oily water which, after line flushing, is transferred to the slop tank(s) or cargo tank(s) in which slop is preliminarily stored (identify tank(s)). State the total quantity.
24. Position of ship when additional ballast water was taken to dedicated clean ballast tank(s).
25. Time and position of ship when valves separating the dedicated clean ballast tanks from cargo and stripping lines were closed.
26. Quantity of clean ballast taken on board.

(G) Cleaning of cargo tanks

27. Identity of tank(s) cleaned.
28. Port or ship's position.
29. Duration of cleaning.
30. Method of cleaning.⁴

³ If the programmes given in the Operations and Equipment Manual are not followed, then the reasons must be given under Remarks.

⁴ Hand-hosing, machine washing and/or chemical cleaning. Where chemically cleaned, the chemical concerned and amount used should be stated.

31. Tank washings transferred to:
 - .1 reception facilities (state port and quantity)⁵;
 - .2 slop tank(s) or cargo tank(s) designated as slop tank(s) (identify tank(s); state quantity transferred and total quantity).

(H) Discharge of dirty ballast

32. Identity of tank(s).
33. Position of ship at start of discharge into the sea.
34. Position of ship on completion of discharge into the sea.
35. Quantity discharged into the sea.
36. Ship's speed(s) during discharge.
37. Was the discharge monitoring and control system in operation during the discharge?
38. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
39. Quantity of oily water transferred to slop tank(s) (identify slop tank(s)). State total quantity.
40. Discharged to shore reception facilities (identify port and quantity involved).⁵

(I) Discharge of water from slop tanks into the sea

41. Identity of slop tanks.
42. Time of settling from last entry of residues, or
43. Time of settling from last discharge.
44. Time and position of ship at start of discharge.
45. Ullage of total contents at start of discharge.
46. Ullage of oil/water interface at start of discharge.
47. Bulk quantity discharged and rate of discharge.
48. Final quantity discharged and rate of discharge.
49. Time and position of ship on completion of discharge.

⁵ Ships' masters should obtain from the operator of the reception facilities, which include barges and tank trucks, a receipt or certificate detailing the quantity of tank washings, dirty ballast, residues or oily mixtures transferred, together with the time and date of the transfer. This receipt or certificate, if attached to the Oil Record Book, may aid the master of the ship in proving that his ship was not involved in an alleged pollution incident. The receipt or certificate should be kept together with the Oil Record Book.

- 50. Was the discharge monitoring and control system in operation during the discharge?
- 51. Ullage of oil/water interface on completion of discharge.
- 52. Ship's speed(s) during discharge.
- 53. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?
- 54. Confirm that all applicable valves in the ship's piping system have been closed on completion of discharge from the slop tanks.

(J) Disposal of residues and oily mixtures not otherwise dealt with

- 55. Identity of tank(s).
- 56. Quantity disposed of from each tank. (State the quantity retained.)
- 57. Method of disposal:
 - .1 to reception facilities (identify port and quantity involved);⁵
 - .2 mixed with cargo (state quantity);
 - .3 transferred to (an)other tank(s) (identify tank(s); state quantity transferred and total quantity in tank(s));
 - .4 other method (state which); state quantity disposed of.

(K) Discharge of clean ballast contained in cargo tanks

- 58. Position of ship at start of discharge of clean ballast.
- 59. Identity of tank(s) discharged.
- 60. Was (were) the tank(s) empty on completion?
- 61. Position of ship on completion if different from 58.
- 62. Was a regular check kept on the effluent and the surface of the water in the locality of the discharge?

(L) Discharge of ballast from dedicated clean ballast tanks (CBT tankers only)

- 63. Identity of tank(s) discharged.

⁵ Ships' masters should obtain from the operator of the reception facilities, which include barges and tank trucks, a receipt or certificate detailing the quantity of tank washings, dirty ballast, residues or oily mixtures transferred, together with the time and date of the transfer. This receipt or certificate, if attached to the Oil Record Book, may aid the master of the ship in proving that his ship was not involved in an alleged pollution incident. The receipt or certificate should be kept together with the Oil Record Book.

64. Time and position of ship at start of discharge of clean ballast into the sea.
65. Time and position of ship on completion of discharge into the sea.
66. Quantity discharged:
 - .1 into the sea; or
 - .2 to reception facility (identify port).
67. Was there any indication of oil contamination of the ballast water before or during discharge into the sea?
68. Was the discharge monitored by an oil content meter?
69. Time and position of ship when valves separating dedicated clean ballast tanks from the cargo and stripping lines were closed on completion of deballasting.

(M) Condition of oil discharge monitoring and control system

70. Time of system failure.
71. Time when system has been made operational.
72. Reasons for failure.

(N) Accidental or other exceptional discharges of oil

73. Time of occurrence.
74. Port or ship's position at time of occurrence.
75. Approximate quantity and type of oil.
76. Circumstances of discharge or escape, the reasons therefor and general remarks.

(O) Additional operational procedures and general remarks

TANKERS ENGAGED IN SPECIFIC TRADES

(P) Loading of ballast water

77. Identity of tank(s) ballasted.
78. Position of ship when ballasted.
79. Total quantity of ballast loaded in cubic metres.
80. Remarks.

(Q) Re-allocation of ballast water within the ship.

81. Reasons for re-allocation.

(R) Ballast water discharge to reception facility

82. Port(s) where ballast water was discharged.

83. Name or designation of reception facility.

84. Total quantity of ballast water discharged in cubic metres.

85. Date, signature and stamp of port authority official.

Unified Interpretations of Annex I

Notes: For the purposes of the Unified Interpretations, the following abbreviations are used:

MARPOL 73/78	The 1973 MARPOL Convention as modified by the 1978 Protocol relating thereto
Regulation	Regulation in Annex I of MARPOL 73/78
IOPP Certificate	International Oil Pollution Prevention Certificate
SBT	Segregated ballast tanks
CBT	Dedicated clean ballast tanks
COW	Crude oil washing system
IGS	Inert gas systems
PL	Protective location of segregated ballast tanks
H	Date of entry into force of MARPOL 73/78 (see 2.0.1). "H + 2" means two years after the date of entry into force of MARPOL 73/78.

1 Definitions

Reg. 1(1)

1A.0 *Definition of "oil"*

1A.0.1 (Animal and vegetable oils are found to fall under the category of "noxious liquid substance", and therefore this interpretation has been deleted (see Annex II, appendix II, of MARPOL 73/78).)

Treatment for oily rags

1A.0.2 Oily rags, as defined in the Guidelines for the Implementation of Annex V of MARPOL 73/78, should be treated in accordance with Annex V and the procedures set out in the Guidelines.

Reg. 1(4)

1.0 *Definition of an "oil tanker"*

1.0.1 A gas carrier as defined in regulation 3.20 of chapter II-1 of SOLAS 74 (as amended), when carrying a cargo or part cargo of oil in bulk, should be treated as an "oil tanker" as defined in regulation 1(4).

Reg. 1(6)
1(26)

1.1 *Definition of "new ships"*

1.1.1 Regulations 1(6) and 1(26) defining "new ship" and "new oil tanker", respectively, should be construed to mean that a ship which falls into any one of the categories listed in subparagraphs (a), (b), (c), (d)(i), (d)(ii), or (d)(iii) of these paragraphs should be considered as a new ship or a new oil tanker, as appropriate.

Reg. 1(6)
1(26)
24
13F

1.2 *Unforeseen delay in delivery of ships*

1.2.1 For the purpose of defining “new” or “existing” ships under regulations 1(6), 1(26), 13F and 24, a ship for which the building contract (or keel laying) and delivery were scheduled before the dates specified in these regulations, but which has been subject to delay in delivery beyond the specified date due to unforeseen circumstances beyond the control of the builder *and* the owner, may be accepted by the Administration as an “existing ship”. The treatment of such ships should be considered by the Administration *on a case by case basis*, bearing in mind the particular circumstances.

1.2.2 It is important that ships delivered after the specified dates due to unforeseen delay and allowed to be treated as existing ships by the Administration, should also be accepted as such by port States. In order to ensure this, the following practice is recommended to Administrations when considering an application for such a ship:

- .1 the Administration should thoroughly consider applications on a case by case basis, bearing in mind the particular circumstances. In doing so in the case of a ship built in a foreign country, the Administration may require a formal report from the authorities of the country in which the ship was built, stating that the delay was due to unforeseen circumstances beyond the control of the builder and the owner;
- .2 when a ship is treated as an existing ship upon such an application, the IOPP Certificate for the ship should be endorsed to indicate that the ship is accepted by the Administration as an existing ship; and
- .3 the Administration should report to the Organization on the identity of the ship and the grounds on which the ship has been accepted as an existing ship.

1.2.3 For the purpose of the application of regulation 13F, a ship for which the building contract (or keel laying) and delivery date were scheduled before the dates specified in regulation 13F(1), but which has been subject to delay in delivery, may under the same terms and conditions given in interpretations 1.2.1 and 1.2.2 for “existing ships”, be accepted by the Administration as a ship to which regulation 13F does not apply.

Reg. 1(8)

1.3 *Major conversion*

1.3.1 The deadweight to be used for determining the application of provisions of Annex I is the deadweight assigned to an oil tanker at the time of the assignment of the load lines. If the load lines are reassigned for the purpose of altering the deadweight, without alteration of the structure of the ship, any substantial alteration of the deadweight consequential upon such reassignments should not be construed as “a major conversion” as defined in regulation 1(8).

However, the IOPP Certificate should indicate only one deadweight of the ship and be renewed on every reassignment of load lines.

1.3.2 If an existing crude oil tanker of 40,000 tons deadweight and above satisfying the requirements of COW changes its trade for the carriage of product oil* conversion to CBT or SBT and reissuing of the IOPP Certificate will be necessary (see paragraph 4.5 below). Such conversion should not be considered as a “major conversion” as defined in regulation 1(8).

1.3.3 When an oil tanker is used solely for the storage of oil and is subsequently put into service in the transportation of oil, such a change of function should not be construed as a “major conversion” as defined in regulation 1(8).

1.3.4 The conversion of an existing oil tanker to a combination carrier, or the shortening of a tanker by removing a transverse section of cargo tanks, should constitute a “major conversion” as defined in regulation 1(8).

1.3.5 The conversion of an existing oil tanker to a segregated ballast tanker by the addition of a transverse section of tanks should constitute a “major conversion” as defined in regulation 1(8) only when the cargo carrying capacity of the tanker is increased.

1.3.6 When a ship built as a combination carrier operates exclusively in the bulk cargo trade, the ship may be treated as a ship other than an oil tanker and Form A of the Record of Construction and Equipment should be issued to the ship. If such a ship operates in the oil trade and is equipped to comply with the requirements for an oil tanker, the ship should be certified as an oil tanker (combination carrier) and Form B of the Record of Construction and Equipment should be issued to the ship. The change of such a ship from the bulk trade to the oil trade should not be construed as a “major conversion” as defined in regulation 1(8).

Reg. 1(17)

1.4 *Definition of “segregated ballast”*

1.4.1 The segregated ballast system should be a system which is “completely separated from the cargo oil and fuel oil systems” as required by regulation 1(17). Nevertheless, provision may be made for emergency discharge of the segregated ballast by means of a connection to a cargo pump through a portable spool piece. In this case nonreturn valves should be fitted on the segregated ballast connections to prevent the passage of oil to the segregated ballast tanks. The portable spool piece should be mounted in a conspicuous position in the pump-room and a permanent notice restricting its use should be prominently displayed adjacent to it.

1.4.2 Sliding type couplings should not be used for expansion purposes where lines for cargo oil or fuel oil pass through tanks for segregated ballast, and where lines for segregated ballast pass

* “Product oil” means any oil other than crude oil as defined in regulation 1(28).

through cargo oil or fuel oil tanks. This interpretation is applicable to ships, the keel of which is laid, or which are at a similar stage of construction, on or after 1 July 1992.

Reg. 3

1.5 *Equivalents*

1.5.1 Acceptance by an Administration under regulation 3 of any fitting, material, appliance, or apparatus as an alternative to that required by Annex I includes type approval of pollution prevention equipment which is equivalent to that specified in resolution A.393(X).^{*} An Administration that allows such type approval shall communicate particulars thereof, including the test results on which the approval of equivalency was based, to the Organization in accordance with regulation 3(2).

1.5.2 With regard to the term “appropriate action, if any” in regulation 3(2), any Party to the Convention that has an objection to an equivalency submitted by another Party should communicate this objection to the Organization and to the Party which allowed the equivalency within one year after the Organization circulates the equivalency to the Parties. The Party objecting to the equivalency should specify whether the objection pertains to ships entering its ports.

1A Survey and inspection

**Reg. 4(1)(c)
and 4(3)(b)**

1A.1 *Intermediate and annual survey for ships not required to hold an IOPP Certificate*

1A.1.1 The applicability of regulations 4(1)(c) and 4(3)(b) to ships which are not required to hold an International Oil Pollution Prevention Certificate should be determined by the Administration.

2 Certificate

**Reg. 5
and others**

2.0 *Date of entry into force*

2.0.1 In the application of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (1978 Protocol) the phrase “date of entry into force of the

^{*} For oily-water separating equipment for machinery space bilges of ships, refer to the Guidelines and specifications for pollution prevention equipment for machinery space bilges adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.60(33), which, effective on 6 July 1993, superseded resolution A.393(X). For oil discharge monitoring and control systems installed on oil tankers built before 2 October 1986, refer to the Guidelines and specifications for oil discharge monitoring and control systems for oil tankers, and for oil discharge monitoring and control systems installed on oil tankers built on or after 2 October 1986, refer to the Revised guidelines and specifications for oil discharge monitoring and control systems, which were adopted by the Organization by resolutions A.496(XII) and A.586(14), respectively; see IMO sales publications IMO-608E and IMO-646E. There may be ships operating with oily-water separators (100 ppm) until 6 July 1998.

present Convention” should be construed to mean the date of entry into force of the 1978 Protocol, which was 2 October 1983.

Reg. 5
13
13E

2.1 *Designation of the type of oil tankers*

2.1.1 Oil tankers must be designated on the IOPP Certificate as either “crude oil tanker”, “product carrier” or “crude oil/product carrier”. Furthermore, the requirements contained in regulations 13 to 13E differ for new and existing “crude oil tankers” and “product carriers”, and compliance with these provisions is recorded on the IOPP Certificate. Oil trades in which different types of oil tankers are allowed to be engaged are as follows:

- .1 *Crude oil/product carrier* is allowed to carry either crude oil or product oil, or both simultaneously;
- .2 *Crude oil tanker* is allowed to carry crude oil but is prohibited from carrying product oil; and
- .3 *Product carrier* is allowed to carry product oil but is prohibited from carrying crude oil.

2.1.2 In determining the designation of the type of oil tanker on the IOPP Certificate based on the compliance with the provisions for SBT, PL, CBT and COW, the following standards should apply.

2.1.3 *New oil tankers* of less than 20,000 tons deadweight*

2.1.3.1 These oil tankers may be designated as “crude oil/product carriers”.

2.1.4 *New oil tankers* of 20,000 tons deadweight and above*

2.1.4.1 Oil tankers satisfying the requirements for SBT + PL + COW may be designated as “crude oil/product carrier”.

2.1.4.2 Oil tankers satisfying the requirements for SBT + PL but not COW should be designated as “product carrier”.

2.1.4.3 Oil tankers of 20,000 tons deadweight and above but less than 30,000 tons deadweight *not* fitted with SBT PL should be designated as “product carrier”.

2.1.5 *“New” oil tankers† of 70,000 tons deadweight and above*

2.1.5.1 These oil tankers satisfying the requirements for SBT may be designated as “crude oil/product carrier”.

* As defined in regulation 1(26).

† “New” oil tankers in this case means oil tankers of 70,000 tons deadweight and above built after the dates specified in regulation 1(6) but before the dates specified in regulation 1(26). The term “built” in this context means building contract or keel laying or delivery as defined in paragraph (a) or (b) or (c) of regulation 1(6).

2.1.6 *Existing oil tankers* of less than 40,000 tons deadweight*

2.1.6.1 These oil tankers may be designated as "crude oil/product carrier".

2.1.7 *Existing oil tankers* of 40,000 tons deadweight and above*

2.1.7.1 Oil tankers satisfying the requirements for SBT should be designated as "crude oil/product carrier".

2.1.7.2 Oil tankers satisfying the requirements for COW only should be designated as "crude oil tanker".

2.1.7.3 Oil tankers satisfying the requirements for CBT should be designated as "crude oil/product carrier". Such designation should be valid until the expiry date of the IOPP Certificate, which should be H + 2 (see the definition of terms) for oil tankers of 70,000 tons deadweight and above and H + 4 for oil tankers of 40,000 tons deadweight and above but less than 70,000 tons deadweight.

2.1.7.4 After the above expiry date of the certificate, such an oil tanker should be designated as follows:

- .1 if it continues to operate with CBT, the oil tanker should be designated as "product carrier";
- .2 if it is provided with COW *only*, the oil tanker should be designated as "crude oil tanker";
- .3 if it is provided with SBT, the oil tanker should be designated as "crude oil/product carrier"; and
- .4 if it is provided with CBT + COW, the tanker should be designated as "crude oil/product carrier" (see paragraph 4.5 below).

Reg. 5(1)

2.2 *IOPP Certificate for existing oil tankers*

2.2.1 Under regulation 5(1) the issue of the IOPP Certificate to existing ships is not mandatory until twelve months have elapsed after the date of entry into force of MARPOL 73/78. It is, however, advisable for existing oil tankers of 40,000 tons deadweight and above to carry the IOPP Certificate or an appropriate document issued by the Administration upon entry into force of MARPOL 73/78 which can be presented to the control officers at foreign ports or terminals.

2.3 *Validity of IOPP Certificate issued before the entry into force of the Convention*

2.3.1 Where ships are surveyed and IOPP Certificates issued before the entry into force of the Convention, the period of validity of such certificates should be calculated from the date of their issue.

* As defined in regulation 1(27).

2.4 *IOPP Certificate for crude oil/product carriers with CBT and COW*

2.4.1 When an oil tanker with CBT and COW is surveyed for the conversion from a crude oil tanker operating with COW to a product carrier operating with CBT or vice versa (see paragraph 4.5.2.1), another IOPP Certificate should be issued for a period not exceeding the remaining period of validity of the existing certificate, unless the survey is as comprehensive as the periodical survey required by regulation 4(1)(b) (see also paragraph 4.5.2.2).

2.4.2 The endorsement of surveys made on the existing certificate should be recorded on another IOPP Certificate issued as above.

Reg. 7

2.4A *New form of IOPP Certificate or its Supplement*

2.4A.1 In the case where the form of the IOPP Certificate or its Supplement is amended, the existing form of the certificate or supplement which is current when the amendment enters into force may remain valid until the expiry of that certificate, provided that at the first survey after the date of entry into force of the amendment, necessary changes are indicated in the existing certificate or supplement by means of suitable corrections, e.g. striking over the invalid entry and typing the new entry.

Reg. 8

2.5 *Revalidation of an IOPP Certificate*

2.5.1 Where the survey required in regulation 4 of Annex I of MARPOL 73/78 is not carried out within the period specified in that regulation, the IOPP Certificate ceases to be valid. When a survey corresponding to the requisite survey is carried out subsequently, the validity of the certificate may be restored without altering the expiry date of the original certificate and the certificate endorsed to this effect. The thoroughness and stringency of such survey will depend on the period for which the prescribed survey has elapsed and the conditions of the ship.

3 Controls of discharge of oil

Reg. 9(1)

3.1 *Discharges from machinery space bilges of oil tankers*

3.1.1 The wording "from machinery space bilges excluding cargo pump-room bilges of an oil tanker unless mixed with oil cargo residue" in regulation 9(1)(b) should be interpreted as follows:

- .1 Regulation 9(1)(a) applies to:
 - .1.1 discharges of oil or oily mixture from machinery space bilges of oil tankers where mixed with cargo oil residue or when transferred to slop tanks; and
 - .1.2 discharges from cargo pump-room bilges of oil tankers.
- .2 Regulation 9(1)(b) applies to discharges from machinery space bilges of oil tankers other than those referred to above.

3.1.2 The above interpretation should not be construed as relaxing any existing prohibition of piping arrangements connecting the engine-room and slop tanks which may permit cargo to enter the machinery spaces. Any arrangements provided for machinery space bilge discharges into slop tanks should incorporate adequate means to prevent any backflow of liquid cargo or gases into the machinery spaces. Any such arrangements do not constitute a relaxation of the requirements of regulation 16 with respect to oil discharge monitoring and control systems and oily-water separating equipment.

3.2 *Total quantity of discharge*

3.2.1 The phrase “the total quantity of the particular cargo of which the residue formed a part” in regulation 9(1)(a)(v) relates to the total quantity of the particular cargo which was carried on the previous voyage and should not be construed as relating only to the total quantity of cargo which was contained in the cargo tanks into which water ballast was subsequently loaded.

Reg. 9(4) 3.3 *Discharges from ships of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage within 12 miles from the nearest land* [Deleted]

Reg. 10(3) 3.4 *Automatic stopping device required by regulation 10(3) as amended*

3.4.1 Regulation 10(3)(b)(vi) requires a stopping device which will ensure that the discharge is automatically stopped when the oil content of the effluent exceeds 15 ppm. Since, however, this is not a requirement of regulation 16, ships less than 10,000 tons gross tonnage need not be required to be equipped with such stopping device if no effluent from machinery space bilges is discharged within special areas. Conversely, the discharge of effluent within special areas from ships without an automatic stopping device is a contravention of the Convention even if the oil content of the effluent is below 15 ppm.

Reg. 12(2) 3.5 *Adequate reception facilities for substances regulated by regulation 15(7)*

3.5.1 Unloading ports receiving substances regulated by regulation 15(7) (which include *inter alia* high-density oils) should have adequate facilities dedicated for such products, allowing the entire tank-cleaning operation to be carried out in the port, and should have adequate reception facilities for the proper discharge and reception of cargo residues and solvents necessary for the cleaning operations in accordance with paragraph 6.5.2.

4 SBT, CBT, COW and PL requirements

Reg. 13(3) 4.1 *Capacity of SBT*

as amended

4.1.1 For the purpose of application of regulation 13(3)(b), as amended, the following operations of oil tankers are regarded as falling within the category of exceptional cases:

- .1 when combination carriers are required to operate beneath loading or unloading gantries;

- .2 when tankers are required to pass under a low bridge;
- .3 when local port or canal regulations require specific draughts for safe navigation; and
- .4 when loading and unloading arrangements require the tanker to be at a draught deeper than that achieved when all segregated ballast tanks are full.

Reg. 13(4) 4.2 *Application of regulation 13(4) to new oil tankers of 70,000 tons deadweight and above*

4.2.1 New oil tankers referred to in regulation 13(4) should be taken to mean oil tankers constructed or converted after the dates specified in regulation 1(26). It is not therefore mandatory for crude oil tankers of 70,000 tons deadweight and above, built after the date specified in regulation 1(6) but before the date specified in regulation 1(26), to install COW, and such oil tankers are not subject to the provisions of regulation 13(4).

Reg. 13(5) 4.3 *Segregated ballast conditions for oil tankers less than 150 metres in length*

4.3.1 In determining the minimum draught and trim of oil tankers less than 150 metres in length to be qualified as SBT oil tankers, the Administration should follow the guidance set out in appendix 1 hereto.*

4.3.2 The formulae set out in appendix 1 replace those set out in regulation 13(2), and these oil tankers should also comply with the conditions laid down in regulations 13(3) and (4) in order to be qualified as SBT oil tankers.

Reg. 13(8) 4.4 *Capacity of CBT*

4.4.1 For the purposes of determining the capacity of CBT, the following tanks may be included:

- .1 segregated ballast tanks; and
- .2 cofferdams and fore and after peak tanks, provided that they are exclusively used for the carriage of ballast water and are connected with permanent piping to ballast water pumps.

**Reg. 13(9)
13(10)** 4.5 *Existing oil tankers with CBT and COW*

4.5.1 Existing oil tankers which are fitted with CBT and COW and designated as "crude oil/product carriers" in the IOPP Certificate (see paragraph 2.1.7.4.4) should, after the expiry of the date specified in regulation 13(9), operate as follows:

- .1 They should always operate with CBT when carrying crude oil or product oil or both simultaneously, and neither crude oil nor product oil should be carried in dedicated clean ballast tanks; and

* See appendix 1 to Unified Interpretations.

- .2 When carrying crude oil and product oil simultaneously, or only crude oil, they should operate also with COW for sludge control.

4.5.2 If a crude oil tanker operating with COW is to change its designation to a product carrier operating with CBT, or vice versa, the following provisions shall apply:

- .1 If the tanker has *common* piping and pump arrangements for ballast and cargo handling of the CBT, such tanker should be surveyed and a new IOPP Certificate should be issued. Such survey should ensure that cargo oil tanks to be designated as CBT have been thoroughly cleaned and ballast water which CBT will take can be treated as clean ballast as defined in regulation 1(16).
- .2 If the tanker has *separate independent* piping and pump arrangements for ballasting the CBT, the Administration may issue to such a tanker two IOPP Certificates, the tanker being designated "crude oil tanker" on one of the Certificates and "product carrier" on the other. Only one of these Certificates which corresponds to the particular operation of the tanker should be valid at a time, but entries should be made on each of the Certificates in the remarks column as to the existence of the other Certificate. Such tanker need not be surveyed prior to each conversion of trade. When carrying only crude oil such tanker should be allowed to carry crude oil in those tanks which were designated as CBT when carrying product. When carrying only product no cargo should be carried in the CBT. The approved CBT and COW Manuals must include a chapter describing procedures necessary for the conversion from crude oil service to product service and vice versa.

Reg. 13

4.6 *Oil tankers used for the storage of oil*

4.6.1 When an oil tanker is used as a floating storage unit (FSU) or floating production storage and offloading facility (FPSO) which is used solely for the storage or storage and production of oil and is moored on a fixed location except in extreme environmental or emergency conditions, such a unit is not required to comply with the provisions of regulations 13 to 13G, unless as specified in whole or in part by the coastal State.

4.6.2 When an oil tanker is used as a floating facility to receive dirty ballast discharged from oil tankers, such a tanker is not required to comply with the provisions of regulations 13 to 13G.

Reg. 13A(3)

4.7 *Installation of oil content meter for CBT tankers*

4.7.1 The phrase "first scheduled shipyard visit" in regulation 13A(3) should be interpreted to mean that the oil content meter must be installed not later than at the first scheduled shipyard visit when cargo tanks are gas freed and in any case not later than three

years after the date of entry into force of MARPOL 73/78 as required by regulation 15(1).

4.7.2 It should be noted that ships built after the dates specified in regulation 1(6) but before the dates specified in regulation 1(26) are treated as new ships as far as the application of regulation 15(3) is concerned. Consequently these ships must be fitted with the required oil discharge monitoring and control systems upon entry into force of the Convention.

4.8 *CBT oil content meter*

4.8.1 The discharge of ballast from the dedicated clean ballast tanks should be continuously monitored (but not necessarily recorded) by the oil content meter required by regulation 13A(3) so that the oil content, if any, in the ballast water can be observed from time to time. This oil content meter is not required to come into operation automatically.

Reg. 13B

4.9 *COW system fitted voluntarily*

4.9.1 A COW system fitted on an oil tanker as an addition to the requirements of MARPOL 73/78 should at least comply with those provisions of the revised COW Specifications relating to safety.

Reg. 13E

4.10 *Application of PL requirements to oil tankers of 70,000 tons deadweight and above*

4.10.1 Oil tankers of 70,000 tons deadweight and above built after the dates specified in regulation 1(6) but before the dates specified in regulation 1(26) must be provided with SBT but they need not be protectively located in accordance with regulation 13E.

4.11 *Protective location of SBT*

4.11.1 The measurement of the minimum width of wing tanks and of the minimum vertical depth of double bottom tanks should be taken and value of protective areas (PA_c and PA_s) should be calculated in accordance with the Interim Recommendation for a Unified Interpretation of regulation 13E – Protective Location of Segregated Ballast Spaces – set out in appendix 2 hereto.*

4.11.2 Ships being built in accordance with this interpretation should be regarded as meeting the requirements of regulation 13E and would not need to be altered if different requirements were to result from a later interpretation.

4.11.3 If, in the opinion of the Administration, any oil tanker the keel of which was laid or which was at a similar stage of construction before 1 July 1980 complies with the requirements of regulation 13E without taking into account the above Interim Recommendation, the Administration may accept such tanker as complying with regulation 13E.

* See appendix 2 to Unified Interpretations.

Reg. 13F(3)(d) 4.12 *Aggregate capacity of ballast tanks*

4.12.1 Any ballast carried in localized inboard extensions, indentations or recesses of the double hull, such as bulkhead stools, should be excess ballast above the minimum requirement for segregated ballast capacity according to regulation 13 of Annex I of MARPOL 73/78.

4.12.2 In calculating the aggregate capacity under regulation 13F(3)(d), the following should be taken into account:

- .1 the capacity of engine-room ballast tanks should be excluded from the aggregate capacity of ballast tanks;
- .2 the capacity of ballast tank located inboard of double hull should be excluded from the aggregate capacity of ballast tanks (see figure 1).

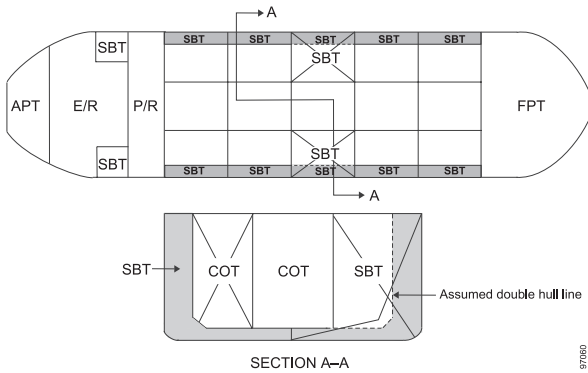


Figure 1

- .3 spaces such as void spaces located in the double hull within the cargo tank length should be included in the aggregate capacity of ballast tanks (see figure 2).

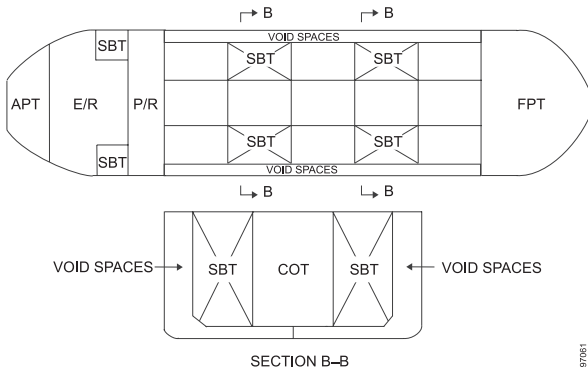


Figure 2

Reg. 13G(4) 4.13 *Wing tanks and double bottom spaces of existing oil tankers used for water ballast*

4.13.1 If the wing tanks and double bottom tanks referred to in regulation 13G(4) are used for water ballast, the ballast arrangement should at least be in compliance with the Revised Specifications for Oil Tankers with Dedicated CBT (resolution A.495(XII)).*

5 Fuel oil

Reg. 14(2) 5.1 *Large quantities of oil fuel*

5.1.1 The phrase "large quantities of oil fuel" in regulation 14(2) was formulated in drafting MARPOL 73/78 to take account of those ships which are required to stay at sea for extended periods because of the particular nature of their operation and trade. Under the circumstances considered these ships would be required to fill their empty oil fuel tanks with water ballast in order to maintain sufficient stability and safe navigation conditions.

5.1.2 Such ships may include *inter alia* certain large fishing vessels or ocean-going tugs. Certain other types of ships which for reasons of safety, such as stability, may be required to carry ballast in oil fuel tanks may also be included in this category.

Reg. 14(3) 5.2 *Application of regulation 14(3)*

5.2.1 The phrase "all other ships" in regulation 14(3) should include:

- .1 new ships other than oil tankers of less than 4,000 tons gross tonnage;
- .2 new oil tankers of less than 150 tons gross tonnage; and
- .3 all existing ships irrespective of tonnage.

5.2.2 When the separation of oil fuel tanks and water ballast tanks is unreasonable or impracticable for ships mentioned in paragraph 5.2.1 above, ballast water may be carried in oil fuel tanks, provided that such ballast water is discharged into the sea in compliance with regulation 9(1)(b), 10(2) or 10(3) or into reception facilities in compliance with regulation 10(4).

6 Retention of oil on board

Reg. 1(4)
15(2)
15(3)(b) 6.1 *Equivalent provisions for the carriage of oil by a chemical tanker*

6.1.1 Under regulation 1(4) of Annex I of MARPOL 73/78 any chemical tanker when carrying a cargo or part cargo of oil in bulk is defined as an oil tanker and consequently must comply with the requirements of Annex I applicable to oil tankers. Such a tanker, if it is impracticable for it to be provided with slop tank arrangements in

* See IMO sales publication IMO-619E.

compliance with regulation 15(2) and oil/water interface detectors in accordance with regulation 15(3)(b), should comply with the equivalent provisions set out in appendix 3.*

**Reg. 15(2)(c)
as amended**

6.2 *Tanks with smooth walls*

6.2.1 The term “tanks with smooth walls” should be taken to include the main cargo tanks of oil/bulk/ore carriers which may be constructed with vertical framing of a small depth. Vertically corrugated bulkheads are considered smooth walls.

Reg. 15(3)(b)

6.3 *Oil/water interface detectors*

6.3.1 In the case of existing tankers, the oil/water interface detector referred to in regulation 15(3)(b) should be provided no later than on the date of entry into force of MARPOL 73/78.

**Reg. 15(5)
16(3)(a)**

6.4 *Conditions for waiver*

6.4.1 The International Oil Pollution Prevention Certificate, when required, should contain sufficient information to permit the port State to determine if the ship complies with the waiver conditions regarding the phrase “restricted voyages as determined by the Administration”. This may include a list of ports, the maximum duration of the voyage between ports having reception facilities, or similar conditions as established by the Administration.

Reg. 15(5)

6.4.1A The time limitation “of 72 hours or less in duration” in regulation 15(5)(b)(ii)(2) should be counted:

- (a) from the time the tanker leaves the special area, when a voyage starts within a special area, or
- (b) from the time the tanker leaves a port situated outside the special area to the time the tanker approaches a special area.

6.4.2 The phrase “all oily mixtures” in regulation 15(5)(a) and 15(5)(b)(ii)(3) includes all ballast water and tank washing residues from cargo oil tanks.

Reg. 15(7)

6.5 *Annex I substances which through their physical properties inhibit effective product/water separation and monitoring*

6.5.1 The Government of the receiving Party should establish appropriate measures in order to ensure that the provisions of 6.5.2 are complied with.

6.5.2 A tank which has been unloaded should, subject to the provisions of 6.5.3, be washed and all contaminated washings should be discharged to a reception facility before the ship leaves the port of unloading for another port.

* See appendix 3 to Unified Interpretations.

6.5.3 At the request of the ship's master, the Government of the receiving Party may exempt the ship from the requirements referred to in 6.5.2, where it is satisfied that:

- .1 the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tanker will not be washed or ballasted prior to loading;
- .2 the tank unloaded is neither washed nor ballasted at sea if the ship is to proceed to another port unless it has been confirmed in writing that a reception facility at that port is available and adequate for the purpose of receiving the residues and solvents necessary for the cleaning operations.

6.5.4 An exemption referred to in 6.5.3 should only be granted by the Government of the receiving Party to a ship engaged in voyages to ports or terminals under the jurisdiction of other Parties to the Convention. When such an exemption has been granted it should be certified in writing by the Government of the receiving Party.

6.5.5 In the case of ships retaining their residues on board and proceeding to ports or terminals under the jurisdiction of other Parties to the Convention, the Government of the receiving Party is advised to inform the next port of call of the particulars of the ship and cargo residues, for their information and appropriate action for the detection of violations and enforcement of the Convention.

7 Oil discharge monitoring and control system and oil filtering equipment

Reg. 16(1)

7.1 *Control of discharge of ballast water from oil fuel tanks*

7.1.1 The second sentence of regulation 16(1) should be interpreted as follows:

- .1 Any ship of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage:
 - .1.1 which does not carry water ballast in oil fuel tanks should be fitted with 15 ppm oil filtering equipment for the control of discharge of machinery space bilges;
 - .1.2 which carries water ballast in oil fuel tanks should be fitted with the equipment required by regulation 16(2) for the control of machinery space bilges and dirty ballast water from oil fuel tanks. Ships on which it is not reasonable to fit this equipment should retain on board dirty ballast water from oil fuel tanks and discharge it to reception facilities.

7.1.2 The above equipment should be of adequate capacity to deal with the quantities of effluent to be discharged.

- Reg. 16(1) 7.2 *Oil filtering equipment*
16(2) 7.2.1 Oil filtering equipment referred to in regulation 16(1) and 16(2) may include any combination of a separator, filter or coalescer and also a single unit designed to produce an effluent with oil content not exceeding 15 ppm.
- Reg. 16(3)(a) 7.3 *Waivers for restricted voyages*
7.3.1 The International Oil Pollution Prevention Certificate, when required, should contain sufficient information to permit the port State to determine if the ship complies with the waiver conditions regarding the phrase "restricted voyages as determined by the Administration". This may include a list of ports, the maximum duration of the voyage between ports having reception facilities, or similar conditions as established by the Administration.
- Reg. 16(6) 7.4 *Automatic stopping device for existing ships having operated with 15 ppm oil filtering equipment*
7.4.1 The requirements for the fitting of an automatic stopping device under regulation 16(2) need not be applied to existing ships until 6 July 1998, if such ships are fitted with 15 ppm oil filtering equipment.

8 Sludge tanks

- Reg. 17(1) 8.1 *Capacity of sludge tanks*
8.1.1 To assist Administrations in determining the adequate capacity of sludge tanks, the following criteria may be used as guidance. These criteria should not be construed as determining the amount of oily residues which will be produced by the machinery installation in a given period of time. The capacity of sludge tanks may, however, be calculated upon any other reasonable assumptions. For a ship the keel of which is laid or which is at a similar stage of construction on or after 31 December 1990, the guidance given in items .4 and .5 below should be used in lieu of the guidance contained in items .1 and .2.
- .1 For ships which do not carry ballast water in oil fuel tanks, the minimum sludge tank capacity (V_1) should be calculated by the following formula:
$$V_1 = K_1CD \text{ (m}^3\text{)}$$
where: $K_1 = 0.01$ for ships where heavy fuel oil is purified for main engine use, or 0.005 for ships using diesel oil or heavy fuel oil which does not require purification before use,
 $C =$ daily fuel oil consumption (metric tons),
 $D =$ maximum period of voyage between ports where sludge can be discharged ashore (days). In the absence of precise data a figure of 30 days should be used.

- .2 When such ships are fitted with homogenizers, sludge incinerators or other recognized means on board for the control of sludge, the minimum sludge tank capacity (V_1) should, in lieu of the above, be:
 $V_1 = 1 \text{ m}^3$ for ships of 400 tons gross and above but less than 4,000 tons gross tonnage, or 2 m^3 for ships of 4,000 tons gross tonnage and above.
- .3 For ships which carry ballast water in fuel oil tanks, the minimum sludge tank capacity (V_2) should be calculated by the following formula:
 $V_2 = V_1 + K_2B \text{ (m}^3\text{)}$
where: V_1 = sludge tank capacity specified in .1 or .2 above,
 $K_2 = 0.01$ for heavy fuel oil bunker tanks, or 0.005 for diesel oil bunker tanks,
 B = capacity of water ballast tanks which can also be used to carry oil fuel (metric tons).
- .4 For ships which do not carry ballast water in fuel oil tanks, the minimum sludge tank capacity (V_1) should be calculated by the following formula:
 $V_1 = K_1CD \text{ (m}^3\text{)}$
where: $K_1 = 0.015$ for ships where heavy fuel oil is purified for main engine use or 0.005 for ships using diesel oil or heavy fuel oil which does not require purification before use,
 C = daily fuel oil consumption (m^3),
 D = maximum period of voyage between ports where sludge can be discharged ashore (days). In the absence of precise data a figure of 30 days should be used.
- .5 For ships fitted with homogenizers, sludge incinerators or other recognized means on board for the control of sludge, the minimum sludge tank capacity should be:
- .5.1 50% of the value calculated according to item .4 above;
or
- .5.2 1 m^3 for ships of 400 gross tonnage and above but less than 4,000 gross tonnage or 2 m^3 for ships of 4,000 gross tonnage and above;
whichever is the greater.

8.1.2 Administrations should establish that in a ship the keel of which is laid or which is at a similar stage of construction on or after 31 December 1990, adequate tank capacity, which may include the sludge tank(s) referred to under 8.1.1 above, is available also for leakage, drain and waste oils from the machinery installations. In

existing installations this should be taken into consideration as far as reasonable and practicable.

Reg. 17(2) 8.2 *Cleaning of sludge tanks and discharge of residues*

8.2.1 To assist Administrations in determining the adequacy of the design and construction of sludge tanks to facilitate their cleaning and the discharge of residues to reception facilities, the following guidance is provided, having effect on ships the keel of which is laid or which is at a similar stage of construction on or after 31 December 1990:

- .1 sufficient man-holes should be provided such that, taking into consideration the internal structure of the sludge tanks, all parts of the tank can be reached to facilitate cleaning;
- .2 sludge tanks in ships operating with heavy oil, that needs to be purified for use, should be fitted with adequate heating arrangements or other suitable means to facilitate the pumpability and discharge of the tank content;
- .3 there should be no interconnections between the sludge tank discharge piping and bilge-water piping other than possible common piping leading to the standard discharge connection referred to in regulation 19. However, arrangements may be made for draining of settled water from the sludge tanks by means of manually operated self-closing valves or equivalent arrangements; and
- .4 the sludge tank should be provided with a designated pump for the discharge of the tank content to reception facilities. The pump should be of a suitable type, capacity and discharge head, having regard to the characteristics of the liquid being pumped and the size and position of tank(s) and the overall discharge time.

Reg. 17(3) 8.3 *Overboard connection of sludge tanks*

8.3.1 Ships with existing installations having piping to and from sludge tanks to overboard discharge outlets, other than the standard discharge connection referred to in regulation 19, may comply with regulation 17(3) by the installation of blanks in this piping.

9 Pumping and piping arrangements

Reg. 18(2) 9.1 *Piping arrangements for discharge above the waterline*
as amended

9.1.1 Under regulation 18(2), pipelines for discharge to the sea above the waterline must be led either:

- .1 to a ship's discharge outlet located above the waterline in the deepest ballast condition; or
- .2 to a midship discharge manifold or, where fitted, a stern or bow loading/discharge facility above the upper deck.

9.1.2 The ship's side discharge outlet referred to in 9.1.1.1 should be so located that its lower edge will not be submerged when the ship carries the maximum quantity of ballast during its ballast voyages, having regard to the type and trade of the ship. The discharge outlet located above the waterline in the following ballast condition will be accepted as complying with this requirement:

- .1 on oil tankers not provided with SBT or CBT, the ballast condition when the ship carries both normal departure ballast and normal clean ballast simultaneously;
- .2 on oil tankers provided with SBT or CBT, the ballast condition when the ship carries ballast water in segregated or dedicated clean ballast tanks, together with additional ballast in cargo oil tanks in compliance with regulation 13(3).

9.1.3 The Administration may accept piping arrangements which are led to the ship's side discharge outlet located above the departure ballast waterline but not above the waterline in the deepest ballast condition, if such arrangements have been fitted before 1 January 1981.

9.1.4 Although regulation 18(2) does not preclude the use of the facility referred to in 9.1.1.2 for the discharge of ballast water, it is recognized that the use of this facility is not desirable, and it is strongly recommended that ships be provided with either the side discharge outlets referred to in 9.1.1.1 or the part flow arrangements referred to in regulation 18(6)(e).

**Reg. 18(4)(b)
as amended**

9.2 *Small diameter line*

9.2.1 For the purpose of application of regulation 18(4)(b), the cross-sectional area of the small diameter line should not exceed:

- .1 10% of that of a main cargo discharge line for new oil tankers or existing oil tankers not already fitted with a small diameter line; or
- .2 25% of that of a main cargo discharge line for existing oil tankers already fitted with such a line.

(See paragraph 4.4.5 of the revised COW Specifications contained in resolution A.446(XI)).*

Reg. 18(4)(b)

9.3 *Connection of small diameter line to the manifold valve*

9.3.1 The phrase "connected outboard of" with respect to the small diameter line for discharge ashore should be interpreted to mean a connection on the downstream side of the tanker's deck manifold valves, both port and starboard, when the cargo is being discharged.

This arrangement would permit drainage back from the tanker's cargo lines to be pumped ashore with the tanker's manifold valves

* See IMO sales publication IMO-617E.

closed through the same connections as for main cargo lines (see the sketch shown in appendix 4).*

Reg. 18(6)(e)(ii) as amended

9.4 *Part flow system specifications*

9.4.1 The Specifications for the Design, Installation and Operation of a Part Flow System for Control of Overboard Discharges referred to in regulation 18(6)(e)(ii) is set out in appendix 5.†

10 Requirements for drilling rigs and other platforms

Reg. 21 Art. 2(3)(b)(ii)

10.1 *Application of MARPOL 73/78*

10.1.1 There are four categories of discharges associated with the operation of offshore platforms when engaged in the exploration and exploitation of mineral resources, i.e.:

- .1 machinery space drainage;
- .2 offshore processing drainage;
- .3 production water discharge; and
- .4 displacement discharge.

Only the discharge of machinery space drainage should be subject to MARPOL 73/78.‡

10.1.2 When an oil tanker is used as a floating storage unit (FSU) or floating production storage and offloading facility (FPSO) referred to in Unified Interpretation 4.6.1 it is to be regarded as an “other platform” for the purpose of the discharge requirements of regulation 21.

11 Tank size limitation and damage stability

Reg. 22(1)(b)

11.1 *Bottom damage assumptions*

11.1.1 When applying the figures for bottom damage within the forward part of the ship as specified in regulation 22(1)(b) for the purpose of calculating both oil outflow and damage stability, 0.3L from the forward perpendicular should be the aftermost point of the extent of damage.

Reg. 23

11.2 *Hypothetical oil outflow for combination carriers*

11.2.1 For the purpose of calculation of the hypothetical oil outflow for combination carriers:

- .1 the volume of a cargo tank should include the volume of the hatchway up to the top of the hatchway coamings, regardless of the construction of the hatch, but may not include the volume of any hatch cover; and

* See appendix 4 to Unified Interpretations.

† See appendix 5 to Unified Interpretations.

‡ See appendix 6 to Unified Interpretations.

- .2 for the measurement of the volume to moulded lines, no deduction should be made for the volume of internal structures.

Reg. 23(1)(b) 11.3 *Calculation of hypothetical oil outflow*

11.3.1 In a case where the width b_i is not constant along the length of a particular wing tank, the smallest b_i value in the tank should be used for the purposes of assessing the hypothetical outflows of oil O_c and O_s .

Reg. 25(1) 11.4 *Operating draught*

11.4.1 With regard to the term "any operating draught reflecting actual partial or full load conditions", the information required should enable the damage stability to be assessed under conditions the same as or similar to those under which the ship is expected to operate.

Reg. 25(2) 11.5 *Suction wells*

11.5.1 For the purpose of determining the extent of assumed damage under regulation 25(2), suction wells may be neglected, provided such wells are not excessive in area and extend below the tank for a minimum distance and in no case more than half the height of the double bottom.

Reg. 25A(2) **11A Intact stability**

11.5.1 The vessel should be loaded with all cargo tanks filled to a level corresponding to the maximum combined total of vertical moment of volume plus free surface inertia moment at 0° heel, for each individual tank. Cargo density should correspond to the available cargo deadweight at the displacement at which transverse KM reaches a minimum value, assuming full departure consumables and 1% of the total water ballast capacity. The maximum free surface moment should be assumed in all ballast tanks. For the purpose of calculating GM_c , liquid free surface corrections should be based on the appropriate upright free surface inertia moment. The righting lever curve may be corrected on the basis of liquid transfer moments.

12 Shipboard oil pollution emergency plan

Reg. 26(1) 12.1 *Definition of new ships*

12.1.1 The phrase "ships built" referred to in the last sentence of regulation 26(1) should be taken to mean "ships delivered".

12.2 *Equivalent provision for application of requirement for oil pollution emergency plans*

12.2.1 Any fixed or floating drilling rig or other offshore installation when engaged in the exploration, exploitation or associated offshore processing of sea-bed mineral resources, which has an oil pollution emergency plan co-ordinated with, and approved in accordance with procedures established by, the coastal State, should be regarded as complying with regulation 26.

Appendices to Unified Interpretations of Annex I

Appendix 1

Guidance to Administrations concerning draughts recommended for segregated ballast tankers below 150 m in length

Introduction

1 Three formulations are set forth as guidance to Administrations concerning minimum draught requirements for segregated ballast tankers below 150 m in length.

2 The formulations are based both on the theoretical research and surveys of actual practice on tankers of differing configuration reflecting varying degrees of concern with propeller emergence, vibration, slamming, speed loss, rolling, docking and other matters. In addition, certain information concerning assumed sea conditions is included.

3 Recognizing the nature of the underlying work, the widely varying arrangement of smaller tankers and each vessel's unique sensitivity to wind and sea conditions, no basis for recommending a single formulation is found.

Caution

4 It must be cautioned that the information presented should be used as general guidance for Administrations. With regard to the unique operating requirements of a particular vessel, the Administration should be satisfied that the tanker has sufficient ballast capacity for safe operation. In any case the stability should be examined independently.

5 *Formulation A*

.1 mean draught (m) = $0.200 + 0.032L$

.2 maximum trim = $(0.024 - 6 \times 10^{-5}L)L$

6 These expressions were derived from a study of 26 tankers ranging in length from 50 to 150 m. The draughts, in some cases, were abstracted from ship's trim and stability books and represent departure ballast conditions. The ballast conditions represent sailing conditions in weather up to and including Beaufort 5.

7 *Formulation B*

.1 minimum draught at bow (m) = $0.700 + 0.0170L$

Appendices to Unified Interpretations of Annex I

.2 minimum draught at stern (m) = $2.300 + 0.030L$

or

.3 minimum mean draught (m) = $1.550 + 0.023L$

.4 maximum trim = $1.600 + 0.013L$

8 These expressions resulted from investigations based on theoretical research, model and full scale tests. These formulae are based on a Sea 6 (International Sea Scale).

9 *Formulation C*

.1 minimum draught aft (m) = $2.0000 + 0.0275L$

.2 minimum draught forward (m) = $0.5000 + 0.0225L$

10 These expressions provide for certain increased draughts to aid in the prevention of propeller emergence and slamming in higher length ships.

Appendix 2

Interim recommendation for a unified interpretation of regulation 13E

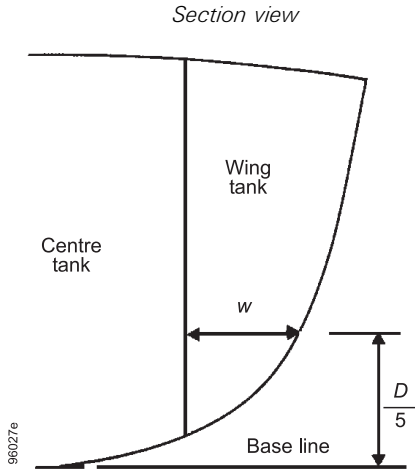
1 Regulation 13E(4) of Annex I of MARPOL 73/78 relating to the measurement of the 2 m minimum width of wing tanks and the measurement of the minimum vertical depth of double bottom tanks of 2 m or $B/15$ in respect of tanks at the ends of the ship where no identifiable bilge area exists should be interpreted as given hereunder. No difficulty exists in the measurement of the tanks in the parallel middle body of the ship where the bilge area is clearly identified. The regulation does not explain how the measurements should be taken.

2 The minimum width of wing tanks should be measured at a height of $D/5$ above the base line providing a reasonable level above which the 2 m width of collision protection should apply, under the assumption that in all cases $D/5$ is above the upper turn of bilge amidships (see figure 1). The minimum height of double bottom tanks should be measured at a vertical plane measured $D/5$ inboard from the intersection of the shell with a horizontal line $D/5$ above the base line (see figure 2).

3 The PA_c value for a wing tank which does not have a minimum width of 2 m throughout its length would be zero; no credit should be given for that part of the tank in which the minimum width is in excess of 2 m. No credit should be given in the assessment of PA_s to any double bottom tank, part of which does not meet the minimum depth requirements anywhere within its length. If, however, the projected dimensions of the bottom of the cargo tank above the double bottom fall entirely within the area of the double bottom tank or space which meets the minimum height requirement and provided the side bulkheads bounding the cargo tank above are vertical or have a slope of not more than 45° from the vertical, credit may be given to the part of the double bottom tank defined by the projection of the cargo tank bottom. For similar cases where the wing tanks above the double bottom are segregated ballast tanks or void spaces, such credit may also be given. This would not, however, preclude in the above cases credit being given to a PA_s value in the first case and to a PA_c value in the second case where the respective vertical or horizontal protection complies with the minimum distances prescribed in regulation 13E(4).

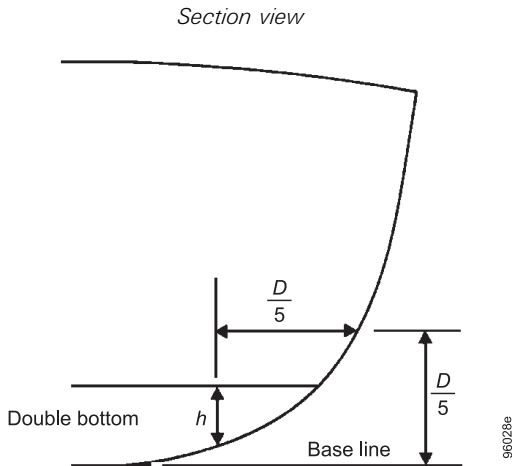
4 Projected dimensions should be used as shown in examples of figures 3 to 8. Figures 7 and 8 represent measurement of the height for the calculation of PA_c for double bottom tanks with sloping tank top. Figures 9 and 10 represent the cases where credit is given in calculation of PA_s to part or the whole of a double bottom tank.

Figure 1 – Measurement of minimum width of wing ballast tank at ends of ship



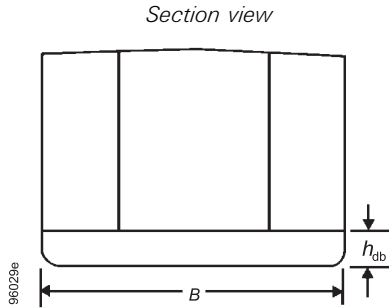
w must be at least 2 metres along the entire length of the tank for the tank to be used in the calculation of PA_c

Figure 2 – Measurement of minimum height of double bottom tank at ends of ship



h must be at least 2 metres or $\frac{B}{15}$, whichever is less, along the entire length of the tank for the tank to be used in the calculation of PA_s

Figure 3 – Calculation of PA_c and PA_s for double bottom tank amidships



If h_{db} is at least 2 metres or $\frac{B}{15}$, whichever is less, along entire tank length,

$$PA_c = h_{db} \times \text{double bottom tank length} \times 2$$

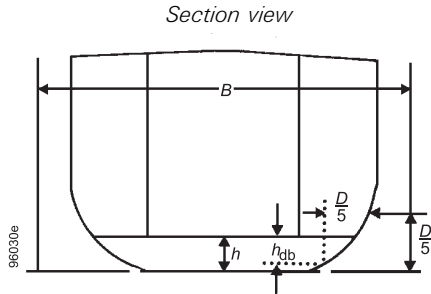
$$PA_s = B \times \text{double bottom tank length}$$

If h_{db} is less than 2 metres or $\frac{B}{15}$, whichever is less,

$$PA_c = h_{db} \times \text{double bottom tank length} \times 2$$

$$PA_s = 0$$

Figure 4 – Calculation of PA_c and PA_s for double bottom tank at ends of ship



If h_{db} is at least 2 metres or $\frac{B}{15}$, whichever is less, along entire tank length,

$$PA_c = h \times \text{double bottom tank length} \times 2$$

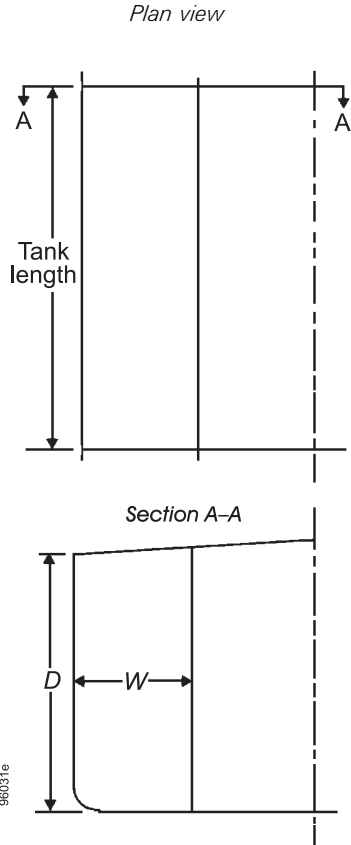
$$PA_s = B \times \text{double bottom tank length}$$

If h_{db} is less than 2 metres or $\frac{B}{15}$, whichever is less,

$$PA_c = h \times \text{double bottom tank length} \times 2$$

$$PA_s = 0$$

Figure 5 - Calculation of PA_c and PA_s for wing tank amidships



If W is 2 metres or more,

$$PA_c = D \times \text{tank length} \times 2^*$$

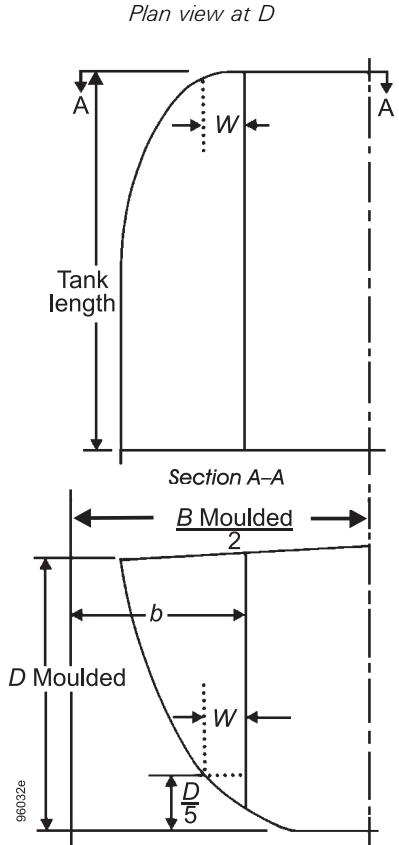
$$PA_s = W \times \text{tank length} \times 2^*$$

If W is less than 2 metres,

$$PA_c = 0$$

$$PA_s = W \times \text{tank length} \times 2^*$$

Figure 6 - Calculation of PA_c and PA_s for wing tank at end of ship



If W is 2 metres or more,

$$PA_c = D \times \text{tank length} \times 2^*$$

$$PA_s = b \times \text{tank length} \times 2^*$$

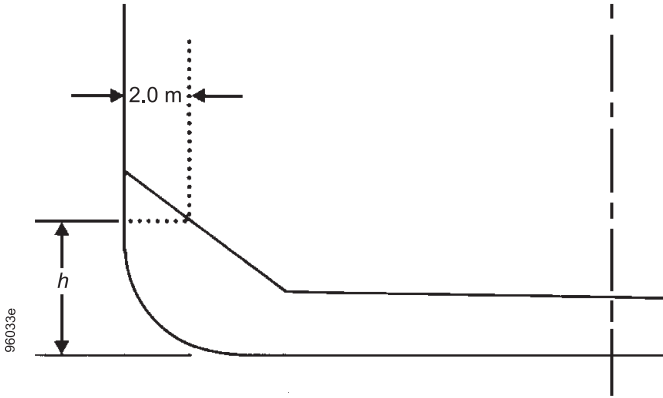
If W is less than 2 metres,

$$PA_c = 0$$

$$PA_s = b \times \text{tank length} \times 2^*$$

Figure 7 – Measurement of h for calculation of PA_c for double bottom tanks with sloping tank tops (1)

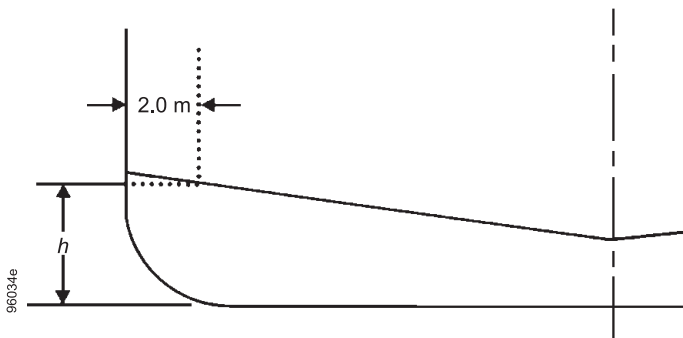
Section view



$$PA_c = h \times \text{double bottom tank length} \times 2^*$$

Figure 8 – Measurement of h for calculation of PA_c for double bottom tanks with sloping tank tops (2)

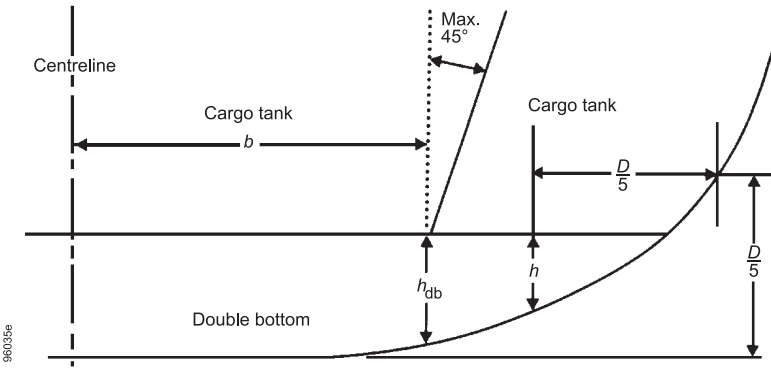
Section view



$$PA_c = h \times \text{double bottom tank length} \times 2^*$$

* To include port and starboard.

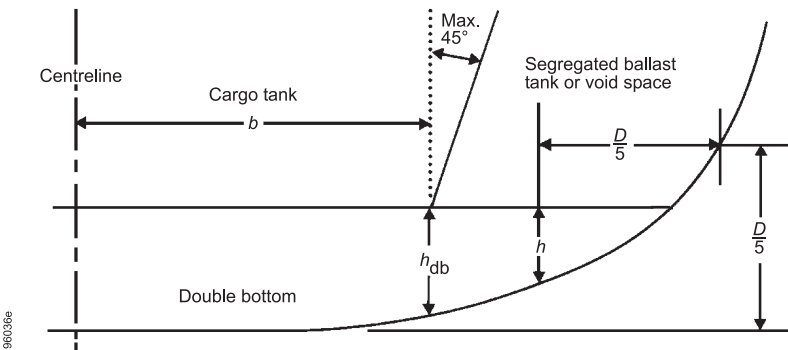
Figure 9 – Calculation of PA_s for double bottom tank without clearly defined turn of bilge area – when wing tank is cargo tank



If h is less than 2 metres or $\frac{B}{15}$, whichever is less, anywhere along the tank length, but h_{db} is at least 2 metres or $\frac{B}{15}$, whichever is less, along the entire tank length within the width of $2b$, then:

$$PA_s = 2b \times \text{cargo tank length}$$

Figure 10 – Calculation of PA_s for double bottom tank without clearly defined turn of bilge area – when wing tank is segregated ballast tank or void space



If h is less than 2 metres or $\frac{B}{15}$, whichever is less, anywhere along the tank length, but h_{db} is at least 2 metres or $\frac{B}{15}$, whichever is less, along the entire tank length within the width of $2b$, then:

$$PA_s = B \times \text{cargo tank length}$$

Appendix 3

Equivalent provisions for the carriage of oil by a chemical tanker*

1 By implication regulation 1(4) of Annex I of MARPOL 73/78 prescribes that where a cargo subject to the provisions of Annex I of MARPOL 73/78 is carried in a cargo space of a chemical tanker, the appropriate requirements of Annex I of MARPOL 73/78 shall apply. For the purposes of application of such requirements, a chemical tanker when carrying oil, if it is impracticable to comply with the requirements of regulation 15(2) and 15(3)(b), shall comply with the following equivalent provisions in accordance with regulation 3 of Annex I.

2 A chemical tanker shall hold a valid Certificate of Fitness issued under the provision of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.

3 A chemical tanker shall be fitted within the cargo tank area with the following equipment:

- .1 oily-water separating equipment capable of producing effluent with oil content of less than 100 ppm, complying with the requirements of regulation 16(6) which has been demonstrated to be suitable for the full range of Annex I products and with a minimum capacity as shown in the table below:

Deadweight tons	Capacity of separating equipment (m ³ /h)
Less than 2,000	5
2,000 and above but less than 5,000	7.5
5,000 and above but less than 10,000	10
10,000 and above	deadweight/1000

- .2 permanently installed transfer pump for overboard discharge of effluent containing oil through the oily-water separating equipment, with a capacity not exceeding the capacity of the separating equipment;
- .3 holding tank of sufficient capacity for the separated oil and with the means for discharge of such oil to reception facilities. The holding tank capacity shall be at least equal to the total quantity of residues remaining in the cargo tanks after unloading as determined by the methods prescribed in appendix A of the Standards for Procedures and Arrangements for the Discharge of Noxious Liquid Substances; and
- .4 a collecting tank for collecting tank washings. Any cargo tank may be designated as a collecting tank.

* The 1992 amendments to regulation 16, adopted by the Marine Environment Protection Committee by resolution MEPC.51(32), have effectively made some contents of paragraphs 3 and 4 of this appendix invalid. Therefore, this appendix is subject to future amendment by the MEPC.

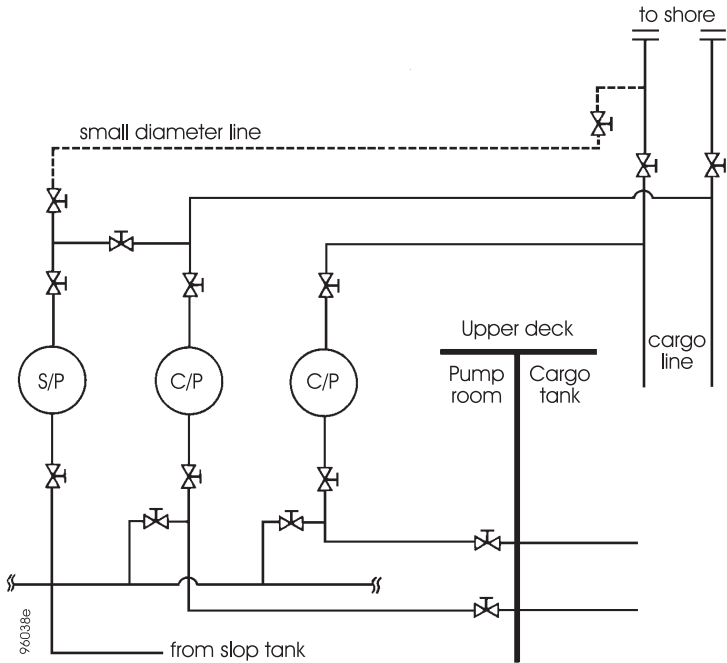
Appendices to Unified Interpretations of Annex I

4 The equipment referred to in paragraph 3.1 shall be of the type approved under the terms of resolution A.393(X).

5 The outlet for the overboard discharge of the effluent from the oily-water separating equipment shall be located above the waterline in the deepest loaded conditions.

Appendix 4

Connection of small diameter line to the manifold valve



Appendix 5

Specifications for the design, installation and operation of a part flow system for control of overboard discharges

1 Purpose

1.1 The purpose of these Specifications is to provide specific design criteria and installation and operational requirements for the part flow system referred to in regulation 18(6)(e) of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

2 Application

2.1 Existing oil tankers may, in accordance with regulation 18(6)(e) of Annex I of MARPOL 73/78, discharge dirty ballast water and oil contaminated water from cargo tank areas below the waterline, provided that a part of the flow is led through permanent piping to a readily accessible location on the upper deck or above where it may be visually observed during the discharge operation and provided that the arrangements comply with the requirements established by the Administration which shall at least contain all the provisions of these Specifications.

2.2 The part flow concept is based on the principle that the observation of a representative part flow of the overboard effluent is equivalent to observing the entire effluent stream. These specifications provide the details of the design, installation and operation of a part flow system.

3 General provisions

3.1 The part flow system shall be so fitted that it can effectively provide a representative sample of the overboard effluent for visual display under all normal operating conditions.

3.2 The part flow system is in many respects similar to the sampling system for an oil discharge monitoring and control system but shall have pumping and piping arrangements separate from such a system, or combined equivalent arrangements acceptable to the Administration.

3.3 The display of the part flow shall be arranged in a sheltered and readily accessible location on the upper deck or above, approved by the Administration (e.g. the entrance to the pump-room). Regard should be given to effective communication between the location of the part flow display and the discharge control position.

3.4 Samples shall be taken from relevant sections of the overboard discharge piping and be passed to the display arrangement through a permanent piping system.

3.5 The part flow system shall include the following components:

- .1 sampling probes;

- .2 sample water piping system;
 - .3 sample feed pump(s);
 - .4 display arrangements;
 - .5 sample discharge arrangements; and, subject to the diameter of the sample piping,
 - .6 flushing arrangement.
- 3.6 The part flow system shall comply with the applicable safety requirements.

4 System arrangement

4.1 Sampling points

4.1.1 Sampling point location:

- .1 Sampling points shall be so located that relevant samples can be obtained of the effluent being discharged through outlets below the waterline which are used for operational discharges.
- .2 Sampling points shall as far as practicable be located in pipe sections where a turbulent flow is normally encountered.
- .3 Sampling points shall as far as practicable be arranged in accessible locations in vertical sections of the discharge piping.

4.1.2 Sampling probes:

- .1 Sampling probes shall be arranged to protrude into the pipe a distance of about one fourth of the pipe diameter.
- .2 Sampling probes shall be arranged for easy withdrawal for cleaning.
- .3 The part flow system shall have a stop valve fitted adjacent to each probe, except that where the probe is mounted in a cargo line, two stop valves shall be fitted in series, in the sample line.
- .4 Sampling probes should be of corrosion-resistant and oil-resistant material, of adequate strength, properly jointed and supported.
- .5 Sampling probes shall have shape that is not prone to becoming clogged by particle contaminants and should not generate high hydrodynamic pressures at the sampling probe tip. Figure 1 is an example of one suitable shape of a sampling probe.
- .6 Sampling probes shall have the same nominal bore as the sample piping.

4.2 Sample piping

- .1 The sample piping shall be arranged as straight as possible between the sampling points and the display arrangement. Sharp bends and pockets where settled oil or sediment may accumulate should be avoided.
- .2 The sample piping shall be so arranged that sample water is conveyed to the display arrangement within 20 s. The flow velocity in the piping should not be less than 2 m/s.

- .3 The diameter of the piping shall not be less than 40 mm if no fixed flushing arrangement is provided and shall not be less than 25 mm if a pressurized flushing arrangement as detailed in paragraph 4.4 is installed.
- .4 The sample piping should be of corrosion-resistant and oil-resistant material, of adequate strength, properly jointed and supported.
- .5 Where several sampling points are installed, the piping shall be connected to a valve chest at the suction side of the sample feed pump.

4.3 Sample feed pump

- .1 The sample feed pump capacity shall be suitable to allow the flow rate of the sample water to comply with 4.2.2.

4.4 Flushing arrangement

- .1 If the diameter of sample piping is less than 40 mm, a fixed connection from a pressurized sea or fresh water piping system shall be installed for flushing of the sample piping system.

4.5 Display arrangement

- .1 The display arrangement shall consist of a display chamber provided with a sight glass. The chamber should be of a size that will allow a free fall stream of the sample water to be clearly visible over a length of at least 200 mm. The Administration may approve equivalent arrangements.
- .2 The display arrangement shall incorporate valves and piping in order to allow part of the sample flow to bypass the display chamber to obtain a laminar flow for display in the chamber.
- .3 The display arrangement shall be designed to be easily opened and cleaned.
- .4 The interior of the display chamber shall be white except for the background wall which shall be so coloured as to facilitate the observation of any change in the quality of the sample water.
- .5 The lower part of the display chamber shall be shaped like a funnel for collection of the sample water.
- .6 A test cock for taking a grab sample shall be provided in order that a sample of the water can be examined independent of that in the display chamber.
- .7 The display arrangement shall be adequately lighted to facilitate visual observation of the sample water.

4.6 Sample discharge arrangement

- .1 The sample water leaving the display chamber shall be routed to the sea or to a slop tank through fixed piping of adequate diameter.

5 *Operation*

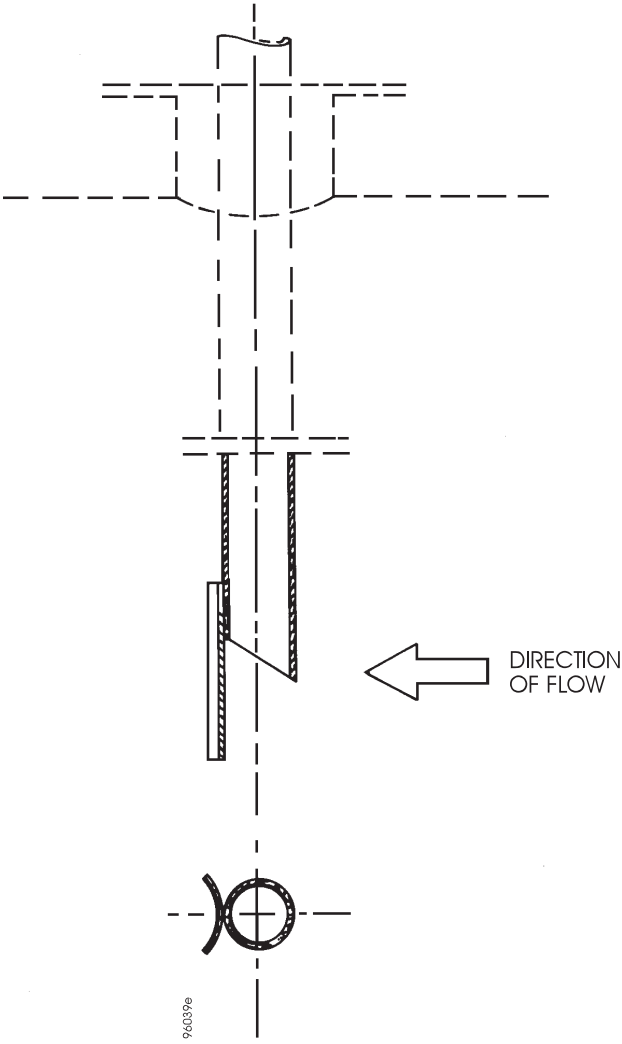
5.1 When a discharge of dirty ballast water or other oil contaminated water from the cargo tank area is taking place through an outlet below the waterline, the part flow system shall provide sample water from the relevant discharge outlet at all times.

5.2 The sample water should be observed particularly during those phases of the discharge operation when the greatest possibility of oil contamination occurs. The discharge shall be stopped whenever any traces of oil are visible in the flow and when the oil content meter reading indicates that the oil content exceeds permissible limits.

5.3 On those systems that are fitted with flushing arrangements, the sample piping should be flushed after contamination has been observed and, additionally, it is recommended that the sample piping be flushed after each period of usage.

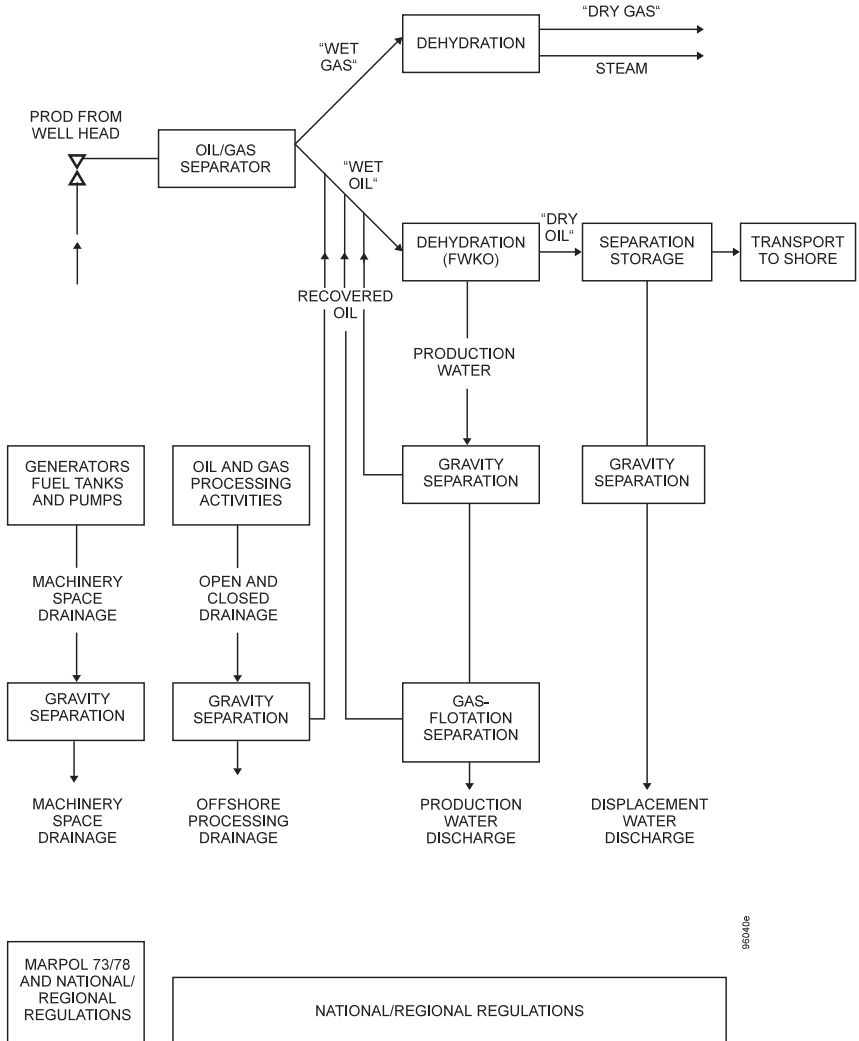
5.4 The ship's cargo and ballast handling manuals and, where applicable, those manuals required for crude oil washing systems or dedicated clean ballast tanks operation shall clearly describe the use of the part flow system in conjunction with the ballast discharge and the slop tank decanting procedures.

Figure 1 - Sampling probe for a part flow display system



Appendix 6

Offshore platform discharges



Appendix 7

Guidelines for approval of alternative structural or operational arrangements as called for in MARPOL 73/78, Annex I, regulation 13G(7)*

Background

1 Regulation 13G(4) of Annex I of MARPOL 73/78 specifies the requirements applicable to existing crude oil tankers of 20,000 tons deadweight and above and product carriers of 30,000 tons deadweight and above to reduce the accidental outflow of oil in the event of a collision or stranding. Regulation 13G(7) permits other structural or operational arrangements to be accepted as alternatives, provided that such alternatives provide at least the same level of protection against oil pollution in the event of collision or stranding, and are approved by the Administration based on guidelines developed by the Organization.

The guidelines contained herein specify the criteria by which the acceptability of alternative arrangements should be determined. Methods approved by the MEPC at the time of development of the guidelines are detailed in the appendix.

Other alternative arrangements may be approved by the MEPC after considering their pollution-prevention and safety characteristics. A proposal for approval of a new or revised arrangement should be submitted by an Administration and contain technical and operational specifications and evaluation of any safety aspects.

Applicability

2 These guidelines apply to crude oil tankers of 20,000 tons deadweight and above and product carriers of 30,000 tons deadweight and above which are not required to comply with regulation 13F and do not satisfy the requirements of regulation 13G(1)(c).

Performance requirements

3 The required minimum protection against accidental oil outflow is governed by regulation 13G(4), which stipulates that tankers to which regulation 13G applies shall have wing tanks or double-bottom spaces, not used for the carriage of oil and meeting the width and height requirements of regulation 13E(4), covering at least 30% of L_t for the full depth of the ship on each side or at least 30% of the projected bottom shell area within the length L_t , where L_t is as defined in regulation 13E(2). Equivalent structural or operational arrangements, as permitted by regulation 13G(7), should ensure at least the same degree of protection against oil pollution in the event of collision or stranding. The equivalency should be determined by calculations in accordance with paragraphs 4 and 5 below.

* An interpretation (IACS Unified Interpretation MPC 7) of sections of these guidelines has been circulated as MEPC/Circ. 365.

Damage and outflow criteria

4 The oil outflow should be calculated for the damage cases identified in subparagraph 5.1 of these guidelines. The hypothetical outflow should be calculated for the conditions specified in subparagraphs 4.1, 4.2 and 4.3 below and in accordance with the procedures defined in subparagraphs 5.2, 5.3 and 5.4. The hypothetical outflows so calculated, divided by the volume of the cargo being carried by the ship in its original configuration, and expressed as a percentage, constitute the equivalent oil spill number (the EOS number) for the ship under each of the conditions detailed in subparagraphs 4.1, 4.2 and 4.3.

4.1 The EOS number should be calculated for the existing ship, with the ship loaded to the maximum assigned load line with zero trim and with cargo having a uniform density, allowing all cargo tanks to be loaded to 98% full. This calculation establishes the base EOS number and also the nominal cargo oil density, which should be applied in the calculations required by subparagraphs 4.2 and 4.3.

4.2 A second EOS number should be calculated for the ship arranged with non-cargo side tanks as referred to in regulation 13G(4).

4.3 A third EOS number should be calculated for the selected alternative method and should not exceed the EOS number as calculated according to subparagraph 4.2, and should furthermore not be greater than 85% of the EOS number calculated according to subparagraph 4.1.

4.4 Fuel oil tanks located within the cargo tank length should be considered as cargo oil tanks for the purpose of calculating the EOS numbers.

Methodology for calculation of the hypothetical oil outflow

5 The methodology detailed in this paragraph should be used for calculating the EOS number as required by paragraph 4.

5.1 Damage assumptions

The damage assumptions identified below should be applied to all oil tanks when calculating the EOS number.

5.1.1 *Side damage*

Longitudinal extent	$l_c = \sqrt[3]{L^2/3}$ or 14.5 m whichever is less
Transverse extent	$t_c = B/5$ or 11.5 m whichever is less
Vertical extent	$v_c =$ from the baseline upwards without limit

5.1.2 *Bottom damage*

Longitudinal extent	$l_s = 0.2L$
Transverse extent	$b_s = B/6$ or 10 m whichever is less, but not less than 5 m
Vertical extent from the baseline	$v_s = B/15$

5.2 Calculation of outflow in case of side damage

Calculation of the outflow from a side damage should be done as follows:

Length between the forward and after extremities of the cargo tanks	= L_t (m)
Length of tank number i	= l_i (m)
Distance from hull plating to the tank boundary	= s_i (m)
Cargo volume in tank number i	= V_i (m ³)
Length of side damage according to subparagraph 5.1.1	= l_c (m)
Transverse extent of damage according to subparagraph 5.1.1	= t_c (m)

Even longitudinal distribution of damage location is assumed

Probability factor for breaching tank number i due to side damage

$$q_{ci} = (1 - s_i/t_c) \frac{(l_i + l_c)}{(L_t + l_c)}$$

$$(1 - s_i/t_c) \text{ to be } \geq 0$$

Total hypothetical outflow in case of a side damage

$$O_c = \sum q_{ci} \cdot V_i$$

This calculation method gives appropriate credit for any number and size of side ballast tanks. It also takes into account the effect of the cargo tank size. The risk of breaching a longitudinal bulkhead and outflow from centre tanks is also taken into account.

5.3 Calculation of outflow in case of bottom damage

Calculation of the outflow from bottom damages should be done as follows:

Length between the forward and after extremities of the cargo tanks	= L_t (m)
Width of the cargo tank area	= B_t (m)
Length of tank number i	= l_i (m)
Width of tank number i	= b_i (m)
Height of a double bottom	= h_i (m)
Cargo volume in tank number i	= V_i (m ³)
Length of a bottom damage according to subparagraph 5.1.2	= l_s (m)
Width of a bottom damage according to subparagraph 5.1.2	= b_s (m)
Vertical extent of a bottom damage according to subparagraph 5.1.2	= v_s (m)

Probability factor for breaching tank number i due to bottom damage

$$q_{si} = (1 - h_i/v_s) \frac{(l_i + l_s)(b_i + b_s)}{(L_t + l_s)(B_t + b_s)}$$

$(1 - h_i/v_s)$ to be ≥ 0

Nominal density of the cargo according to paragraph 4 = ρ_c (t/m³)

Density of the seawater (normally 1.025) = ρ_s (t/m³)

Loaded condition draught = d (m)

Height of cargo column above the cargo tank bottom = h_c (m)

Highest normal overpressure in the inert gas system (normally 0.05 bar) = $\Delta\rho$ (bar)

Margin for average transient loss, swell and tide effects = 1.1

Standard acceleration of gravity g = 9.81 m/s²

Outflow factor due to hydrostatic overpressure in tank number i

$$q_{hi} = 1 - \frac{(\rho_s(d - h_i)g - 100\Delta\rho)}{1.1\rho_c \cdot h_c \cdot g}$$

q_{hi} to be ≥ 0

Outflow from tank number i

$$O_{si} = q_{si} \cdot q_{hi} \cdot V_i$$

Total hypothetical outflow in case of a bottom damage

$$O_s = \sum q_{si} \cdot q_{hi} \cdot V_i$$

In case the ship is equipped with a double bottom the calculated outflow from tanks located above such double bottom may be assumed to be reduced by 50% of the total capacity of the affected double bottom tanks but in no case by more than 50% of the calculated outflow from each tank.

5.4 Calculation of total outflow in case of a side or bottom damage

The outflow calculated under subparagraphs 5.2 and 5.3 above should be combined to the total hypothetical outflow as follows:

$$O_{tot} = 0.4O_c + 0.6O_s$$

Outflow-reducing arrangements

6 Alternative outflow-reducing methods as permitted under regulation 13G(7) may include a single method or a combination of methods giving protection in case of collision or stranding or both. Methods that have been approved by the MEPC are identified in the appendix.

Other methods may be accepted by the Organization. Such methods should, in addition to meeting the outflow criteria given in paragraphs 4 and 5, be evaluated in each individual case for acceptability from general operational and safety points of view. In particular any such method:

should not expose the tanker to an unacceptable stress level in intact condition and should not cause the accidental hull damage to be exacerbated;

should not create an unacceptable additional fire or explosion hazard.

Operations Manual

7 The master should be supplied with operational instructions, approved by the Administration, in which the operational conditions required for compliance with these guidelines should be clearly described. These instructions may be contained in a separate manual or be incorporated into existing shipboard manuals. These instructions should identify approved loading conditions, including part load conditions and including any ballasting used for obtaining these conditions. It should also contain information on the use of inert gas system and relevant trim, stress and stability information.

Endorsement of the IOPP Certificate/Supplement

8 The IOPP Certificate/Supplement should be endorsed to identify the structural or operational measures approved in accordance with regulation 13(G)(7) as well as the approved operations instructions.

Appendix

Arrangements acceptable as alternatives under regulation 13G(7) of Annex I of MARPOL 73/78

This appendix contains detailed requirements on arrangements accepted by the MEPC as alternatives under the provisions of regulation 13G(7) of Annex I of MARPOL 73/78. At the time of development this appendix contains only one approved alternative method.

Requirements for application of hydrostatic balance loading in cargo tanks

Hydrostatic balance loading is based on the principle that the hydrostatic pressure at the cargo tank bottom of the cargo oil column plus the ullage space inert gas overpressure remains equal to or less than the hydrostatic pressure of the outside water column, thereby mitigating the outflow of oil in case of bottom damage.

The maximum cargo level in each tank being loaded under this criterion should therefore satisfy the following equation:

$$h_c \cdot \rho_c \cdot g + 100\Delta p \leq (d - h_i) \cdot \rho_s \cdot g$$

Appendix 7: Guidelines for approval of alternative structural arrangements

where:

h_c	is the maximum acceptable cargo level in each tank, measured from the cargo tank bottom	(m).
ρ_c	is the density of the current cargo	(t/m ³).
d	is the corresponding draught of the vessel	(m).
h_i	is the height of the tank bottom above the keel	(m).
Δp	is the highest normal overpressure in the inert gas system, expressed in bar (normally 0.05 bar)	(bar).
ρ_s	is the density of the seawater	(t/m ³).
g	is the standard acceleration of gravity	($g = 9.81 \text{ m/s}^2$).

Ballast may be carried in segregated ballast tanks to increase draught to a larger value. This may be used to allow more cargo to be taken into cargo tanks within the hydrostatic equilibrium criterion and within the limits of the assigned load line.

The arrangements and procedures for operation with the hydrostatic balance method should be approved by the Administration. The approval should be based on a system specification and documentation, incorporating also:

- .1 calculations made to confirm whether or not resonance can occur between the natural period of longitudinal cargo liquid motion and the natural period of pitching of the ship, and also between the natural period of transverse cargo liquid motion and the natural period of rolling of the ship under approved cargo loading conditions and in any cargo tanks. In this context 'resonance can occur' means that the natural period of longitudinal motion of cargo oil is within the range from 60% to 130% of the natural period of pitching of the ship and/or the natural period of transverse motion of cargo is within the range from 80% to 120% of the natural period of rolling of the ship. When resonance can occur between ship's motion and cargo liquid motion, the sloshing pressure caused by such resonance should be estimated, and it should be confirmed that the existing structure has sufficient strength to withstand the estimated sloshing pressure; and
- .2 calculations of intact and damage stability, including the effects of free surface. Damage stability calculations are, however, only required for ships defined in regulation 1(6).

When the accidental outflow reduction requirement can be met by applying hydrostatic loading to a limited number of tanks, wing tanks should have priority, thereby ensuring some reduction also in outflow from a side damage and minimizing sloshing in part-loaded centre tanks.

When operating in a multiport loading or unloading mode using the hydrostatic balance loading method, tanks covering at least 30% of the side of the length of the cargo section should be kept empty until the last loading location or should be unloaded at the first unloading location.

Copies of certified ullage measurement reports should be kept on board, clearly identified, for at least three years.

Appendix 8

Interim guidelines for the approval of alternative methods of design and construction of oil tankers under regulation 13F(5) of Annex I of MARPOL 73/78

Preamble

1 The purpose of these Interim Guidelines, hereunder referred to as “the Guidelines”, is to provide an international standard for the evaluation and approval of alternative methods of design and construction of oil tankers under regulation 13F(5) of Annex I of MARPOL 73/78.

2 The basic philosophy of the Guidelines is to compare the oil outflow performance in case of collision or stranding of an alternative tanker design to that of reference double-hull designs complying with regulation 13F(3) on the basis of a calculated pollution-prevention index.

3 The oil outflow performance of double-hull tankers which comply with regulation 13F(3) may be different. The longitudinal subdivision of the cargo tanks has a major influence on the oil outflow in case of inner hull penetration. The selected reference double-hull designs exhibit a favourable oil outflow performance.

4 The calculation of oil outflow is based on the probabilistic methodology and best available tanker accident damage statistics. Reappraisal of the Guidelines may be appropriate when more information on tanker accident damage has become available and more experience with the application of these Guidelines has been gained.

5 Falling tides will have an adverse effect on oil outflow from a stranded tanker and the Guidelines take account of this. The tide values specified in section 5 represent realistic average tidal changes which have been chosen to identify the influence of tidal changes on the oil outflow in case of stranding.

1 *General*

1.1 Regulation 13F of Annex I of MARPOL 73/78 specifies structural requirements for new tankers of 600 tdw and above, contracted on or after 6 July 1993. Paragraph (3) of the regulation requires tankers of 5,000 tdw and above to be equipped with double hulls. Various detailed requirements and permissible exceptions are given in the regulation.

Paragraph (5) of the regulation specifies that other designs may be accepted as alternatives to double hull, provided they give at least the same level of protection against oil pollution in the event of collision or stranding and are approved in principle by the MEPC based on Guidelines developed by the Organization.

1.2 These Guidelines should be used to assess the acceptability of alternative oil tanker designs of 5,000 tdw and above with regard to the prevention of oil outflow in

the event of collision or stranding as specified in paragraph (5) of regulation 13F of Annex I of MARPOL 73/78.

1.3 For any alternative design of an oil tanker not satisfying regulation 13F(3) or (4), a study of the cargo oil outflow performance should be carried out as specified in sections 4 through 6 of these Guidelines.

1.4 This study should cover the full range of ship sizes with a minimum of four different ship sizes, unless the approval is requested for only a limited range of vessel sizes. Data for four reference double-hull designs are given in section 7.

1.5 Evaluation of the cargo oil outflow performance of the proposed alternative design should be made by calculating the pollution-prevention index E as outlined in section 4 of these Guidelines.

1.6 The probabilistic methodology for the calculation of oil outflow according to these Guidelines is based on available tanker casualty statistics. With the collection of additional statistical material, the damage density distribution functions specified in 5.2 should be periodically reviewed.

1.7 In principle, and as far as applicable, the requirements of paragraphs (3)(d)–(f), (6) and (8) of regulation 13F apply also to alternative designs. The requirements of paragraph (9) of regulation 13F also apply to alternative designs. In addition, it should be demonstrated by means of a risk analysis that the new design under consideration provides an adequate safety level. Such analysis should address any specific risks associated with the alternative design, and if there are any, it should be demonstrated that safe solutions exist to cope with them.

2 *Applicability*

2.1 These Guidelines apply to the assessment of alternative designs of oil tankers to be constructed of steel or other equivalent material as required by regulation 42 of chapter II-2 of the 1974 SOLAS Convention as amended. Designs for tankers intended to be constructed of other materials or incorporating novel features (e.g. non-metallic materials) or designs which use impact-absorbing devices should be specially considered.

2.2 The approval procedure of these Guidelines applies to oil tankers of sizes up to 350,000 tdw. For larger sizes the approval procedure should be specially considered.

3 *Approval procedure for alternative tanker designs*

3.1 An Administration of a Party to MARPOL 73/78 which receives a request for approval of an alternative tanker design for the purpose of complying with regulation 13F should first evaluate the proposed design and satisfy itself that the design complies with these Guidelines and other applicable regulations of Annex I of MARPOL 73/78. That Administration should then submit the proposal and the supporting documentation, together with its own evaluation report, to the Organization for evaluation and approval of the design concept by the Marine Environment Protection Committee (MEPC) as an alternative to the requirements of regulation 13F(3). Only design concepts which have been approved in principle by the MEPC are allowed for the construction of tankers to which regulation 13F(5) applies.

3.2 The submission to the Administration and the Organization should at least include the following items:

- .1 Detailed specification of the alternative design concept.
- .2 Drawings showing the basic design of the tank system and, where necessary, of the entire ship.
- .3 Study of the oil outflow performance as outlined in paragraphs 1.3 to 1.5.
- .4 Risk analysis as outlined in paragraph 1.7.
- .5 Details of the calculation procedure or computer program used for the probabilistic oil outflow analysis to satisfy the Administration that the calculation procedure used gives satisfactory results. For verification of the computer program see paragraph 6.2.

Any additional information may be required to be submitted if deemed necessary.

3.3 In addition to the approval procedure for the design concept specified in 3.1 and 3.2 above, the final shipyard design should be approved by the Flag State Administration for compliance with these Guidelines and all other applicable regulations of Annex I of MARPOL 73/78. This should include survivability considerations as referred to in 5.1.5.10.

3.4 Any approved design concept will require reconsideration if the Guidelines have been amended.

4 Oil outflow analysis

4.1 General

4.1.1 The oil pollution prevention performance of a tanker design is expressed by a non-dimensional oil pollution prevention index E which is a function of the three oil outflow parameters: "probability of zero oil outflow", "mean oil outflow" and "extreme oil outflow". The oil outflow parameters should be calculated for all conceivable damage cases within the entire envelope of damage conditions as detailed in section 5.

4.1.2 The three oil outflow parameters are defined as follows:

Probability of zero oil outflow. This parameter represents the probability that no cargo oil will escape from the tanker in case of collision or stranding. If, e.g., the parameter equals 0.6, in 60% of all collision or stranding accidents no oil outflow is expected to occur.

Mean oil outflow parameter. The mean oil outflow represents the sum of all outflow volumes multiplied by their respective probabilities. The mean oil outflow parameter is expressed as a fraction of the total cargo oil capacity at 98% tank filling.

Extreme oil outflow parameter. The extreme oil outflow is calculated – after the volumes of all outflow cases have been arranged in ascending order – as the sum of the outflow volumes between 0.9 and 1.0 cumulative probability, multiplied by their respective probabilities. The value so derived is multiplied by 10. The extreme oil outflow parameter is expressed as a fraction of the total cargo oil capacity at 98% tank filling.

4.1.3 In general, consideration of ship's survivability will not be required for the conceptual approval of an alternative design. This may, however, be required in special cases, depending on special features of the design.

4.2 Pollution-prevention index

The level of protection against oil pollution in the event of collision or stranding as compared to the reference double-hull designs should be determined by calculation of the pollution-prevention index E as follows:

$$E = k_1 \frac{P_0}{P_{0R}} + k_2 \frac{0.01 + O_{MR}}{0.01 + O_M} + k_3 \frac{0.025 + O_{ER}}{0.025 + O_E} \geq 1.0$$

where:

k_1 , k_2 and k_3 are weighting factors having the values:

$$k_1 = 0.5$$

$$k_2 = 0.4$$

$$k_3 = 0.1$$

P_0 = probability of zero oil outflow for the alternative design

O_M = mean oil outflow parameter for the alternative design

O_E = extreme oil outflow parameter for the alternative design

P_{0R} , O_{MR} and O_{ER} are the corresponding parameters for the reference double-hull design of the same cargo oil capacity as specified in section 7.

4.3 Calculation of oil outflow parameters

The oil outflow parameters P_0 , O_M and O_E should be calculated as follows:

Probability of zero oil outflow, P_0 :

$$P_0 = \sum_{i=1}^n P_i \cdot K_i$$

where:

i represents each compartment or group of compartments under consideration, running from $i = 1$ to $i = n$

P_i accounts for the probability that only the compartment or group of compartments under consideration are breached

K_i equals 0 if there is oil outflow from any of the breached cargo spaces in i . If there is no outflow, K_i equals 1.

Mean oil outflow parameter, O_M :

$$O_M = \sum_{i=1}^n \frac{P_i \cdot O_i}{C}$$

where:

- O_i = combined oil outflow (m³) from all cargo spaces breached in i
- C = total cargo oil capacity at 98% tank filling (m³)

Extreme oil outflow parameter, O_E :

$$O_E = 10 \left(\sum \frac{P_{ie} \cdot O_{ie}}{C} \right)$$

where the index “*ie*” represents the extreme outflow cases, which are the damage cases falling within the cumulative probability range between 0.9 and 1.0 after they have been arranged as specified in 6.1.

5 *Assumptions for calculating oil outflow parameters*

5.1 **General**

5.1.1 The assumptions specified in this section should be used when calculating the oil outflow parameters.

5.1.2 Outflow parameters should be calculated independently for collisions and strandings and then combined as follows:

- 0.4 of the computed value for collisions plus
- 0.6 of the computed value for strandings.

5.1.3 For strandings, independent calculations should be done for 0 m, 2 m and 6 m tides. The tide, however, need not be taken greater than 50% of the ship’s maximum draught. Outflow parameters for the stranded conditions should be a weighted average, calculated as follows:

- 0.4 for 0 m tide condition
- 0.5 for minus 2 m tide condition
- 0.1 for minus 6 m tide condition.

5.1.4 The damage cases and the associated probability factor P_i for each damage case should be determined based on the damage density distribution functions as specified in paragraph 5.2.

5.1.5 The following general assumptions apply for the calculation of outflow parameters:

- .1 The ship should be assumed to be loaded to the maximum assigned load line with zero trim and heel and with a cargo having a density allowing all cargo tanks to be filled to 98%.
- .2 For all cases of collision damage, the entire contents of all damaged cargo oil tanks should be assumed to be spilled into the sea, unless proven otherwise.
- .3 For all stranded conditions, the ship should be assumed aground on a shelf. Assumed stranded draughts prior to tidal change should be equal to the initial intact draughts. Should the ship trim or float free due to the outflow of oil, this should be accounted for in the calculations for the final shipyard design.

-
- .4 In general, an inert gas overpressure of 0.05 bar gauge should be assumed.
 - .5 For the calculation of oil outflow in case of stranding, the principles of hydrostatic balance should apply, and the location of damage used for calculations of hydrostatic pressure balance and related oil outflow calculations should be the lowest point in the cargo tank.
 - .6 For cargo tanks bounded by the bottom shell, unless proven otherwise, oil outflow equal to 1% of the volume of the damaged tank should be assumed to account for initial exchange losses and dynamic effects due to current and waves.
 - .7 For breached non-cargo spaces located wholly or in part below breached cargo oil tanks, the flooded volume of these spaces at equilibrium should be assumed to contain 50% oil and 50% seawater by volume, unless proven otherwise.
 - .8 If deemed necessary, model tests may be required to determine the influence of tidal, current and swell effects on the oil outflow performance.
 - .9 For ship designs which incorporate cargo transfer systems for reducing oil outflow, calculations should be provided illustrating the effectiveness of such devices. For these calculations, damage openings consistent with the damage density distribution functions defined in 5.2 should be assumed.
 - .10 Where, for the final shipyard design referred to in 3.3 and in the special cases referred to in 4.1.3, damage stability calculations are required, the following should apply:

A damage stability calculation should be performed for each damage case. The stability in the final stage of flooding should be regarded as sufficient if the requirements of regulation 25(3) of Annex I of MARPOL 73/78 are complied with.

Should the ship fail to meet the survivability criteria as defined in regulation 25(3), 100% oil outflow from all cargo tanks should be assumed for that damage case.

5.2 Damage assumptions

5.2.1 *General, definitions*

The damage assumptions for the probabilistic oil outflow analysis are given in terms of the damage density distribution functions specified in subparagraphs 5.2.2 and 5.2.3. These functions are so scaled that the total probability for each damage parameter equals 100%, i.e. the area under each curve equals 1.0.

The location of a damage refers always to the centre of a damage. Damage location and extent to an inner horizontal bottom or vertical bulkhead should be assumed to be the same as the statistically derived damage to the outer hull.

The location and extent of damage to compartment boundaries should be assumed to be of rectangular shape, following the hull surface in the extents defined in subparagraphs 5.2.2 and 5.2.3.

The following definitions apply for the purpose of subparagraphs 5.2.2 and 5.2.3.

- x = dimensionless distance from A.P. relative to the ship's length between perpendiculars
- y = dimensionless longitudinal extent of damage relative to the ship's length between perpendiculars
- z_t = dimensionless transverse penetration extent relative to the ship's breadth
- z_v = dimensionless vertical penetration extent relative to the ship's depth
- z_l = dimensionless vertical distance between the baseline and the centre of the vertical extent z_v , relative to the distance between baseline and deck level (normally the ship's depth)
- b = dimensionless transverse extent of bottom damage relative to the ship's breadth
- b_l = dimensionless transverse location of bottom damage relative to the ship's breadth.

5.2.2 Side damage due to collision

Function for longitudinal location:

$$f_{s1} = 1.0 \quad \text{for } 0 \leq x \leq 1.0;$$

function for longitudinal extent:

$$\begin{aligned} f_{s2} &= 11.95 - 84.5y && \text{for } y \leq 0.1 \\ f_{s2} &= 6.65 - 31.5y && \text{for } 0.1 < y \leq 0.2 \\ f_{s2} &= 0.35 && \text{for } 0.2 < y \leq 0.3; \end{aligned}$$

function for transverse penetration:

$$\begin{aligned} f_{s3} &= 24.96 - 399.2z_t && \text{for } z_t \leq 0.05 \\ f_{s3} &= 9.44 - 88.8z_t && \text{for } 0.05 < z_t \leq 0.1 \\ f_{s3} &= 0.56 && \text{for } 0.1 < z_t \leq 0.3; \end{aligned}$$

function for vertical extent:

$$\begin{aligned} f_{s4} &= 3.83 - 11.1z_v && \text{for } z_v \leq 0.3 \\ f_{s4} &= 0.5 && \text{for } z_v > 0.3; \end{aligned}$$

function for vertical location:

$$\begin{aligned} f_{s5} &= z_l && \text{for } z_l \leq 0.25 \\ f_{s5} &= 5z_l - 1.0 && \text{for } 0.25 < z_l \leq 0.50 \\ f_{s5} &= 1.50 && \text{for } 0.50 < z_l \leq 1.00. \end{aligned}$$

Graphs of the functions f_{s1} , f_{s2} , f_{s3} , f_{s4} and f_{s5} are shown in figures 1 and 2.

Appendix 8: Approval of alternative methods of design and construction

5.2.3 *Bottom damage due to stranding*

Function for longitudinal location:

$$\begin{aligned}f_{b1} &= 0.2 + 0.8x && \text{for } x \leq 0.5 \\f_{b1} &= 4x - 1.4 && \text{for } 0.5 < x \leq 1.0;\end{aligned}$$

function for longitudinal extent:

$$\begin{aligned}f_{b2} &= 4.5 - 13.33y && \text{for } y \leq 0.3 \\f_{b2} &= 0.5 && \text{for } 0.3 < y \leq 0.8;\end{aligned}$$

function for vertical penetration:

$$\begin{aligned}f_{b3} &= 14.5 - 134z_v && \text{for } z_v \leq 0.1 \\f_{b3} &= 1.1 && \text{for } 0.1 < z_v \leq 0.3;\end{aligned}$$

function for transverse extent:

$$\begin{aligned}f_{b4} &= 4.0 - 12b && \text{for } b \leq 0.3 \\f_{b4} &= 0.4 && \text{for } 0.3 < b \leq 0.9 \\f_{b4} &= 12b - 10.4 && \text{for } b > 0.9;\end{aligned}$$

function for transverse location:

$$f_{b5} = 1.0 \quad \text{for } 0 \leq b_1 \leq 1.0.$$

Graphs of the functions f_{b1} , f_{b2} , f_{b3} , f_{b4} and f_{b5} are shown in figures 3 and 4.

6 *Probabilistic methodology for calculating oil outflow*

6.1 **Damage cases**

6.1.1 Using the damage probability distribution functions specified in paragraph 5.2, all damage cases n as per paragraph 4.3 should be evaluated and placed in ascending order of oil outflow. The cumulative probability for all damage cases should be computed, being the running sum of probabilities beginning at the minimum outflow damage case and proceeding to the maximum outflow damage case. The cumulative probability for all damage cases should be 1.0.

6.1.2 For each damage case the damage consequences in terms of penetrations (breaching) of cargo tank boundaries should be evaluated and the related oil outflow calculated. A cargo tank should be considered as being breached in a damage case under consideration if the applied damage envelope reaches any part of the cargo tank boundaries.

6.1.3 When determining the damage cases, it should be assumed for the purpose of these calculations that the location, extent and penetration of damages are independent of each other.

6.2 **Oil outflow calculations**

6.2.1 The probabilistic oil outflow calculations may be done as outlined by the "Example for the Application of the Interim Guidelines" given in the appendix to these

Guidelines. Other calculation procedures may be accepted, provided they show acceptable accuracy.

6.2.2 The computer program used for the oil outflow analysis should be verified against the data for oil outflow parameters for the reference double-hull designs given in section 7.

6.2.3 After the final waterline has been determined, the oil outflow from each damaged cargo tank should be computed for each damage case under the assumptions specified in 5.1.5.

7 Reference double-hull designs

Data for four reference double-hull designs of 5,000 tdw, 60,000 tdw, 150,000 tdw and 283,000 tdw are summarized in tables 7.1 and 7.2 and are illustrated in figures 5 to 8.

Table 7.1 contains the data for the oil outflow parameters P_{OR} , O_{MR} and O_{ER} to be used for the concept approval (ship survivability not considered). Table 7.2 contains the corresponding data to be used for the shipyard design approval (ship survivability considered).

Table 7.1 – Oil outflow parameters (ship survivability not considered)

Reference design number	Deadweight (t)	Oil outflow parameters (ship survivability not considered)		
		P_{OR}	O_{MR}	O_{ER}
1	5,000	0.81	0.017	0.127
2	60,000	0.81	0.014	0.104
3	150,000	0.79	0.016	0.113
4	283,000	0.77	0.013	0.085

Table 7.2 – Oil outflow parameters (ship survivability considered)

Reference design number	Deadweight (t)	Oil outflow parameters (ship survivability considered)		
		P_{OR}	O_{MR}	O_{ER}
1	5,000	0.72	0.113	0.469
2	60,000	0.81	0.021	0.173
3	150,000	0.79	0.017	0.124
4	283,000	0.77	0.015	0.098

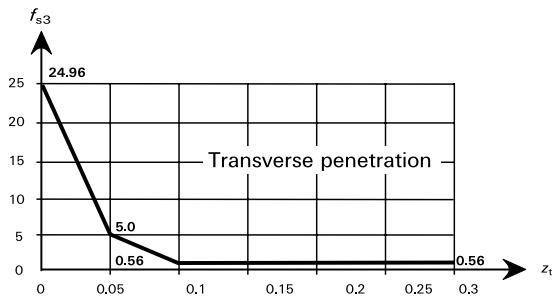
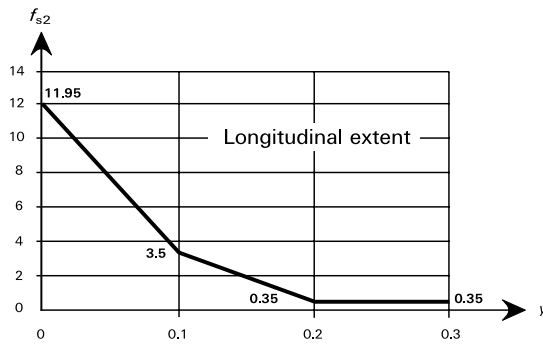
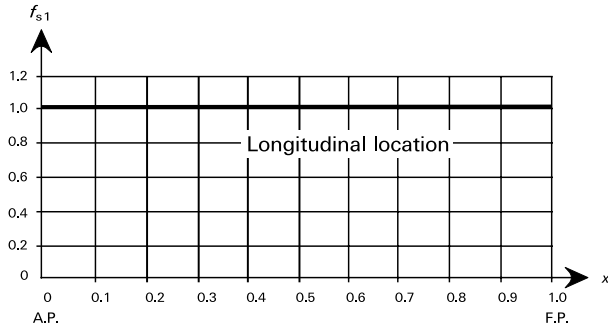


Figure 1 - Side damage due to collision: density distribution functions f_{s1} , f_{s2} , f_{s3}

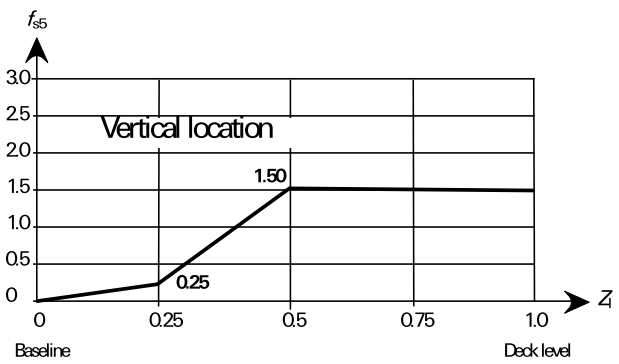
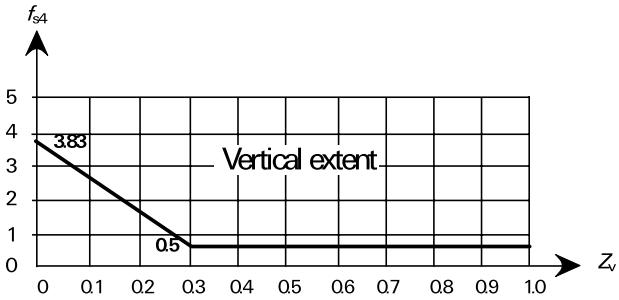


Figure 2 - Side damage due to collision: density distribution functions f_{s4} and f_{s5}

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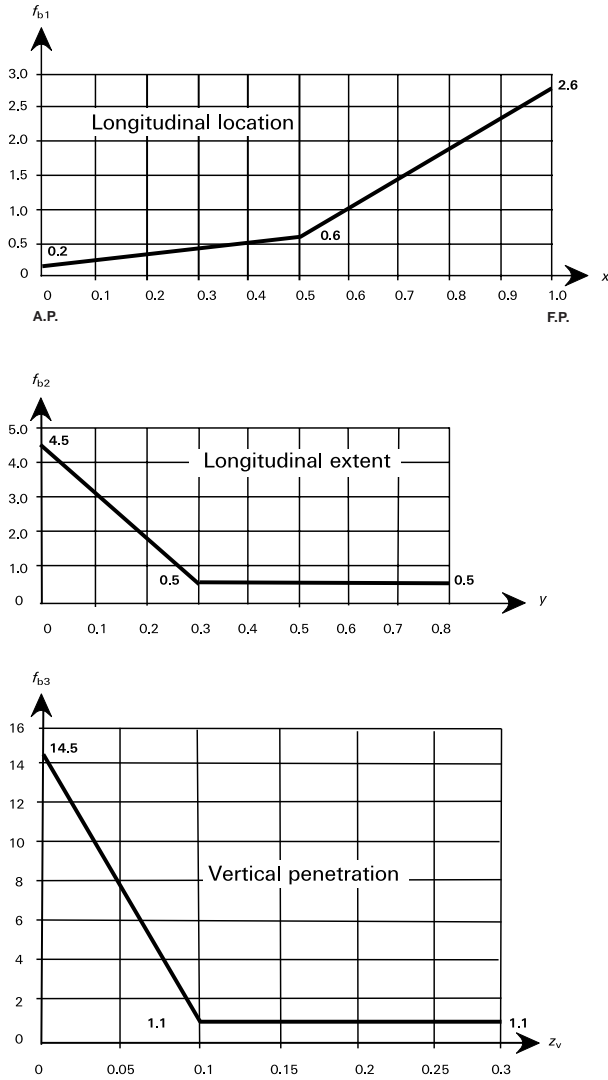


Figure 3 – Bottom damage due to stranding: density distribution functions f_{b1} , f_{b2} , f_{b3}

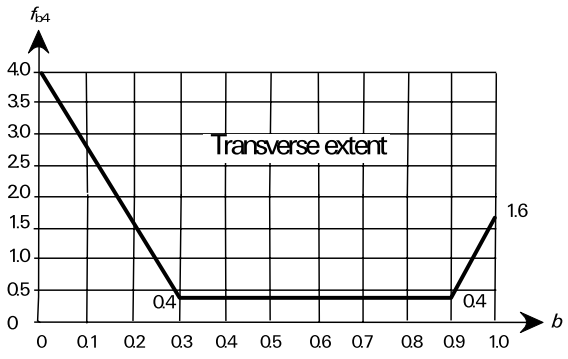
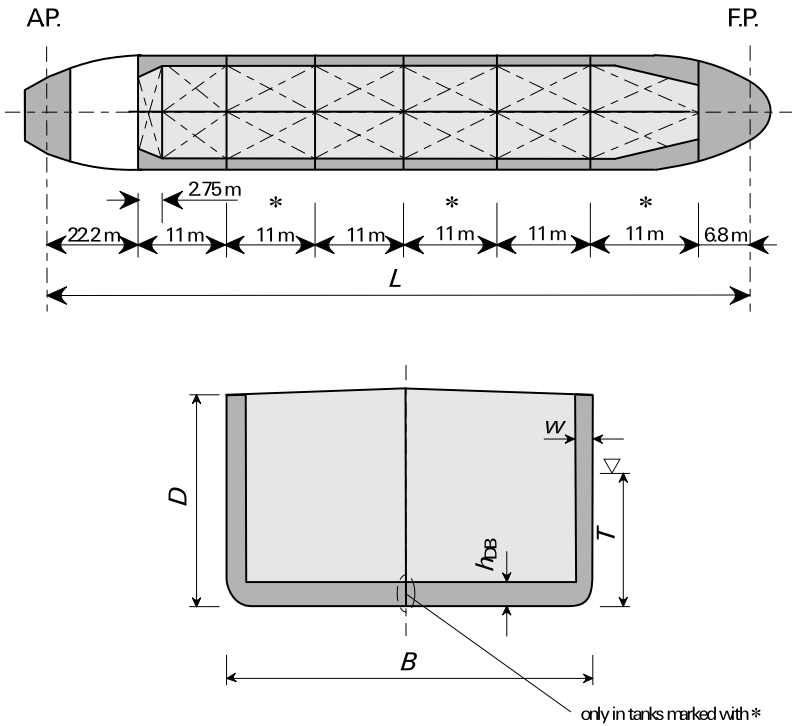


Figure 4 – Bottom damage due to stranding: density distribution functions f_{b4} and f_{b5}

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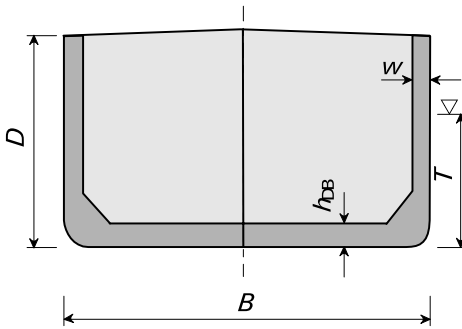
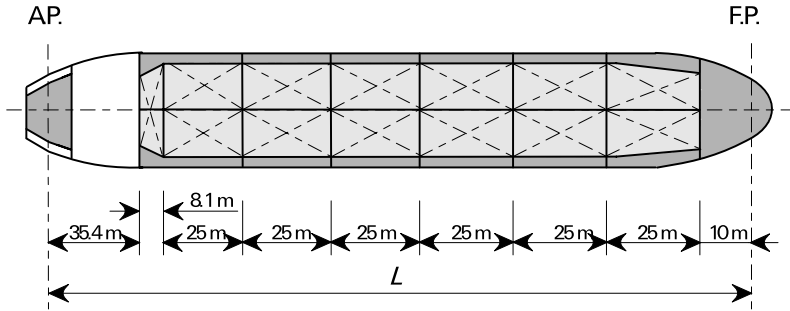
Ballast
 Cargo

- L = 95.00 m
- B = 16.50 m
- D = 8.30 m
- T = 6.20 m
- h_{bb} = 1.10 m
- w = 1.00 m

Cargo oil capacity at 98% tank filling: 6,061 m³
 Cargo oil density: 0.825 t/m³

Figure 5 - Reference double-hull design no. 1
Deadweight: 5,000 tdw

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Ballast
 Cargo

$L = 203.50$ m

$B = 36.00$ m

$D = 18.00$ m

$T = 13.50$ m

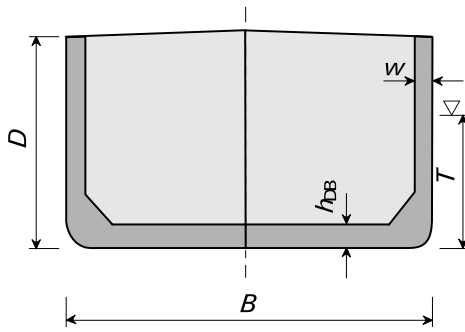
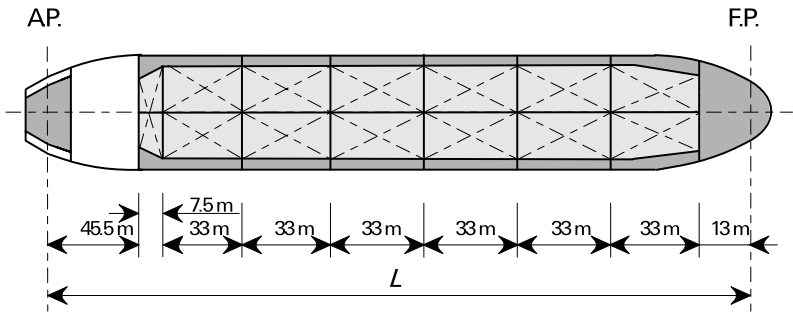
$h_{DB} = 2.00$ m

$w = 2.00$ m

Cargo oil capacity at 98% tank filling: $70,175$ m³
 Cargo oil density: 0.855 t/m³

95100

Figure 6 – Reference double-hull design no. 2
 Deadweight: 60,000 tdw



Ballast
 Cargo

$L = 264.00$ m

$B = 48.00$ m

$D = 24.00$ m

$T = 16.80$ m

$h_{DB} = 2.32$ m

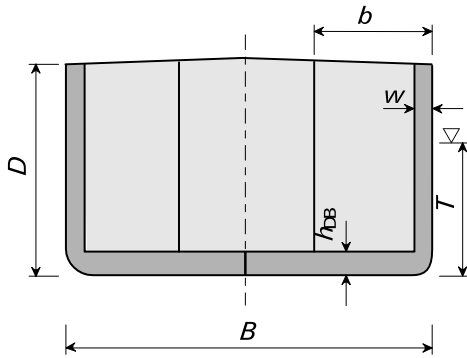
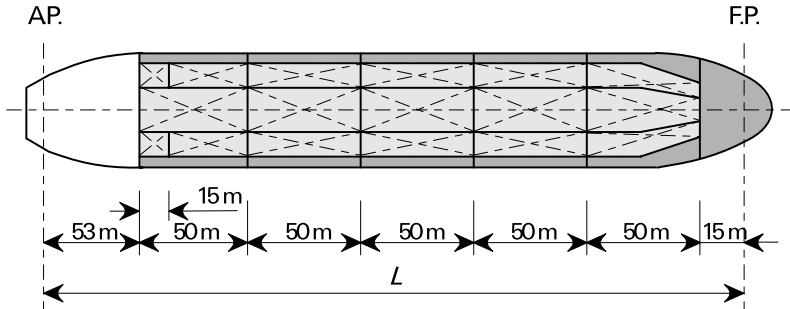
$w = 2.00$ m

Cargo oil capacity at 98% tank filling: 175,439 m³

Cargo oil density: 0.855 t/m³

19161

Figure 7 - Reference double-hull design no. 3
Deadweight: 150,000 tdw



Ballast
 Cargo

- L = 318.00 m
- B = 57.00 m
- D = 31.00 m
- T = 22.00 m
- b = 18.00 m
- h_{TB} = 4.20 m
- w = 2.00 m

Cargo oil capacity at 98% tank filling: 330,994 m³
 Cargo oil density: 0.855 t/m³

95122

Figure 8 – Reference double-hull design no. 4
 Deadweight: 283,000 tdw

Appendix

Example for the application of the “Interim Guidelines”

1 *General*

The application of the Interim Guidelines, hereunder referred to as “the Guidelines”, is shown in the following worked example illustrating the calculation procedure of the oil outflow parameters for a tank barge. For presentation purposes, a simplified hull form and level of compartmentation have been assumed. The procedures described herein are readily adaptable as a computer application, which will be necessary as more complicated arrangements are evaluated. This example is evaluated in accordance with the requirements for “concept approval”. Additional requirements for a shipyard design approval are noted where applicable.

An application of the Guidelines will typically follow these seven basic steps:

- 1) ***Vessel design:*** In accordance with paragraph 3.1 of the Guidelines, the vessel is designed to meet all applicable regulations of Annex I of MARPOL 73/78.
- 2) ***Establishing of the full load condition:*** In accordance with paragraph 5.1.5 of the Guidelines, a full load condition is developed.
- 3) ***Assembling of the damage cases:*** By applying the damage density distribution functions provided in the Guidelines, determine each unique grouping of damaged compartments and the probability associated with that damage condition. Independent sets of damage cases are derived for side (collision) and bottom (stranding) damage.
- 4) ***Computation of the equilibrium condition for each damage case:*** Compute the final equilibrium condition for all side and bottom damage conditions. This step is only required for the final shipyard design, in accordance with paragraph 5.1.5.10 of the Guidelines.
- 5) ***Computation of the oil outflow for each damage case:*** Calculate the oil outflow for each damage case. Separate calculations are done for side damage, and for bottom damage at the 0.0 m, 2.0 m and 6.0 m tide conditions. For side damage, all oil is assumed to escape from damaged tanks. For bottom damage, a hydrostatic balance method is applied. For the final shipyard design, survivability is evaluated in accordance with the requirements of regulation 25(3) of Annex I of MARPOL 73/78.
- 6) ***Computation of the oil outflow parameters:*** The cumulative probability of occurrence of each level of oil outflow is developed. This is done for the side damage and for each bottom damage tide condition. The associated oil outflow parameters are then computed. The bottom damage tidal parameters are combined in accordance with paragraph 5.1.3 and the side and bottom

damage parameters are then combined in accordance with paragraph 5.1.2 of the Guidelines.

- 7) **Computation of the Pollution Prevention Index E:** The new design has satisfactory characteristics if *E* as defined in paragraph 4.2 of the Guidelines is greater than or equal to 1.0.

2 Analysis procedure

The basic steps Nos. 1 through 6 are described in this section.

2.1 Step 1: Vessel design

The arrangement and dimensions of the example barge are as shown in figure A1 (Barge arrangement). For clarity purposes, a simple arrangement has been selected which does not meet all MARPOL 73/78 requirements. However, for actual designs submitted for approval as an alternative to double hull, the vessel must meet all applicable regulations of Annex I of MARPOL 73/78.

2.2 Step 2: Establishing of the full load condition

An intact load condition shall be developed with the vessel at its maximum assigned load line with zero trim and heel. Departure quantities of constants and consumables (fuel oil, diesel oil, fresh water, lube oil, etc.) should be assumed. Capacities of cargo oil tanks should be based on actual permeabilities for these compartments. All cargo oil tanks shall be assumed to be filled to 98% of their capacities. All cargo oil shall be taken at a homogeneous density.

For this example, it is assumed that the permeability of the cargo oil tanks is 0.99 and 0.95 for the double bottom/wing tank ballast spaces. The 100% capacity of the cargo oil tanks CO1 and CO2 is:

CO1:	9,623 m ³
CO2:	28,868 m ³
Total:	<u>38,491 m³</u>

Cargo tank capacity at 98% filling: $C = 0.98 \times 38,491 = 37,721 \text{ m}^3$.

For this barge, for simplicity reasons, zero weight for the constants and consumables has been assumed. At the 9.0 m assigned load line the following values for the cargo oil mass (*W*) and density (ρ_c) are obtained:

$$W = \text{displacement} - \text{light barge weight} = 33,949 \text{ t}$$
$$\rho_c = 33,949 \text{ t} / C = 0.90 \text{ t/m}^3.$$

2.3 Step 3: Assembling of the damage cases

In this step the damage cases have to be developed. This involves applying the probability density distribution functions for side damage (figures 1 and 2) and the probability density distribution functions for bottom damage (figures 3 and 4). Each unique grouping of damaged compartments is determined together with its associated probability. The sum of the probabilities should equal 1.0 for both the side and the bottom damage evaluations.

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There are different methods available for developing the compartment groupings and probabilities, each of which should converge on the same results.

In this example, the compartment groupings and the use of the probability density functions is shown by a "step-wise" evaluation method. This method involves stepping through each damage location and extent at a sufficiently fine increment. For instance, it is assumed (for the side damage) to step through the functions as follows: longitudinal location = 100 steps, longitudinal extent = 100 steps, transverse penetration = 100 steps, vertical location = 10 steps, and vertical extent = 100 steps. You will then be developing 10^9 damage incidents. The probability of each step is equal to the area under the probability density distribution curve over that increment. The probability for each damage incident is the product of the probabilities of the five functions. There are many redundant incidents which damage identical compartments. These are combined by summing their probabilities. For a typical double-hull tanker, the 10^9 damage incidents reduce down to 100 to 400 unique groupings of compartments.

2.3.1 Side damage evaluation

The damage density distribution functions provide independent statistics for location, length, and penetration. For side damage, the probability of a given damage longitudinal location, longitudinal extent, transverse penetration, vertical location and vertical extent is the product of the probabilities of these five damage characteristics.

To maintain the example at a manageable size, fairly coarse increments have been assumed:

Longitudinal location at 10 steps:	= $L/10$	= $0.10L$ per step
Longitudinal extent at 3 steps:	= $0.3L/3$	= $0.10L$ per step
Transverse penetration at 6 steps:	= $0.3B/6$	= $0.05B$ per step.

To further simplify the evaluation, each damage is assumed to extend vertically without limit. Therefore, the probabilities of vertical location and vertical extent are taken as 1.0 for each damage case. This is a reasonable assumption as the double bottom height is only 10% of the depth. Taking the area under the density distribution function for vertical location up to $0.1D$ (see figure 2, function f_{s5}) yields a value of 0.005. This means that the probability of the centre of damage location falling within the double bottom region is $1/200$.

Figure A2 (Side damage definition) shows the steps for longitudinal location, longitudinal extent and transverse penetration in relation to the barge. Table A1 (Increments for step-wise side damage evaluation) gives the range for each step, the mean or average value over the step, and the probability of occurrence of that particular step. For instance, Z_1 covers the range of transverse penetration beginning at the side shell and extending inboard 5% of the breadth. The average penetration is $0.025B$ or 2.5% of the breadth. The probability of occurrence is the likelihood that the penetration will fall within the range of 0% to 5% of the breadth. The probability equals 0.749, which is the area under the density distribution function for transverse penetration (figure 1, function f_{s3}) between $0.0B$ and $0.05B$. The area under each probability density function is 1.0, and therefore the sum of the probabilities for all increments for each function is 1.0.

A total of ten longitudinal locations, three longitudinal extents and six transverse penetrations will be evaluated. All combinations of damages must be considered for a total of $(10) \times (3) \times (6) = 180$ separate incidents. The damaged compartments are found by overlaying each combination of location/extent/penetration onto the barge. These damage boundaries define a rectangular box. Any compartment which extends into this damage zone is considered damaged. Each of the 180 incidents results in damage to one or more compartments. Incidents with identical damaged compartments are collected into a single damage case by summing the probabilities of the individual damage incidents.

Let us begin at the aft end of the barge and proceed forward. The first damage location X_1 is centred $0.05L$ forward of the transom. The first damage extent Y_1 has an average length of $0.05L$. The average value for the first transverse penetration Z_1 is $0.025B$. The resulting damage box lies entirely within the WB1 compartment and therefore damages that compartment only. The probability of this incident is:

$$P_{111}(X_1Y_1Z_1) = (0.1000) \times (0.7725) \times (0.7490) = 0.05786$$

If we step through the transverse penetrations Z_2 through Z_6 , we find that only the WB1 compartment is damaged for each of these cases. The probabilities for these cases are 0.01074, 0.00216, 0.00216, 0.00216, 0.00216, and 0.00216 respectively. The combined probability for the six cases at longitudinal damage location X_1 is:

$$P_{111-6}(X_1Y_1Z_{1-6}) = 0.05786 + 0.01074 + 0.00216 + 0.00216 \\ + 0.00216 + 0.00216 = 0.07725$$

Next, we move to damage extent Y_2 . The damage box $X_1Y_2Z_1$ once again falls within the WB1 compartment. Likewise, transverse penetrations Z_2 through Z_6 fall within this compartment. We compute the probability for these cases and find that $P_{121-6}(X_1Y_2Z_{1-6}) = 0.01925$.

Similarly, the damage boxes defined by $X_1Y_3Z_{1-6}$ lie within the WB1 compartment and have a combined probability $P_{131-6}(X_1Y_3Z_{1-6}) = 0.00350$.

We now move to the next longitudinal location, X_2 . With longitudinal extent Y_1 , the damage stays within the WB1 compartment. The combined probability is $P_{211-6}(X_2Y_1Z_{1-6}) = 0.07725$.

The forward bound of the damage box $X_2Y_2Z_1$ extends forward of the transverse bulkhead located 20.0 m from the transom, damaging compartments both fore and aft of this bulkhead. Transverse penetration Z_1 extends to a point just outboard of the longitudinal bulkhead. Therefore, this combination damages both the WB1 and WB2S compartments. The probability is $P_{221}(X_2Y_2Z_1) = 0.01442$.

We find that the damage box $X_2Y_2Z_2$ extends inboard of the longitudinal bulkhead, damaging compartments WB1, WB2S and CO1. A cargo oil tank has been damaged and oil outflow will occur. Similarly, damage penetrations Z_3 through Z_6 result in breaching of the three compartments. The combined probability for these five incidents is:

$$P_{222-6}(X_2Y_2Z_{2-6}) = 0.00268 + 0.00054 + 0.00054 \\ + 0.00054 + 0.00054 = 0.00483$$

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By stepping through the barge for all 180 incidents and combining unique damage compartment groupings, we obtain the compartment grouping and probability values shown in table A2 (Probability values for side damage). Each compartment group represents a unique set of compartments. The associated probability is the probability that each particular group of compartments will be damaged in a collision which breaches the hull. For instance, the probability of damaging the WB1 compartment is 0.17725. This means there is approximately a 17.7% likelihood that only this compartment will be damaged. Likewise, the probability of concurrently damaging the WB1 and WB2S compartments is 0.03408 or about 3.4%. Note that the cumulative probability of occurrence for all groups equals 1.0.

2.3.2 Bottom damage evaluation

For bottom damage, the probability of a given damage longitudinal location, longitudinal extent, vertical penetration, transverse location and transverse extent is, analogously to the side damage evaluation, the product of the probabilities of these five damage characteristics.

The following increments are assumed for the bottom damage evaluation:

Longitudinal location at 10 steps:	=	$L/10$	=	$0.10L$	per step
Longitudinal extent at 8 steps:	=	$0.8L/8$	=	$0.10L$	per step
Vertical penetration at 6 steps:	=	$0.3D/6$	=	$0.05D$	per step.

To further simplify the evaluation, all damage is assumed to extend transversely without limit. Therefore, the probabilities of transverse extent and transverse location are taken as 1.0 for each damage case.

Compartment groupings are developed using the same process as previously described for side damage.

Analogously, a total of ten longitudinal locations, eight longitudinal extents and six vertical penetrations need to be evaluated. The damage incidents to be taken into account for groundings sum up to a total of $(10) \times (8) \times (6) = 480$ separate incidents.

Figure A3 (Bottom damage definition) shows the steps for longitudinal location, longitudinal extent and vertical penetration in relation to the barge. Table A3 (Increments for step-wise bottom damage definition) gives the range for each step, the mean or average value over the step, and the probability of occurrence of that particular step.

Again, putting the aftmost compartment WB1 together in terms of damage increments, the following probabilities have to be summed up:

$$\begin{aligned}P_{111-6}(X_1 Y_1 Z_{1-6}) &= (0.0240) \times (0.38333) \times (1.0) = 0.00920 \\P_{121-6}(X_1 Y_2 Z_{1-6}) &= (0.0240) \times (0.2500) \times (1.0) = 0.00600 \\P_{131-6}(X_1 Y_3 Z_{1-6}) &= (0.0240) \times (0.11677) \times (1.0) = 0.00280 \\P_{211-6}(X_2 Y_1 Z_{1-6}) &= (0.0320) \times (0.38333) \times (1.0) = 0.01227.\end{aligned}$$

Therefore the likelihood of damaging the WB1 compartment sums up to:

$$P_{WB1} = P_{11} + P_{12} + P_{13} + P_{21} = 0.03027.$$

By addressing each of the 480 incidents to the relevant compartment (or groups of compartments) the likelihood of a damage to these resulting from a grounding is obtained. This is shown in table A4 (Probability values for bottom damage).

2.4 Step 4: Computation of the equilibrium condition for each damage case

This example describes the concept analysis only. Damage stability analyses to determine the equilibrium conditions are only required for the final shipyard design, in accordance with paragraph 5.1.5.10 of the Guidelines.

2.5 Step 5: Computation of the oil outflow for each damage case

In this step the oil outflow associated with each of the compartment groupings is calculated for side and bottom damage as outlined below.

2.5.1 Side damage evaluation

For side damage, 100% of the oil in a damaged cargo oil tank is assumed to outflow into the sea. If we review the eleven compartment groupings for side damage, we find that oil tank damage occurs in three combinations: CO1 only, CO2 only, and concurrent damage to CO1 and CO2. The oil outflow for these tanks is as follows:

CO1 (98% full volume)	=	9,430 m ³
CO2 (98% full volume)	=	28,291 m ³
CO1 + CO2 (98% full volume)	=	37,721 m ³ .

2.5.2 Bottom damage evaluation

For bottom damage, a pressure balance calculation must be carried out. The vessel is assumed to remain stranded on a shelf at its original intact draught. For the concept analysis, zero trim and zero heel are assumed. An inert gas overpressure of 0.05 bar gauge is assumed in accordance with paragraph 5.1.5.4 of the Guidelines. The double bottom spaces located below the cargo oil tanks “capture” some portion of the oil outflow. In accordance with paragraph 5.1.5.7 of the Guidelines, the flooded volume of such spaces should be assumed to contain 50% oil and 50% seawater by volume at equilibrium. When calculating the oil volume captured in these spaces, no assumptions are made on how the oil and seawater is distributed in these spaces.

The calculations are generally carried out for three tidal conditions: 0.0 m tide, with a 2.0 m tidal drop, and with a 6.0 m tidal drop. In accordance with paragraph 5.1.3 of the Guidelines, the tidal drop need not be taken greater than 50% of the ship’s maximum draught. For this example, the appropriate tidal conditions are therefore 0.0 m, 2.0 m and 4.5 m.

The actual oil volume lost from a cargo tank is calculated for each of the three tidal conditions, assuming hydrostatic balance as follows:

$$z_c \cdot \rho_c \cdot g + 100\Delta p = z_s \cdot \rho_s \cdot g$$

where:

z_c = height of remaining oil in the damaged tank (m)

ρ_c = cargo oil density (0.9 t/m³)

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g = gravitational acceleration (9.81 m/s²)

Δp = set pressure of cargo tank pressure/vacuum valves (0.05 bar gauge)

z_s = external seawater head above inner bottom (m)

$z_s = T - 2 = 7.00$ m

ρ_s = seawater density (1.025 t/m³)

See also figure A4.

From the above equation one obtains for the height of remaining oil z_c for the zero-tide condition:

$$z_c = 7.40 \text{ m.}$$

Thus, the height of lost oil ($h_l = 0.98h_c - z_c$) is:

$$h_l = 17.64 - 7.40 = 10.24 \text{ m.}$$

The volume of lost oil (V_l) of cargo tank CO1 is:

$$V_l = 10.24 \times 36 \times 15 \times 0.99 = 5,474 \text{ m}^3.$$

In this case the total volume (V_{wo}) of oil and water in the water ballast tanks is:

$$V_{wo} = 2 \times [20 \times 2 + z_{wo} \times 2] \times 60 \times 0.95 = 6,202 \text{ m}^3$$

where:

$$z_{wo} = 0.5(z_c + z_s) = 7.20 \text{ m.}$$

If one assumes that 50% of V_{wo} is occupied by captured oil, one obtains for the total oil outflow ($V_{outflow}$) of cargo tank CO1:

$$V_{outflow} = V_l - 0.5V_{wo} = 2,373 \text{ m}^3.$$

The oil outflow of cargo tank CO2 is:

$$V_{outflow} = 10.24 \times 36 \times 45 \times 0.99 - 0.5 \times 6,202 = 13,322 \text{ m}^3$$

and the total oil outflow of cargo tanks CO1 and CO2 is:

$$V_{outflow} = 10.24 \times 36 \times 60 \times 0.99 - 0.5 \times 6,202 = 18,796 \text{ m}^3.$$

Step-wise application of the damage extents and assumed increments results in fourteen compartment groupings for bottom damage. Oil tank and double bottom damage occurs in three combinations. The oil outflows for these tanks at 0.0 m, 2.0 m and 4.5 m tide are summarized in the table below:

Tank combination	Oil outflow (m ³) at		
	0.0 m tide	2.0 m tide	4.5 m tide
WB2S+WB2P+CO1	2,373	3,832	5,658
WB2S+WB2P+CO2	13,322	17,210	22,081
WB2S+WB2P+CO1+CO2	18,796	23,898	30,292

2.6 Step 6: Computation of the oil outflow parameters

In this step the oil outflow parameters are computed in accordance with paragraph 4.3 of the Guidelines. To facilitate calculation of these parameters, place the damage groupings in a table in ascending order as a function of oil outflow. A running sum of probabilities is computed, beginning at the minimum outflow damage case and proceeding to the maximum outflow damage case. Tables A5 and A6 (Cumulative probability and oil outflow values) contain the outflow values for the side damage and bottom damage for the three tide conditions.

Probability of zero oil outflow, P_0 : This parameter equals the cumulative probability for all damage cases for which there is no oil outflow. From table A5, we see that the probability of zero outflow for the side damage condition is 0.83798, and the probability of zero outflow for the bottom damage (0.0 m tide) condition is 0.84313.

Mean oil outflow parameter, O_M : This is the weighted average of all cases, and is obtained by summing the products of each damage case probability and the computed outflow for that damage case.

Extreme oil outflow parameter, O_E : This represents the weighted average of the damage cases falling within the cumulative probability range between 0.9 and 1.0. It equals the sum of the products of each damage case probability with a cumulative probability between 0.90 and 1.0 and its corresponding oil outflow, with the result multiplied by 10.

For this example, the computed outflow values are as shown in tables A5 and A6. In accordance with paragraph 5.1.3 of the Guidelines, the bottom damage outflow parameters for the 0.0 m, 2.0 m and 4.5 m tides are combined in a ratio of 0.4 : 0.5 : 0.1 respectively. In accordance with paragraph 5.1.2, the collision (side damage) and stranding (bottom damage) parameters are then combined in a ratio of 0.4 : 0.6 respectively. In table A7 (Summary of oil outflow parameters) the oil outflow parameters P_0 , O_M and O_E for the example tank barge are listed.

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Table A1 – Increments for step-wise side damage evaluation

Longitudinal location (step = 0.1L)

	range of increments			probability
	minimum	maximum	midpoint	
X_1	0.0L	0.1L	0.05L	0.1000
X_2	0.1L	0.2L	0.15L	0.1000
X_3	0.2L	0.3L	0.25L	0.1000
X_4	0.3L	0.4L	0.35L	0.1000
X_5	0.4L	0.5L	0.45L	0.1000
X_6	0.5L	0.6L	0.55L	0.1000
X_7	0.6L	0.7L	0.65L	0.1000
X_8	0.7L	0.8L	0.75L	0.1000
X_9	0.8L	0.9L	0.85L	0.1000
X_{10}	0.9L	1.0L	0.95L	0.1000
				1.0000

Longitudinal extent (step = 0.1L)

	range of extents			probability
	minimum	maximum	average	
Y_1	0.0L	0.1L	0.05L	0.7725
Y_2	0.1L	0.2L	0.15L	0.1925
Y_3	0.2L	0.3L	0.25L	0.0350
				1.0000

Transverse penetration (step = 0.05B)

	range of penetration			probability
	minimum	maximum	average	
Z_1	0.0B	0.05B	0.025B	0.7490
Z_2	0.05B	0.10B	0.075B	0.1390
Z_3	0.10B	0.15B	0.125B	0.0280
Z_4	0.15B	0.20B	0.175B	0.0280
Z_5	0.20B	0.25B	0.225B	0.0280
Z_6	0.25B	0.30B	0.275B	0.0280
				1.0000

Table A2 – Probability values for side damage

Unique compartment groupings		Damage extents and probabilities							Group probability
1	WB1	$X_1Y_1Z_{1-6}$ 0.07725	$X_1Y_2Z_{1-6}$ 0.01925	$X_1Y_3Z_{1-6}$ 0.00350	$X_2Y_1Z_{1-6}$ 0.07725				0.17725
2	WB1 + WB2S	$X_2Y_2Z_1$ 0.01442	$X_2Y_3Z_1$ 0.00262	$X_3Y_3Z_1$ 0.00262	$X_3Y_2Z_1$ 0.01442				0.03408
3	WB1 + WB2S + CO1	$X_2Y_2Z_{2-6}$ 0.00483	$X_2Y_3Z_{2-6}$ 0.00088	$X_3Y_2Z_{2-6}$ 0.00483					0.01054
4	WB2S	$X_3Y_1Z_1$ 0.05786	$X_4Y_1Z_1$ 0.05786	$X_4Y_2Z_1$ 0.01442	$X_4Y_3Z_1$ 0.00262	$X_5Y_1Z_1$ 0.05786	$X_5Y_2Z_1$ 0.01442	$X_5Y_3Z_1$ 0.00262	0.41532
		$X_6Y_1Z_1$ 0.05786	$X_6Y_2Z_1$ 0.01442	$X_6Y_3Z_1$ 0.00262	$X_7Y_1Z_1$ 0.05786	$X_7Y_2Z_1$ 0.01442	$X_7Y_3Z_1$ 0.00262	$X_8Y_1Z_1$ 0.05786	
5	WB2S + CO1	$X_3Y_1Z_{2-6}$ 0.01939							0.01939
6	WB2S + CO1 + CO2	$X_4Y_1Z_{2-6}$ 0.01939	$X_4Y_2Z_{2-6}$ 0.00483	$X_4Y_3Z_{2-6}$ 0.00088	$X_5Y_3Z_{2-6}$ 0.00088				0.02598
7	WB1 + WB2S + CO1 + CO2	$X_3Y_3Z_{2-6}$ 0.00088							0.00088
8	WB2S + CO2	$X_5Y_1Z_{2-6}$ 0.01939	$X_5Y_2Z_{2-6}$ 0.00483	$X_6Y_1Z_{2-6}$ 0.01939	$X_6Y_2Z_{2-6}$ 0.00483	$X_6Y_3Z_{2-6}$ 0.00088	$X_7Y_1Z_{2-6}$ 0.01939	$X_7Y_2Z_{2-6}$ 0.00483	0.09381
		$X_7Y_3Z_{2-6}$ 0.00088	$X_8Y_1Z_{2-6}$ 0.01939						
9	WB2S + WB3	$X_8Y_2Z_1$ 0.01442	$X_8Y_3Z_1$ 0.00262	$X_9Y_2Z_1$ 0.01442	$X_9Y_3Z_1$ 0.00262				0.03408
10	WB2S + CO2 + WB3	$X_8Y_2Z_{2-6}$ 0.00483	$X_8Y_3Z_{2-6}$ 0.00088	$X_9Y_2Z_{2-6}$ 0.00483	$X_9Y_3Z_{2-6}$ 0.00088				0.01142
11	WB3	$X_9Y_1Z_{1-6}$ 0.07725	$X_{10}Y_1Z_{1-6}$ 0.07725	$X_{10}Y_2Z_{1-6}$ 0.01925	$X_{10}Y_3Z_{1-6}$ 0.00350				0.17725
									1.00000

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Table A3 – Increments for step-wise bottom damage definition

Longitudinal location (step = 0.1L)

	range of increments			probability
	minimum	maximum	midpoint	
X_1	0.0L	0.1L	0.05L	0.0240
X_2	0.1L	0.2L	0.15L	0.0320
X_3	0.2L	0.3L	0.25L	0.0400
X_4	0.3L	0.4L	0.35L	0.0480
X_5	0.4L	0.5L	0.45L	0.0560
X_6	0.5L	0.6L	0.55L	0.0800
X_7	0.6L	0.7L	0.65L	0.1200
X_8	0.7L	0.8L	0.75L	0.1600
X_9	0.8L	0.9L	0.85L	0.2000
X_{10}	0.9L	1.0L	0.95L	0.2400
				1.0000

Longitudinal extent (step = 0.1L)

	range of extents			probability
	minimum	maximum	average	
Y_1	0.0L	0.1L	0.05L	0.3833
Y_2	0.1L	0.2L	0.15L	0.2500
Y_3	0.2L	0.3L	0.25L	0.1167
Y_4	0.3L	0.4L	0.35L	0.0500
Y_5	0.4L	0.5L	0.45L	0.0500
Y_6	0.5L	0.6L	0.55L	0.0500
Y_7	0.6L	0.7L	0.65L	0.0500
Y_8	0.7L	0.8L	0.75L	0.0500
				1.0000

Vertical penetration (step = 0.05D)

	range of penetration			probability
	minimum	maximum	average	
Z_1	0.0D	0.05D	0.025D	0.5575
Z_2	0.05D	0.10D	0.075D	0.2225
Z_3	0.10D	0.15D	0.125D	0.0550
Z_4	0.15D	0.20D	0.175D	0.0550
Z_5	0.20D	0.25D	0.225D	0.0550
Z_6	0.25D	0.30D	0.275D	0.0550
				1.0000

Table A4 – Probability values for bottom damage

Unique compartment groupings		Damage extents and probabilities								Group probability
1	WB1	$X_{1-2}Y_1Z_{1-6}$ 0.02147	$X_1Y_2Z_{1-6}$ 0.006	$X_1Y_3Z_{1-6}$ 0.0028						0.03027
2	WB1 + WB2S + WB2P		$X_{2-3}Y_2Z_{1-2}$ 0.01404	$X_{2-3}Y_3Z_{1-2}$ 0.00655	$X_{1-4}Y_4Z_{1-2}$ 0.00562	$X_{1-4}Y_5Z_{1-2}$ 0.00562	$X_{1-5}Y_6Z_{1-2}$ 0.0078	$X_{1-5}Y_7Z_{1-2}$ 0.0078	$X_{1-4}Y_8Z_{1-2}$ 0.00562	0.05305
3	WB2S + WB2P + WB3		$X_{8-9}Y_2Z_{1-2}$ 0.0702	$X_{8-9}Y_3Z_{1-2}$ 0.03276	$X_{7-10}Y_4Z_{1-2}$ 0.02808	$X_{7-10}Y_5Z_{1-2}$ 0.02808	$X_{6-10}Y_6Z_{1-2}$ 0.0312	$X_{6-10}Y_7Z_{1-2}$ 0.0312	$X_{7-10}Y_8Z_{1-2}$ 0.02808	0.24960
4	WB1 + WB2S + WB2P + WB3								$X_{5-6}Y_8Z_{1-2}$ 0.00530	0.00530
5	WB2S + WB2P	$X_{3-8}Y_1Z_{1-2}$ 0.1507	$X_{4-7}Y_2Z_{1-2}$ 0.05928	$X_{4-7}Y_3Z_{1-2}$ 0.02766	$X_{5-6}Y_4Z_{1-2}$ 0.0053	$X_{5-6}Y_5Z_{1-2}$ 0.0053				0.24824
6	WB3	$X_{9-10}Y_1Z_{1-6}$ 0.16867	$X_{10}Y_2Z_{1-6}$ 0.06	$X_{10}Y_3Z_{1-6}$ 0.028						0.25667
7	WB1 + WB2S + WB2P + CO1		$X_{2-3}Y_2Z_{3-6}$ 0.00396	$X_2Y_3Z_{3-6}$ 0.00082	$X_{1-2}Y_4Z_{3-6}$ 0.00062	$X_1Y_5Z_{3-6}$ 0.00026	$X_1Y_6Z_{3-6}$ 0.00026			0.00592
8	WB2S + WB2P + CO1	$X_3Y_1Z_{3-6}$ 0.00337								0.00337
9	WB2S + WB2P + CO2	$X_{5-8}Y_1Z_{3-6}$ 0.03508	$X_{5-7}Y_2Z_{3-6}$ 0.01408	$X_{6-7}Y_3Z_{3-6}$ 0.00513	$X_6Y_4Z_{3-6}$ 0.00088					0.05517
10	WB2S + WB2P + WB3 + CO2		$X_{8-9}Y_2Z_{3-6}$ 0.0198	$X_{8-9}Y_3Z_{3-6}$ 0.00924	$X_{7-10}Y_4Z_{3-6}$ 0.00792	$X_{7-10}Y_5Z_{3-6}$ 0.00792	$X_{7-10}Y_6Z_{3-6}$ 0.00792	$X_{8-10}Y_7Z_{3-6}$ 0.0066	$X_{8-10}Y_8Z_{3-6}$ 0.0066	0.06600
11	WB1 + WB2S + WB2P + CO1 + CO2			$X_3Y_3Z_{3-6}$ 0.00098	$X_{3-4}Y_4Z_{3-6}$ 0.00098	$X_{2-4}Y_5Z_{3-6}$ 0.00132	$X_{2-5}Y_6Z_{3-6}$ 0.00194	$X_{1-5}Y_7Z_{3-6}$ 0.0022	$X_{1-4}Y_8Z_{3-6}$ 0.00158	0.00903
12	WB2S + WB2P + WB3 + CO1 + CO2						$X_6Y_6Z_{3-6}$ 0.00088	$X_{6-7}Y_7Z_{3-6}$ 0.0022	$X_7Y_8Z_{3-6}$ 0.00132	0.00440
13	WB1 + WB2S + WB2P + WB3 + CO1 + CO2								$X_{5-6}Y_8Z_{3-6}$ 0.0015	0.00150
14	WB2S + WB2P + CO1 + CO2	$X_4Y_1Z_{3-6}$ 0.00405	$X_4Y_2Z_{3-6}$ 0.00264	$X_{4-5}Y_3Z_{3-6}$ 0.00267	$X_5Y_4Z_{3-6}$ 0.00062	$X_{5-6}Y_5Z_{3-6}$ 0.0015				0.01148

1.00000

Table A5 – Cumulative probability and oil outflow values

Side damage

Compartment groupings	Oil outflow O_i (m ³)	Probability P_i	Cumulative probability [sum of P_i]	Mean oil outflow $P_i \times O_i$ (m ³)	Probability P_{re}	Extreme outflow $O_{re} \times P_{re} \times 10$ (m ³)
WB1	0.00	0.17725	0.17725	0.00		
WB1 + WB2S	0.00	0.03408	0.21133	0.00		
WB2S	0.00	0.41532	0.62665	0.00		
WB2S + WB3	0.00	0.03408	0.66073	0.00		
WB3	0.00	0.17725	0.83798	0.00		
WB1 + WB2S + CO1	9430.00	0.01054	0.84852	99.39		
WB2S + CO1	9430.00	0.01939	0.86791	182.85		
WB2S + CO2	28291.00	0.09381	0.96172	2653.98	0.06172	17461.2052
WB2S + CO2 + WB3	28291.00	0.01142	0.97314	323.08	0.01142	3230.8322
WB1 + WB2S + CO1 + CO2	37721.00	0.00088	0.97402	33.19	0.00088	331.9448
WB2S + CO1 + CO2	37721.00	0.02598	1.00000	979.99	0.02598	9799.9158
				4272.48	0.10000	30823.898

Table A5 – Cumulative probability and oil outflow values (continued)

Bottom damage (0.0 metre tide)

Compartment groupings	Oil outflow O_i (m ³)	Probability P_i	Cumulative probability [sum of P_i]	Mean oil outflow $P_i \times O_i$ (m ³)	Probability P_{ie}	Extreme outflow $O_{ie} \times P_{ie} \times 10$ (m ³)
WB1	0.00	0.03027	0.03027	0.00		
WB1 + WB2S + WB2P	0.00	0.05304	0.08331	0.00		
WB1 + WB2S + WB2P + WB3	0.00	0.00530	0.08861	0.00		
WB2S + WB2P	0.00	0.24825	0.33686	0.00		
WB2S + WB2P + WB3	0.00	0.24960	0.58646	0.00		
WB3	0.00	0.25667	0.84313	0.00		
WB1 + WB2S + WB2P + CO1	2373.00	0.00592	0.84905	14.05		
WB2S + WB2P + CO1	2373.00	0.00337	0.85242	8.00		
WB2S + WB2P + CO2	13322.00	0.05518	0.90760	735.11	0.00760	1012.4720
WB2S + WB2P + WB3 + CO2	13322.00	0.06600	0.97360	879.25	0.06600	8792.5200
WB1 + WB2S + WB2P + CO1 + CO2	18796.00	0.00903	0.98263	169.73	0.00903	1697.2788
WB3 + WB2S + WB2P + CO1 + CO2	18796.00	0.00150	0.98413	28.19	0.00150	281.9400
WB1 + WB2S + WB2P + WB3 + CO1 + CO2	18796.00	0.00440	0.98853	82.70	0.00440	827.0240
WB2S + WB2P + CO1 + CO2	18796.00	0.01147	1.00000	215.59	0.01147	2155.9012
				2132.62	0.10000	14767.1360

Table A6 – Cumulative probability and oil outflow values

Bottom damage (2.0 metre tide)

Compartment groupings	Oil outflow O_i (m ³)	Probability P_i	Cumulative probability [sum of P_i]	Mean oil outflow $P_i \times O_i$ (m ³)	Probability P_{re}	Extreme outflow $O_{re} \times P_{re} \times 10$ (m ³)
WB1	0.00	0.03027	0.03027	0.00		
WB1 + WB2S + WB2P	0.00	0.05304	0.08331	0.00		
WB1 + WB2S + WB2P + WB3	0.00	0.00530	0.08861	0.00		
WB2S + WB2P	0.00	0.24825	0.33686	0.00		
WB2S + WB2P + WB3	0.00	0.24960	0.58646	0.00		
WB3	0.00	0.25667	0.84313	0.00		
WB1 + WB2S + WB2P + CO1	3832.00	0.00592	0.84905	22.69		
WB2S + WB2P + CO1	3832.00	0.00337	0.85242	12.91		
WB2S + WB2P + CO2	17210.00	0.05518	0.90760	949.65	0.00760	1307.9600
WB2S + WB2P + WB3 + CO2	17210.00	0.06600	0.97360	1135.86	0.06600	11358.6000
WB1 + WB2S + WB2P + CO1 + CO2	23898.00	0.00903	0.98263	215.80	0.00903	2157.9894
WB3 + WB2S + WB2P + CO1 + CO2	23898.00	0.00150	0.98413	35.85	0.00150	358.4700
WB1 + WB2S + WB2P + WB3 + CO1 + CO2	23898.00	0.00440	0.98853	105.15	0.00440	1051.5120
WB2S + WB2P + CO1 + CO2	23898.00	0.01147	1.00000	274.11	0.01147	2741.1006
				2752.02	0.10000	18975.6320

Table A6 – Cumulative probability and oil outflow values (continued)

Bottom damage (4.5 metre tide)

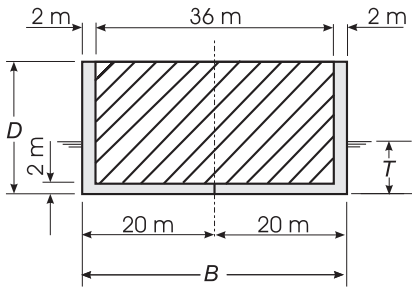
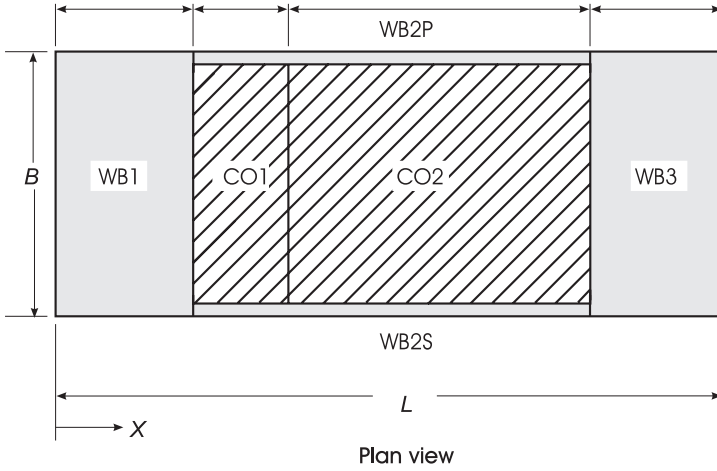
Compartment groupings	Oil outflow O_i (m ³)	Probability P_i	Cumulative probability [sum of P_i]	Mean oil outflow $P_i \times O_i$ (m ³)	Probability P_{ie}	Extreme outflow $O_{ie} \times P_{ie} \times 10$ (m ³)
WB1	0.00	0.03027	0.03027	0.00		
WB1 + WB2S + WB2P	0.00	0.05304	0.08331	0.00		
WB1 + WB2S + WB2P + WB3	0.00	0.00530	0.08861	0.00		
WB2S + WB2P	0.00	0.24825	0.33686	0.00		
WB2S + WB2P + WB3	0.00	0.24960	0.58646	0.00		
WB3	0.00	0.25667	0.84313	0.00		
WB1 + WB2S + WB2P + CO1	5658.00	0.00592	0.84905	33.50		
WB2S + WB2P + CO1	5658.00	0.00337	0.85242	19.07		
WB2S + WB2P + CO2	22081.00	0.05518	0.90760	1218.43	0.00760	1678.1560
WB2S + WB2P + WB3 + CO2	22081.00	0.06600	0.97360	1457.35	0.06600	14573.4600
WB1 + WB2S + WB2P + CO1 + CO2	30292.00	0.00903	0.98263	273.54	0.00903	2735.3676
WB3 + WB2S + WB2P + CO1 + CO2	30292.00	0.00150	0.98413	45.44	0.00150	454.3800
WB1 + WB2S + WB2P + WB3 + CO1 + CO2	30292.00	0.00440	0.98853	133.28	0.00440	1332.8480
WB2S + WB2P + CO1 + CO2	30292.00	0.01147	1.00000	347.45	0.01147	3474.4924
				3528.05	0.10000	24248.7040

Appendix 8: Approval of alternative methods of design and construction

Table A7 – Summary of oil outflow parameters

Bottom damage	(40%) 0.0 m tide	(50%) 2.0 m tide	(10%) 4.5 m tide	Combined
Probability of zero outflow P_0	0.8431	0.8431	0.8431	0.8431
Mean outflow (m ³)	2133	2752	3528	2582
Extreme outflow (m ³)	14767	18976	24249	17820

Combined side and bottom damage	(40%) Side damage	(60%) Bottom damage	Combined
Probability of zero outflow P_0	0.8380	0.8431	0.8411
Mean outflow (m ³)	4272	2582	3258
Extreme outflow (m ³)	30824	17820	23021
Mean outflow parameter O_M			0.0864
Extreme outflow parameter O_E			0.6103



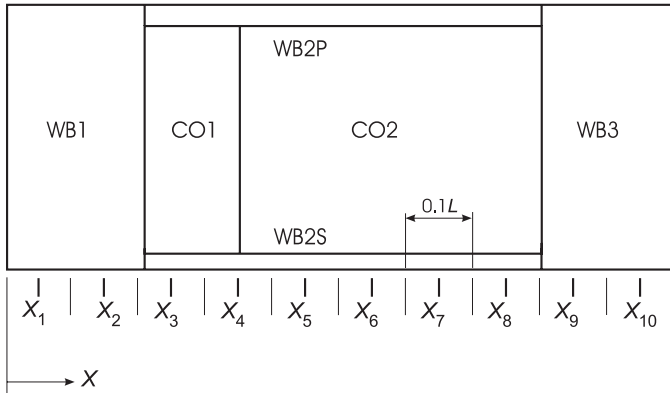
Midship section

Barge particulars

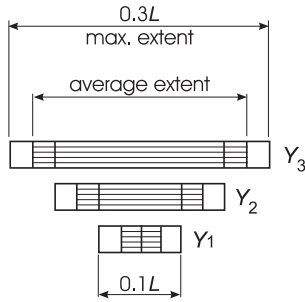
$L =$ _____ 100 m
 $B =$ _____ 40 m
 $D =$ _____ 20 m
 $T =$ _____ 9 m
displacement = _____ 36,900 t
light barge weight = _____ 2,951 t
CO1, CO2 = _____ cargo oil tanks
WB1, WB2, WB3 = water ballast tanks

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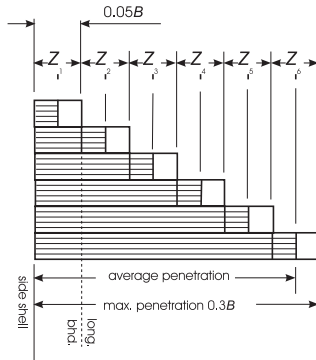
Figure A1 – Barge arrangement



Longitudinal damage location



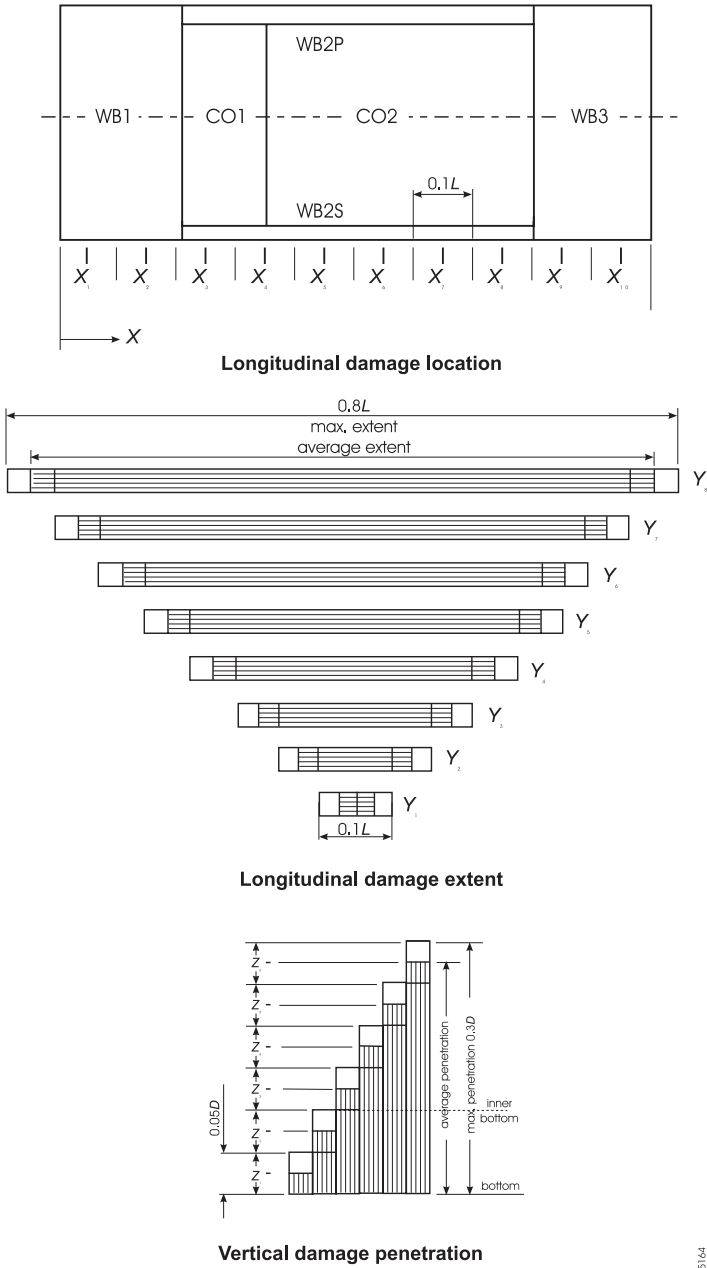
Longitudinal damage extent



Transverse damage penetration

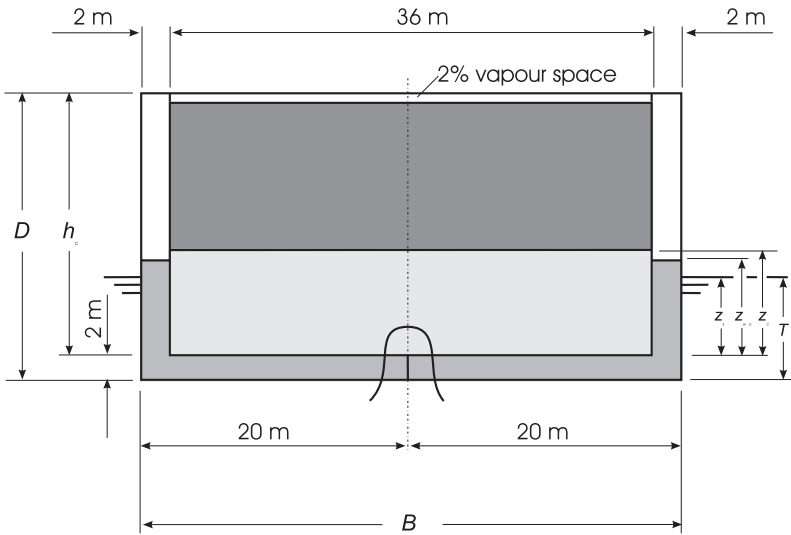
Figure A2 – Side damage definition




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Figure A3 – Bottom damage definition



- | | | | | |
|---------------|---|--------|---|----------------------------------|
| $L_{c_{o_1}}$ | = | 15.0 m |  | 50% oil and 50% water |
| $L_{c_{o_2}}$ | = | 45.0 m |  | oil |
| $L_{w_{o_2}}$ | = | 60.0 m |  | oil volume lost from cargo tanks |
| h_o | = | 18.0 m | | |

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Figure A4 - Oil outflow scheme for bottom damage

Annex II of MARPOL 73/78
(including amendments)

*Regulations for the
Control of Pollution by
Noxious Liquid Substances
in Bulk*

Annex II of MARPOL 73/78 (including amendments*)

Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk

Regulation 1

Definitions

For the purposes of this Annex:

- (1) *Chemical tanker* means a ship constructed or adapted primarily to carry a cargo of noxious liquid substances in bulk and includes an “oil tanker” as defined in Annex I of the present Convention when carrying a cargo or part cargo of noxious liquid substances in bulk.
- (2) *Clean ballast* means ballast carried in a tank which, since it was last used to carry a cargo containing a substance in Category A, B, C or D, has been thoroughly cleaned and the residues resulting therefrom have been discharged and the tank emptied in accordance with the appropriate requirements of this Annex.
- (3) *Segregated ballast* means ballast water introduced into a tank permanently allocated to the carriage of ballast or to the carriage of ballast or cargoes other than oil or noxious liquid substances as variously defined in the Annexes of the present Convention, and which is completely separated from the cargo and oil fuel system.
- (4) *Nearest land* is as defined in regulation 1(9) of Annex I of the present Convention.
- (5) *Liquid substances* are those having a vapour pressure not exceeding 2.8 kp/cm^2 at a temperature of 37.8°C .

* As of the publication of this Consolidated Edition, the 1990 Amendments on the harmonized system of surveys and certification had not entered into force. For information purposes only, refer to resolution MEPC.39(29) on the introduction of the harmonized system of survey and certification to Annexes I and II of MARPOL 73/78 adopted on 16 March 1990 by the Marine Environment Protection Committee, as set out in the Additional Information section of the present publication.

- (6) *Noxious liquid substance* means any substance referred to in appendix II to this Annex or provisionally assessed under the provisions of regulation 3(4) as falling into Category A, B, C or D.
- (7) *Special area* means a sea area where for recognized technical reasons in relation to its oceanographic and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by noxious liquid substances is required. Special areas shall be:
- (a) the Baltic Sea area, and
 - (b) the Black Sea area, and
 - (c) the Antarctic area
- (8) *Baltic Sea area* is as defined in regulation 10(1)(b) of Annex I of the present Convention.
- (9) *Black Sea area* is as defined in regulation 10(1)(c) of Annex I of the present Convention.
- (9A) *The Antarctic area* means the sea area south of latitude 60° S.
- (10) *International Bulk Chemical Code* means the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk* adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.19(22), as may be amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the present Convention concerning amendment procedures applicable to an appendix to an Annex.
- (11) *Bulk Chemical Code* means the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk† adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.20(22), as may be amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the present Convention concerning amendment procedures applicable to an appendix to an Annex.
- (12) *Ship constructed* means a ship the keel of which is laid or which is at a similar stage of construction. A ship converted to a chemical tanker, irrespective of the date of construction, shall be treated as a chemical tanker constructed on the date on which such conversion commenced. This conversion provision shall not apply to the

* See IMO sales publication IMO-100E.

† See IMO sales publication IMO-772E.

modification of a ship which complies with all of the following conditions:

- (a) the ship is constructed before 1 July 1986; and
- (b) the ship is certified under the Bulk Chemical Code to carry only those products identified by the Code as substances with pollution hazards only.

SEE INTERPRETATION 1.1

(13) *Similar stage of construction* means the stage at which:

- (a) construction identifiable with a specific ship begins; and
- (b) assembly of that ship has commenced comprising at least 50 tons or 1% of the estimated mass of all structural material, whichever is less.



Regulation 2

Application

- (1) Unless expressly provided otherwise the provisions of this Annex shall apply to all ships carrying noxious liquid substances in bulk.
- (2) Where a cargo subject to the provisions of Annex I of the present Convention is carried in a cargo space of a chemical tanker, the appropriate requirements of Annex I of the present Convention shall also apply.
- (3) Regulation 13 of this Annex shall apply only to ships carrying substances which are categorized for discharge control purposes in Category A, B or C.
- (4) For ships constructed before 1 July 1986, the provisions of regulation 5 of this Annex in respect of the requirement to discharge below the waterline and maximum concentration in the wake astern of the ship shall apply as from 1 January 1988.
- (5) The Administration may allow any fitting, material, appliance or apparatus to be fitted in a ship as an alternative to that required by this Annex if such fitting, material, appliance or apparatus is at least as effective as that required by this Annex. This authority of the Administration shall not extend to the substitution of operational methods to effect the control of discharge of noxious liquid substances as equivalent to those design and construction features which are prescribed by regulations in this Annex.

SEE INTERPRETATION 2.1

- (6) The Administration which allows a fitting, material, appliance or apparatus as alternative to that required by this Annex, under paragraph (5) of this regulation, shall communicate to the Organization for circulation to the Parties to the Convention, particulars thereof, for their information and appropriate action, if any.

SEE INTERPRETATION 2.1

- (7) (a) Where an amendment to this Annex and the International Bulk Chemical and Bulk Chemical Codes involves changes to the structure or equipment and fittings due to the upgrading of the requirements for the carriage of certain substances, the Administration may modify or delay for a specified period the application of such an amendment to ships constructed before the date of entry into force of that amendment, if the immediate application of such an amendment is considered unreasonable or impracticable. Such relaxation shall be determined with respect to each substance, having regard to the guidelines developed by the Organization.*
- (b) The Administration allowing a relaxation of the application of an amendment under this paragraph shall submit to the Organization a report giving details of the ship or ships concerned, the cargoes carried, the trade in which each ship is engaged and the justification for the relaxation, for circulation to the Parties to the Convention for their information and appropriate action, if any.

Regulation 3

Categorization and listing of noxious liquid substances

- (1) For the purpose of the regulations of this Annex, noxious liquid substances shall be divided into four categories as follows:
- (a) *Category A*: Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a major hazard to either marine resources or human health or cause serious harm to amenities or other legitimate uses of the sea and therefore justify the application of stringent anti-pollution measures.

* Refer to the Guidelines for the Application of Amendments to the List of Substances in Annex II of MARPOL 73/78 and the IBC Code and BCH Code with Respect to Pollution Hazards, approved by the Marine Environment Protection Committee at its thirty-first session; see the Appendix to Unified Interpretations of Annex II.

- (b) *Category B*: Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify the application of special anti-pollution measures.
 - (c) *Category C*: Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a minor hazard to either marine resources or human health or cause minor harm to amenities or other legitimate uses of the sea and therefore require special operational conditions.
 - (d) *Category D*: Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a recognizable hazard to either marine resources or human health or cause minimal harm to amenities or other legitimate uses of the sea and therefore require some attention in operational conditions.
- (2) Guidelines for use in the categorization of noxious liquid substances are given in appendix I to this Annex.
 - (3) Noxious liquid substances carried in bulk which are presently categorized as Category A, B, C and D and subject to the provisions of this Annex are referred to in appendix II to this Annex.
 - (4) Where it is proposed to carry a liquid substance in bulk which has not been categorized under paragraph (1) of this regulation or evaluated as referred to in regulation 4(1) of this Annex, the Governments of Parties to the Convention involved in the proposed operation shall establish and agree on a provisional assessment for the proposed operation on the basis of the guidelines referred to in paragraph (2) of this regulation. Until full agreement between the Governments involved has been reached, the substance shall be carried under the most severe conditions proposed. As soon as possible, but not later than 90 days after its first carriage, the Administration concerned shall notify the Organization and provide details of the substance and the provisional assessment for prompt circulation to all Parties for their information and consideration. The Government of each Party shall have a period of 90 days in which to forward its comments to the Organization, with a view to the assessment of the substance.

SEE INTERPRETATIONS 2A.1 to 2A.4

Regulation 4

Other liquid substances

- (1) The substances referred to in appendix III to this Annex have been evaluated and found to fall outside the Category A, B, C and D, as defined in regulation 3(1) of this Annex because they are at present considered to present no harm to human health, marine resources, amenities or other legitimate uses of the sea, when discharged into the sea from tank cleaning or deballasting operations.
- (2) The discharge of bilge or ballast water or other residues or mixtures containing only substances referred to in appendix III to this Annex shall not be subject to any requirement of this Annex.
- (3) The discharge into the sea of clean ballast or segregated ballast shall not be subject to any requirement of this Annex.

Regulation 5

*Discharge of noxious liquid substances**

SEE INTERPRETATION 3.1

Category A, B and C substances outside special areas and Category D substances in all areas

Subject to the provisions of paragraph (14) of this regulation and of regulation 6 of this Annex,

- (1) The discharge into the sea of substances in Category A as defined in regulation 3(1)(a) of this Annex or of those provisionally assessed as such or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited. If tanks containing such substances or mixtures are to be washed, the resulting residues shall be discharged to a reception facility until the concentration of the substance in the effluent to such facility is at or below 0.1% by weight and until the tank is empty, with the exception of phosphorus, yellow or white, for which the residual concentration shall be 0.01% by weight. Any water subsequently added to the tank may be discharged into the sea when all the following conditions are satisfied:
 - (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

* For reference to “standards developed by the Organization” as used in this regulation, refer to the Standards for procedures and arrangements for the discharge of noxious liquid substances.

-
- (b) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land in a depth of water of not less than 25 m.
- (2) The discharge into the sea of substances in Category B as defined in regulation 3(1)(b) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:
- (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;
 - (c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in subparagraph (b) of this paragraph, which shall in no case exceed the greater of 1 m³ or 1/3,000 of the tank capacity in m³;
 - (d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 m.
- (3) The discharge into the sea of substances in Category C as defined in regulation 3(1)(c) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:
- (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the

- effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 10 parts per million;
- (c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in subparagraph (b) of this paragraph, which shall in no case exceed the greater of 3 m³ or 1/1,000 of the tank capacity in m³;
 - (d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 m.
- (4) The discharge into the sea of substances in Category D as defined in regulation 3(1)(d) of this Annex, or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:
- (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (b) such mixtures are of a concentration not greater than one part of the substance in ten parts of water; and
 - (c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land.
- (5) Ventilation procedures approved by the Administration may be used to remove cargo residues from a tank. Such procedures shall be based upon standards developed by the Organization. Any water subsequently introduced into the tank shall be regarded as clean and shall not be subject to paragraph (1), (2), (3) or (4) of this regulation.
- (6) The discharge into the sea of substances which have not been categorized, provisionally assessed, or evaluated as referred to in regulation 4(1) of this Annex, or of ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited.

Category A, B and C substances within special areas

Subject to the provisions of paragraph (14) of this regulation and regulation 6 of this Annex,

- (7) The discharge into the sea of substances in Category A as defined in regulation 3(1)(a) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures

containing such substances shall be prohibited. If tanks containing such substances or mixtures are to be washed, the resulting residues shall be discharged to a reception facility which the States bordering the special area shall provide in accordance with regulation 7 of this Annex, until the concentration of the substance in the effluent to such facility is at or below 0.05% by weight and until the tank is empty, with the exception of phosphorus, yellow or white, for which the residual concentration shall be 0.005% by weight. Any water subsequently added to the tank may be discharged into the sea when all the following conditions are satisfied:

- (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (b) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 m.
- (8) The discharge into the sea of substances in Category B as defined in regulation (3)(1)(b) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:
- (a) the tank has been prewashed in accordance with the procedure approved by the Administration and based on standards developed by the Organization and the resulting tank washings have been discharged to a reception facility;
 - (b) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (c) the procedures and arrangements for discharge and washings are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;
 - (d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 m.

- (9) The discharge into the sea of substances in Category C as defined in regulation 3(1)(c) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:
- (a) the ship is proceeding *en route* at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;
 - (b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;
 - (c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in subparagraph (b) of this paragraph which shall in no case exceed the greater of 1 m^3 or $1/3,000$ of the tank capacity in m^3 ;
 - (d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and
 - (e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 m.
- (10) Ventilation procedures approved by the Administration may be used to remove cargo residues from a tank. Such procedures shall be based upon standards developed by the Organization. Any water subsequently introduced into the tank shall be regarded as clean and shall not be subject to paragraph (7), (8) or (9) of this regulation.
- (11) The discharge into the sea of substances which have not been categorized, provisionally assessed or evaluated as referred to in regulation 4(1) of this Annex, or of ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited.
- (12) Nothing in this regulation shall prohibit a ship from retaining on board the residues from a Category B or C cargo and discharging such residues into the sea outside a special area in accordance with paragraph (2) or (3) of this regulation, respectively.
- (13) (a) The Governments of Parties to the Convention, the coastlines of which border on any given special area, shall collectively agree and establish a date by which time the requirement of regulation 7(1) of this Annex will be fulfilled and from which the

requirements of paragraphs (7), (8), (9) and (10) of this regulation in respect of that area shall take effect and notify the Organization of the date so established at least six months in advance of that date. The Organization shall then promptly notify all Parties of that date.

- (b) If the date of entry into force of the present Convention is earlier than the date established in accordance with subparagraph (a) of this paragraph, the requirements of paragraphs (1), (2) and (3) of this regulation shall apply during the interim period.
- (14) In respect of the Antarctic area any discharge into the sea of noxious liquid substances or mixtures containing such substances shall be prohibited.

Regulation 5A

*Pumping, piping and unloading arrangements**

- (1) Every ship constructed on or after 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favourable pumping conditions, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 0.1 m³ in the tank's associated piping and in the immediate vicinity of that tank's suction point.
- (2)
 - (a) Subject to the provisions of subparagraph (b) of this paragraph, every ship constructed before 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favourable pumping conditions, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 0.3 m³ in the tank's associated piping and in the immediate vicinity of that tank's suction point.
 - (b) Until 2 October 1994 ships referred to in subparagraph (a) of this paragraph if not in compliance with the requirements of that subparagraph shall, as a minimum, be provided with pumping and piping arrangements to ensure, through testing under favourable pumping conditions and surface residue assessment, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 1 m³ or 1/3000 of the tank capacity in m³, whichever is greater, in that tank and the associated piping.
- (3) Every ship constructed on or after 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under

* For reference to "standards developed by the Organization" as used in this regulation, refer to the Standards for procedures and arrangements for the discharge of noxious liquid substances.

favourable pumping conditions, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 0.3 m³ in the tank's associated piping and in the immediate vicinity of that tank's suction point.

- (4) (a) Subject to the provisions of subparagraph (b) of this paragraph, every ship constructed before 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favourable pumping conditions, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 0.9 m³ in the tank's associated piping and in the immediate vicinity of that tank's suction point.
 - (b) Until 2 October 1994 the ships referred to in subparagraph (a) of this paragraph if not in compliance with the requirements of that subparagraph shall, as a minimum, be provided with pumping and piping arrangements to ensure, through testing under favourable pumping conditions and surface residue assessment, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 3 m³ or 1/1000 of the tank capacity in m³, whichever is greater, in that tank and the associated piping.
- (5) Pumping conditions referred to in paragraphs (1), (2), (3) and (4) of this regulation shall be approved by the Administration and based on standards developed by the Organization. Pumping efficiency tests referred to in paragraphs (1), (2), (3) and (4) of this regulation shall use water as the test medium and shall be approved by the Administration and based on standards developed by the Organization. The residues on cargo tank surfaces, referred to in paragraphs (2)(b) and (4)(b) of this regulation shall be determined based on standards developed by the Organization.
- (6) (a) Subject to the provisions of subparagraph (b) of this paragraph, the provisions of paragraphs (2) and (4) of this regulation need not apply to a ship constructed before 1 July 1986 which is engaged in restricted voyages as determined by the Administration between:
 - (i) ports or terminals within a State Party to the present Convention; or
 - (ii) ports or terminals of States Parties to the present Convention.
 - (b) The provisions of subparagraph (a) of this paragraph shall only apply to a ship constructed before 1 July 1986 if:
 - (i) each time a tank containing Category B or C substances or mixtures is to be washed or ballasted, the tank is washed in accordance with a prewash procedure approved by the

Administration and based on standards developed by the Organization and the tank washings are discharged to a reception facility;

- (ii) subsequent washings or ballast water are discharged to a reception facility or at sea in accordance with other provisions of this Annex;
- (iii) the adequacy of the reception facilities at the ports or terminals referred to above, for the purpose of this paragraph, is approved by the Governments of the States Parties to the present Convention within which such ports or terminals are situated;
- (iv) in the case of ships engaged in voyages to ports or terminals under the jurisdiction of other States Parties to the present Convention, the Administration communicates to the Organization, for circulation to the Parties to the Convention, particulars of the exemption, for their information and appropriate action, if any; and

SEE INTERPRETATION 4.1

- (v) the certificate required under this Annex is endorsed to the effect that the ship is solely engaged in such restricted voyages.
- (7) For a ship whose constructional and operational features are such that ballasting of cargo tanks is not required and cargo tank washing is only required for repair or dry-docking, the Administration may allow exemption from the provisions of paragraphs (1), (2), (3) and (4) of this regulation, provided that all of the following conditions are complied with:
- (a) the design, construction and equipment of the ship are approved by the Administration, having regard to the service for which it is intended;
 - (b) any effluent from tank washings which may be carried out before a repair or dry-docking is discharged to a reception facility, the adequacy of which is ascertained by the Administration;
 - (c) the certificate required under this Annex indicates:
 - (i) that each cargo tank is certified for the carriage of only one named substance; and
 - (ii) the particulars of the exemption;
 - (d) the ship carries a suitable operational manual approved by the Administration; and

- (e) in the case of ships engaged in voyages to ports or terminals under the jurisdiction of other States Parties to the present Convention, the Administration communicates to the Organization, for circulation to the Parties to the Convention, particulars of the exemption, for their information and appropriate action, if any.

SEE INTERPRETATION 4.1

Regulation 6

Exceptions

Regulation 5 of this Annex shall not apply to:

- (a) the discharge into the sea of noxious liquid substances or mixtures containing such substances necessary for the purpose of securing the safety of a ship or saving life at sea; or
- (b) the discharge into the sea of noxious liquid substances or mixtures containing such substances resulting from damage to a ship or its equipment:
 - (i) provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimizing the discharge; and
 - (ii) except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or
- (c) the discharge into the sea of noxious liquid substances or mixtures containing such substances, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution. Any such discharge shall be subject to the approval of any Government in whose jurisdiction it is contemplated the discharge will occur.

Regulation 7

Reception facilities and cargo unloading terminal arrangements

- (1) The Government of each Party to the Convention undertakes to ensure the provision of reception facilities according to the needs of ships using its ports, terminals or repair ports as follows:
 - (a) cargo loading and unloading ports and terminals shall have facilities adequate for reception without undue delay to ships of such residues and mixtures containing noxious liquid substances

as would remain for disposal from ships carrying them as a consequence of application of this Annex; and

- (b) ship repair ports undertaking repairs to chemical tankers shall have facilities adequate for the reception of residues and mixtures containing noxious liquid substances.

SEE INTERPRETATION 5.1

- (2) The Government of each Party shall determine the types of facilities provided for the purpose of paragraph (1) of this regulation at each cargo loading and unloading port, terminal and ship repair port in its territories and notify the Organization thereof.
- (3) The Government of each Party to the Convention shall undertake to ensure that cargo unloading terminals shall provide arrangements to facilitate stripping of cargo tanks of ships unloading noxious liquid substances at these terminals. Cargo hoses and piping systems of the terminal, containing noxious liquid substances received from ships unloading these substances at the terminal, shall not be drained back to the ship.
- (4) Each Party shall notify the Organization, for transmission to the Parties concerned, of any case where facilities required under paragraph (1) or arrangements required under paragraph (3) of this regulation are alleged to be inadequate.

Regulation 8

*Measures of control**

- (1) (a) The Government of each Party to the Convention shall appoint or authorize surveyors for the purpose of implementing this regulation. The surveyors shall execute control in accordance with control procedures developed by the Organization.[†]
- (b) The master of a ship carrying noxious liquid substances in bulk shall ensure that the provisions of regulation 5 and this regulation have been complied with and that the Cargo Record Book is completed in accordance with regulation 9 of this Annex whenever operations as referred to in that regulation take place.
- (c) An exemption referred to in paragraphs (2)(b), (5)(b), (6)(c) or (7)(c) of this regulation may only be granted by the Government

* For reference to “standards developed by the Organization” as used in this regulation, refer to the Standards for procedures and arrangements for the discharge of noxious liquid substances.

[†] Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19); see IMO sales publication IMO-650E.

of the receiving Party to a ship engaged in voyages to ports or terminals under the jurisdiction of other States Parties to the present Convention. When such an exemption has been granted, the appropriate entry made in the Cargo Record Book shall be endorsed by the surveyor referred to in subparagraph (a) of this paragraph.

Category A substances in all areas

- (2) With respect to Category A substances the following provisions shall apply in all areas:
 - (a) A tank which has been unloaded shall, subject to the provisions of subparagraph (b) of this paragraph, be washed in accordance with the requirements of paragraphs (3) or (4) of this regulation before the ship leaves the port of unloading.
 - (b) At the request of the ship's master, the Government of the receiving Party may exempt the ship from the requirements referred to in subparagraph (a) of this paragraph, where it is satisfied that:
 - (i) the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tank will not be washed or ballasted prior to loading; or
 - (ii) the tank unloaded is neither washed nor ballasted at sea and the provisions of paragraphs (3) or (4) of this regulation are complied with at another port provided that it has been confirmed in writing that a reception facility at that port is available and is adequate for such a purpose; or
 - (iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.
- (3) If the tank is to be washed in accordance with subparagraph (2)(a) of this regulation, the effluent from the tank washing operation shall be discharged to a reception facility at least until the concentration of the substance in the discharge, as indicated by analyses of samples of the effluent taken by the surveyor, has fallen to the concentration specified in regulation 5(1) or 5(7), as applicable, of this Annex. When the required concentration has been achieved, remaining tank washings shall continue to be discharged to the reception facility until the tank is empty. Appropriate entries of these operations shall be made in the Cargo Record Book and endorsed by the surveyor referred to under paragraph (1)(a) of this regulation.
- (4) Where the Government of the receiving party is satisfied that it is impracticable to measure the concentration of the substance in the

effluent without causing undue delay to the ship, that Party may accept an alternative procedure as being equivalent to paragraph (3) of this regulation provided that:

- (a) the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization; and
- (b) the surveyor referred to under paragraph (1)(a) certifies in the Cargo Record Book that:
 - (i) the tank, its pump and piping systems have been emptied; and
 - (ii) the prewash has been carried out in accordance with the prewash procedure approved by the Administration for that tank and that substance; and
 - (iii) the tank washings resulting from such prewash have been discharged to a reception facility and the tank is empty.

Category B and C substances outside special areas

- (5) With respect to Category B and C substances, the following provisions shall apply outside special areas:
 - (a) A tank which has been unloaded shall, subject to the provisions of subparagraph (b) of this paragraph, be prewashed before the ship leaves the port of unloading, whenever:
 - (i) the substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity exceeding the maximum quantity which may be discharged into the sea under regulation 5(2) or (3) of this Annex in case of Category B or C substances respectively; or

SEE INTERPRETATION 5A.1

- (ii) the unloading is not carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under regulation 5A(5) of this Annex, unless alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this regulation to remove the cargo residues from the ship to quantities specified in regulation 5A of this Annex as applicable.

The prewash procedure used shall be approved by the Administration and based on standards developed by the

Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.

- (b) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of subparagraph (a) of this paragraph, where it is satisfied that:
 - (i) the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tank will not be washed nor ballasted prior to loading; or
 - (ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a reception facility at that port is available and adequate for such a purpose; or
 - (iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category B substances within special areas

- (6) With respect to Category B substances, the following provisions shall apply within special areas:
 - (a) A tank which has been unloaded shall, subject to the provisions of subparagraphs (b) and (c), be prewashed before the ship leaves the port of unloading. The prewash procedure used shall be approved by the Administration and based on standards developed by the Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.
 - (b) The requirements of subparagraph (a) of this paragraph do not apply when all the following conditions are satisfied:
 - (i) the Category B substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity not exceeding the maximum quantity which may be discharged into the sea outside special areas under regulation 5(2) of this Annex, and the residues are retained on board for subsequent discharge into the sea outside the special area in compliance with regulation 5(2) of this Annex; and
 - (ii) the unloading is carried out in accordance with the pumping conditions for the tank approved by the

Administration and based on standards developed by the Organization as referred to under regulation 5A(5) of this Annex, or failing to comply with the approved pumping conditions, alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this regulation to remove the cargo residues from the ship to quantities specified in regulation 5A of this Annex as applicable.

- (c) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of subparagraph (a) of this paragraph, where it is satisfied that:
 - (i) the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tank will not be washed or ballasted prior to loading; or
 - (ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a reception facility at that port is available and adequate for such a purpose; or
 - (iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category C substances within special areas

- (7) With respect to Category C substances, the following provisions shall apply within special areas:
 - (a) A tank which has been unloaded shall, subject to the provisions of subparagraphs (b) and (c) of this paragraph, be prewashed before the ship leaves the port of unloading, whenever:
 - (i) the Category C substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity exceeding the maximum quantity which may be discharged into the sea under regulation 5(9) of this Annex; or

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- (ii) the unloading is not carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the

Organization as referred to under regulation 5A(5) of this Annex, unless alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this regulation to remove the cargo residues from the ship to quantities specified in regulation 5A of this Annex as applicable.

The prewash procedure used shall be approved by the Administration and based on standards developed by the Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.

- (b) The requirements of subparagraph (a) of this paragraph do not apply when all the following conditions are satisfied:
 - (i) the Category C substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity not exceeding the maximum quantity which may be discharged into the sea outside special areas under regulation 5(3) of this Annex, and the residues are retained on board for subsequent discharge into the sea outside the special area in compliance with regulation 5(3) of this Annex; and
 - (ii) the unloading is carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under regulation 5A(5) of this Annex, or failing to comply with the approved pumping conditions, alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this regulation to remove the cargo residues from the ship to quantities specified in regulation 5A of this Annex as applicable.
- (c) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of subparagraph (a) of this paragraph, where it is satisfied that:
 - (i) the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tank will not be washed or ballasted prior to loading; or
 - (ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a

- reception facility at that port is available and adequate for such a purpose; or
- (iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category D substances in all areas

- (8) With respect to Category D substances, a tank which has been unloaded shall either be washed and the resulting tank washings shall be discharged to a reception facility, or the remaining residues in the tank shall be diluted and discharged into the sea in accordance with regulation 5(4) of this Annex.

Discharge from a slop tank

- (9) Any residues retained on board in a slop tank, including those from cargo pump-room bilges, which contain a Category A substance, or within a special area either a Category A or a Category B substance, shall be discharged to a reception facility in accordance with the provisions of regulation 5(1), (7) or (8) of this Annex, whichever is applicable.

Regulation 9

Cargo Record Book

- (1) Every ship to which this Annex 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 this Annex.
- (2) The Cargo Record Book shall be completed, on a tank-to-tank basis, whenever any of the following operations with respect to a noxious liquid substance take place in the ship:
 - (i) loading of cargo;
 - (ii) internal transfer of cargo;
 - (iii) unloading of cargo;
 - (iv) cleaning of cargo tanks;
 - (v) ballasting of cargo tanks;
 - (vi) discharge of ballast from cargo tanks;
 - (vii) disposal of residues to reception facilities;
 - (viii) discharge into the sea or removal by ventilation of residues in accordance with regulation 5 of this Annex.

- (3) In the event of any discharge of the kind referred to in article 8 of the present Convention and regulation 6 of this Annex of any noxious liquid substance or mixture containing such substance, whether intentional or accidental, an entry shall be made in the Cargo Record Book stating the circumstances of, and the reason for, the discharge.
- (4) When a surveyor appointed or authorized by the Government of the Party to the Convention to supervise any operations under this Annex has inspected a ship, then that surveyor shall make an appropriate entry in the Cargo Record Book.
- (5) Each operation referred to in paragraphs (2) and (3) of this regulation shall be fully recorded without delay in the Cargo Record Book so that all the entries in the book appropriate to that operation are completed. Each entry shall be signed by the officer or officers in charge of the operation concerned and each page shall be signed by the master of the ship. The entries in the Cargo Record Book shall be in an official language of the State whose flag the ship is entitled to fly, and, for ships holding an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or a certificate referred to in regulation 12A of this Annex in English or French. The entries in an official national language of the State whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy.
- (6) The Cargo Record Book shall be kept in such a place as to be readily available for inspection and, except in the case of unmanned ships under tow, shall be kept on board the ship. It shall be retained for a period of three years after the last entry has been made.
- (7) The competent authority of the Government of a Party may inspect the Cargo Record Book on board any ship to which this Annex applies while the ship is in its port, and may make a copy of any entry in that book and may require the master of the ship to certify that the copy is a true copy of such entry. Any copy so made which has been certified by the master of the ship as a true copy of an entry in the ship's Cargo Record Book shall be made admissible in any judicial proceedings as evidence of the facts stated in the entry. The inspection of a Cargo Record Book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.



Regulation 10

Surveys

- (1) Ships carrying noxious liquid substances in bulk shall be subject to the surveys specified below:

- (a) An initial survey before the ship is put in service or before the certificate required under regulation 11 of this Annex is issued for the first time, and which shall include a complete survey of its structure, equipment, systems, fittings, arrangements and material in so far as the ship is covered by this Annex. This survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex.
- (b) Periodical surveys at intervals specified by the Administration, but not exceeding five years, and which shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the requirements of this Annex.
- (c) A minimum of one intermediate survey during the period of validity of the certificate and which shall be such as to ensure that the equipment and associated pump and piping systems fully comply with the applicable requirements of this Annex and are in good working order. In cases where only one such intermediate survey is carried out in any one certificate validity period, it shall be held not before six months prior to, nor later than six months after the half-way date of the certificate's period of validity. Such intermediate surveys shall be endorsed on the certificate issued under regulation 11 of this Annex.

SEE INTERPRETATION 6.1

- (d) An annual survey within three months before or after the day and the month of the date of issue of the certificate and which shall include a general examination to ensure that the structure, fittings, arrangements and materials remain in all respects satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the certificate issued under regulation 11 of this Annex.

SEE INTERPRETATION 6.1

- (2)
 - (a) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.
 - (b) An Administration nominating surveyors or recognizing organizations to conduct surveys and inspections as set forth in subparagraph (a) of this paragraph, shall as a minimum empower any nominated surveyor or recognized organization to:

- (i) require repairs to a ship; and
- (ii) carry out surveys and inspections 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 the nominated surveyors or recognized organizations, for circulation to Parties to the present Convention for the information of their officers.

- (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 presenting an unreasonable threat of harm to the marine environment, 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 certificate should be withdrawn and the Administration shall be notified immediately; and if the ship is in a 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 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 applicable, the Government of the port State concerned shall take such steps as will ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without presenting an unreasonable threat of harm to the marine environment.
 - (d) In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and inspection and shall undertake to ensure the necessary arrangements to satisfy this obligation.
- (3)
- (a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment.
 - (b) After any survey of the ship under paragraph (1) of this regulation has been completed, no change shall be made in the structure, equipment, systems, fittings, arrangements or material covered by the survey, without the sanction of the Adminis-

tration, except the direct replacement of such equipment and fittings.

- (c) Whenever an accident occurs to a ship or a defect is discovered which substantially affects the integrity of the ship or the efficiency or completeness of its equipment covered by this Annex, the master or owner of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph (1) of this regulation is necessary. If the ship is in a port of another Party, 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 report has been made.



Regulation 11

Issue of certificate

- (1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued, after survey in accordance with the provisions of regulation 10 of this Annex, 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 the Convention.
- (2) Such certificate shall be issued either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the certificate.
- (3) (a) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk to the ship in accordance with this Annex.
- (b) A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.
- (c) A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the certificate issued under paragraph (1) of this regulation.
- (d) No International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

- (4) The International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be drawn up in an official language of the issuing country in the form corresponding to the model given in appendix V to this Annex. If the language used is neither English nor French, the text shall include a translation into one of these languages.



Regulation 12

Duration of certificate

- (1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue.
- (2) A certificate shall cease to be valid if significant alterations have taken place in the construction, equipment, systems, fittings, arrangements or material required without the sanction of the Administration, except the direct replacement of such equipment or fittings, or if intermediate or annual surveys as specified by the Administration under regulation 10(1)(c) or (d) of this Annex are not carried out.
- (3) A certificate issued to a ship shall also cease to be valid upon transfer of the ship to the flag of another State. A new certificate shall be issued only when the Government issuing the new certificate is fully satisfied that the ship is in full compliance with the requirements of regulation 10(3) (a) and (b) of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall transmit as soon as possible to the Administration a copy of the certificate carried by the ship before the transfer and, if available, a copy of the relevant survey report.

Regulation 12A

Survey and certification of chemical tankers

Notwithstanding the provisions of regulations 10, 11 and 12 of this Annex, chemical tankers which have been surveyed and certified by States Parties to the present Convention in accordance with the provisions of the International Bulk Chemical Code or the Bulk Chemical Code, as applicable, shall be deemed to have complied with the provisions of the said regulations, and the certificate issued under that Code shall have the

same force and receive the same recognition as the certificate issued under regulation 11 of this Annex.

Regulation 13

Requirements for minimizing accidental pollution

- (1) The design, construction, equipment and operation of ships carrying noxious liquid substances of Category A, B or C in bulk, shall be such as to minimize the uncontrolled discharge into the sea of such substances.
- (2) Chemical tankers constructed on or after 1 July 1986 shall comply with the requirements of the International Bulk Chemical Code.
- (3) Chemical tankers constructed before 1 July 1986 shall comply with the following requirements:
 - (a) The following chemical tankers shall comply with the requirements of the Bulk Chemical Code as applicable to ships referred to in 1.7.2 of that Code:
 - (i) ships for which the building contract is placed on or after 2 November 1973 and which are engaged on voyages to ports or terminals under the jurisdiction of other States Parties to the Convention; and
 - (ii) ships constructed on or after 1 July 1983 which are engaged solely on voyages between ports or terminals within the State the flag of which the ship is entitled to fly.
 - (b) The following chemical tankers shall comply with the requirements of the Bulk Chemical Code as applicable to ships referred to in 1.7.3 of that Code:
 - (i) ships for which the building contract is placed before 2 November 1973 and which are engaged on voyages to ports or terminals under the jurisdiction of other States Parties to the Convention; and
 - (ii) ships constructed before 1 July 1983 which are engaged on voyages between ports or terminals within the State the flag of which the ship is entitled to fly, except that for ships of less than 1,600 tons gross tonnage compliance with the Code in respect of construction and equipment shall take effect not later than 1 July 1994.
- (4) In respect of ships other than chemical tankers carrying noxious liquid substances of Category A, B or C in bulk, the Administration shall establish appropriate measures based on the Guidelines developed by

the Organization* in order to ensure that the provisions of paragraph (1) of this regulation are complied with.

SEE INTERPRETATION 6A.1.1

Regulation 14

Carriage and discharge of oil-like substances

SEE INTERPRETATIONS 7.1 and 7.2

Notwithstanding the provisions of other regulations of this Annex, noxious liquid substances referred to in appendix II of this Annex as falling under Category C or D and identified by the Organization[†] as oil-like substances under the criteria developed by the Organization, may be carried on an oil tanker as defined in Annex I of the Convention and discharged in accordance with the provisions of Annex I of the present Convention, provided that all of the following conditions are complied with:

- (a) the ship complies with the provisions of Annex I of the present Convention as applicable to product carriers as defined in that Annex;
 - (b) the ship carries an International Oil Pollution Prevention Certificate and its Supplement B and the certificate is endorsed to indicate that the ship may carry oil-like substances in conformity with this regulation and the endorsement includes a list of oil-like substances the ship is allowed to carry;
 - (c) in the case of Category C substances the ship complies with the ship type 3 damage stability requirements of;
 - (i) the International Bulk Chemical Code in the case of a ship constructed on or after 1 July 1986; or
 - (ii) the Bulk Chemical Code, as applicable under regulation 13 of this Annex, in the case of a ship constructed before 1 July 1986; and
-

SEE INTERPRETATION 7.3

- (d) the oil content meter in the oil discharge monitoring and control system of the ship is approved by the Administration for use in monitoring the oil-like substances to be carried.
-

SEE INTERPRETATION 7.4

* Refer to Interpretation 6A.1.1 of the Unified Interpretations of Annex II.

† Refer to Interpretation 7.2.1 of the Unified Interpretations of Annex II.

Regulation 15

*Port State control on operational requirements**

- (1) A ship when in a port of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by noxious liquid substances.
- (2) In the circumstances given in paragraph (1) of this regulation, the Party 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 this Annex.
- (3) Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
- (4) Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.



* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19); see IMO sales publication IMO-650E.

Appendices to Annex II

Appendix I

Guidelines for the categorization of noxious liquid substances

- Category A** Substances which are bioaccumulated and liable to produce a hazard to aquatic life or human health, or which are highly toxic to aquatic life (as expressed by a Hazard Rating 4, defined by a TLm less than 1 ppm); and additionally certain substances which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLm of 1 ppm or more, but less than 10 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.
- Category B** Substances which are bioaccumulated with a short retention of the order of one week or less, or which are liable to produce tainting of the sea food, or which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLm of 1 ppm or more, but less than 10 ppm); and additionally certain substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLm of 10 ppm or more, but less than 100 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.
- Category C** Substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLm of 10 ppm or more, but less than 100 ppm); and additionally certain substances which are practically non-toxic to aquatic life (as expressed by a Hazard Rating 1, defined by a TLm of 100 ppm or more, but less than 1,000 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.
- Category D** Substances which are practically non-toxic to aquatic life (as expressed by a Hazard Rating 1, defined by a TLm of 100 ppm or more, but less than 1,000 ppm); or causing deposits blanketing the sea floor with a high biochemical oxygen demand (BOD); or which are highly hazardous to human

health, with an LD₅₀ of less than 5 mg/kg; or which produce moderate reduction of amenities because of persistency, smell or poisonous or irritant characteristics, possibly interfering with use of beaches; or which are moderately hazardous to human health, with an LD₅₀ of 5 mg/kg or more, but less than 50 mg/kg, and produce slight reduction of amenities.

Other Liquid Substances (for the purposes of regulation 4 of this Annex)
Substances other than those categorized in Categories A, B, C, and D above.

Appendix II

List of noxious liquid substances carried in bulk

Noxious liquid substances carried in bulk and which are presently categorized as Category A, B, C or D and subject to the provisions of this Annex, are so indicated in the Pollution Category column of chapters 17 or 18 of the International Bulk Chemical Code.

Appendix III

List of other liquid substances

Liquid substances carried in bulk which are identified as falling outside Categories A, B, C and D and not subject to the provisions of this Annex and indicated as 'III' in the Pollution Category column of chapters 17 or 18 of the International Bulk Chemical Code.

Appendix IV

Form of Cargo Record Book for ships carrying noxious liquid substances in bulk

CARGO RECORD BOOK FOR SHIPS CARRYING NOXIOUS LIQUID SUBSTANCES IN BULK

Name of ship

Distinctive number or letters

Gross tonnage

Period from to

Note: Every ship carrying noxious liquid substances in bulk shall be provided with a Cargo Record Book to record relevant cargo/ballast operations.

Introduction

The following pages show a comprehensive list of items of cargo and ballast operations which are, when appropriate, to be recorded in the Cargo Record Book on a tank-to-tank basis in accordance with paragraph 2 of regulation 9 of Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended. The items have been grouped into operational sections, each of which is denoted by a letter.

When making entries in the Cargo Record Book, the date, operational code and item number shall be inserted in the appropriate columns and the required particulars shall be recorded chronologically in the blank spaces.

Each completed operation shall be signed for and dated by the officer or officers in charge and, if applicable, by a surveyor authorized by the competent authority of the State in which the ship is unloading. Each completed page shall be countersigned by the master of the ship.

Entries in the Cargo Record Book are required only for operations involving Categories A, B, C and D substances.

List of items to be recorded

Entries are required only for operations involving Categories A, B, C and D substances.

(A) Loading of cargo

1. Place of loading.
2. Identify tank(s), name of substance(s) and category(ies).

(B) Internal transfer of cargo

3. Name and category of cargo(es) transferred.
4. Identity of tanks:
 - .1 from:
 - .2 to:
5. Was (were) tank(s) in 4.1 emptied?
6. If not, quantity remaining in tank(s).

(C) Unloading of cargo

7. Place of unloading.
8. Identity of tank(s) unloaded.
9. Was (were) tank(s) emptied?
 - .1 If yes, confirm that the procedure for emptying and stripping has been performed in accordance with the ship's Procedures and Arrangements Manual (i.e. list, trim, stripping temperature).
 - .2 If not, quantity remaining in tank(s).
10. Does the ship's Procedures and Arrangements Manual require a prewash with subsequent disposal to reception facilities?
11. Failure of pumping and/or stripping system:
 - .1 time and nature of failure;
 - .2 reasons for failure;
 - .3 time when system has been made operational.

(D) Mandatory prewash in accordance with the ship's Procedures and Arrangements Manual

12. Identify tank(s), substance(s) and category(ies).

13. Washing method:
 - .1 number of washing machines per tank;
 - .2 duration of wash/washing cycles;
 - .3 hot/cold wash.
14. Prewash slops transferred to:
 - .1 reception facility in unloading port (identify port);
 - .2 reception facility otherwise (identify port).

(E) Cleaning of cargo tanks except mandatory prewash (other prewash operations, final wash, ventilation etc.)

15. State time, identify tank(s), substance(s) and category(ies) and state:
 - .1 washing procedure used;
 - .2 cleaning agent(s) (identify agent(s) and quantities);
 - .3 dilution of cargo residues with water (state how much water used (only Category D substances));
 - .4 ventilation procedure used (state number of fans used, duration of ventilation).
16. Tank washings transferred:
 - .1 into the sea;
 - .2 to reception facility (identify port);
 - .3 to slops collecting tank (identify tank).

(F) Discharge into the sea of tank washings

17. Identify tank(s):
 - .1 Were tank washings discharged during cleaning of tank(s)? If so at what rate?
 - .2 Were tank washing(s) discharged from a slops collecting tank? If so, state quantity and rate of discharge.
18. Time pumping commenced and stopped.
19. Ship's speed during discharge.

(G) Ballasting of cargo tanks

20. Identity of tank(s) ballasted.
21. Time at start of ballasting.

(H) Discharge of ballast water from cargo tanks

22. Identity of tank(s).

23. Discharge of ballast:
 - .1 into the sea;
 - .2 to reception facilities (identify port).
24. Time ballast discharge commenced and stopped.
25. Ship's speed during discharge.

(I) Accidental or other exceptional discharge

26. Time of occurrence.
27. Approximate quantity, substance(s) and category(ies).
28. Circumstances of discharge or escape and general remarks.

(J) Control by authorized surveyors

29. Identify port.
30. Identify tank(s), substance(s), category(ies) discharged ashore.
31. Have tank(s), pump(s), and piping system(s) been emptied?
32. Has a prewash in accordance with the ship's Procedures and Arrangements Manual been carried out?
33. Have tank washings resulting from the prewash been discharged ashore and is the tank empty?
34. An exemption has been granted from mandatory prewash.
35. Reasons for exemption.
36. Name and signature of authorized surveyor.
37. Organization, company, government agency for which surveyor works.

(K) Additional operational procedures and remarks

Appendix IV: Form of Cargo Record Book

Name of ship

Distinctive number or letters

CARGO/BALLAST OPERATIONS

Date	Code (letter)	Item (number)	Record of operations/signature of officer in charge/name of and signature of authorized surveyor

Signature of master

Appendix V

Form of NLS Certificate



**INTERNATIONAL POLLUTION PREVENTION
CERTIFICATE FOR THE CARRIAGE OF
NOXIOUS LIQUID SUBSTANCES
IN BULK**

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended (hereinafter referred to as "the Convention"), under the authority of the Government of:

.....
(full designation of the country)

by.....
*(full designation of the competent person or organization
authorized under the provisions of the Convention)*

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage

THIS IS TO CERTIFY:

- 1 That the ship has been surveyed in accordance with the provisions of regulation 10 of Annex II of the Convention.
- 2 That the survey showed that the structure, equipment, systems, fitting, arrangements and material of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the applicable requirements of Annex II of the Convention.
- 3 That the ship has been provided with a Manual in accordance with the Standards for Procedures and Arrangements as called for by regulation 5, 5A and 8 of Annex II of the Convention, and that the arrangements and equipment of the ship prescribed in the manual are in all respects satisfactory and comply with the applicable requirements of the said Standards.
- 4 That the ship is suitable for the carriage in bulk of the following noxious liquid substances, provided that all relevant operational provisions of Annex II of the Convention are observed.

Noxious liquid substances	Conditions of carriage (tank numbers etc.)
*Continued on additional signed and dated sheets	

This certificate is valid until
subject to surveys in accordance with regulation 10 of Annex II of the Convention.

Issued at
(Place of issue of certificate)

.....
(Date of issue)

.....
(Signature of duly authorized official issuing the certificate)

(Seal or stamp of the authority, as appropriate)

* Delete as necessary.

Unified Interpretations of Annex II

(Unless specified, regulations referred to are those of Annex II)

1 Definitions

Reg. 1(12)

1.1 *Conversion and modification of ships built before 1 July 1986*

1.1.1 An oil tanker or a chemical tanker previously not certified to carry safety hazard chemicals but which changes to a service of carrying these cargoes should be considered as having undergone a conversion. Safety hazard cargoes are identified in chapter VI of the Bulk Chemical Code (BCH Code) or chapter 17 of the International Bulk Chemical Code (IBC Code).

1.1.2 The last sentence of regulation 1(12) should apply only to modifications made on oil tankers and chemical tankers and the expression "modification" referred thereto should generally be those changes necessary to comply with Annex II and include the fitting of improved stripping systems and underwater discharge arrangements but do not include major structural changes such as those which might be necessary to comply with ship type requirements.

2 Application

Reg. 2(5)
and 2(6)

2.1 *Equivalency for gas carriers*

2.1.1 With respect to liquefied gas carriers carrying Annex II substances listed in the Gas Carrier Code, equivalency may be permitted under the terms of regulation 2(5) on construction and equipment requirements contained in regulations 5, 5A and 13 when a gas carrier meets all the following conditions:

- .1 hold a Certificate of Fitness in accordance with the appropriate Gas Carrier Code for ships carrying liquefied gases in bulk;
- .2 hold an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate);
- .3 be provided with segregated ballast arrangements;
- .4 be provided with deepwell pumps and arrangements which minimize the amount of cargo residue remaining after discharge, to the extent that the Administration is satisfied on the basis of the design that the stripping requirements of regulation 5A(2)(b) or 5A(4)(b), without regard to the limiting date, are met and the cargo residue can be vented to the atmosphere through the approved venting arrangements;

- .5 be provided with a Procedures and Arrangements Manual approved by the Administration. This manual should ensure that no operational mixing of cargo residues and water will occur and, after venting, no cargo residues will remain; and
- .6 be certified in an NLS Certificate to carry only those Annex II noxious liquid substances listed in the appropriate Gas Carrier Code.

When such equivalency is granted, notification required by regulation 2(6) need not be made.

2A Categorization of substances

Reg. 3(4)

2A.1 When a substance which is not included in appendix II or III of MARPOL 73/78 is offered for bulk carriage, the provisional category should be established in accordance with the following procedure:*

- .1 The Government of the State Party to MARPOL 73/78 shipping or producing the substance should check MEPC circulars to see whether the substance has been categorized by the Organization, or provisionally assessed by another State Party to MARPOL 73/78;
- .2 if no information is found in the circulars, the Government of the Party should contact the Organization[†] to see if the substance has already been given a provisional assessment by the Organization or by another Government of a Party to MARPOL 73/78. If the latter is the case, the details should be obtained and, if satisfied, the Government of the Party may accept that provisional assessment;
- .3 if there has been no previous provisional assessment, or the Government of the Party is not satisfied with the previous provisional assessment given, the Government of the Party shipping or producing the substance should carry out a provisional assessment in accordance with the attached guidelines;[‡]
- .4 the Government of the Party should notify the Government of the State in whose port the cargo will be received and the

* In carrying out the evaluation of substances, it will be necessary to establish minimum carriage requirements not only for Annex II purposes but also for safety purposes. Due regard should, therefore, be given to the “Criteria for Hazard Evaluation of Bulk Chemicals” approved by the MSC at its forty-second session (Annex 3 to the 1985 edition of the BCH Code, also included in the 1993 edition of the BCH Code and the 1994 edition of the IBC Code).

[†] The enquiry should be addressed to: The Director, MED, IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom; tel.: 44 171 735 7611, telex: 23588 IMOLDN G, telefax: 44 171 587 3210; and include the enquirer’s mailing address, telex and telefax numbers. The latter, if available, would facilitate a quick reply.

[‡] The Guidelines for the provisional assessment of liquid substances offered to be carried in bulk have been superseded by the Guidelines for the provisional assessment of liquids transported in bulk; see IMO sales publication IMO-653E.

Government of the flag State of their assessment along with information providing the basis for their pollution and safety hazard assessment, or the provisional assessment registered at the Organization, by the quickest means available;

- .5 in the event of disagreement, the most severe conditions proposed should prevail;
- .6 in the absence of an interim or final response to the notification from any of the other Parties involved within 14 days of the despatch, the provisional assessment made by the Government of the Party shipping or producing the substance should be deemed to have been accepted;
- .7 the Organization should be notified and details provided of the provisional assessment made as required by regulation 3(4) (i.e. within 90 days, but preferably as soon as possible);
- .8 the Organization should circulate the information as it is received through an MEPC circular and submit provisional assessments to the BCH Sub-Committee for review. The Organization should also maintain a register of all such substances and their provisional assessments until such time as the substances are formally included in the Annex II lists and the IBC and BCH Codes; and
- .9 the Organization should forward to GESAMP all such information received, with a view to formal hazard evaluation and subsequent categorization and establishment of minimum carriage requirements by the BCH Sub-Committee, with a view to formal amendment of Annex II of MARPOL 73/78 and the IBC and BCH Codes.

2A.2 In the case that such provisionally assessed substances fall into Category A, B, C or D, amendment sheets to the ship's Certificate of Fitness, or to the NLS Certificate only in cases of Category D substances, and to the Ship's Procedures and Arrangements (P and A) Manual should be issued by the Administration before the ship sails, thus permitting their carriage. This authorization for the carriage of the substance may take the form of telex or equivalent means, which should be kept with the ship's Certificate of Fitness and P and A Manual until the substance is accepted as an amendment to the IBC/BCH Codes. Then the certificate and the P and A Manual should formally be amended.

2A.3 In cases where it is necessary to provisionally assess pollutant-only mixtures, which contain substances for which the Organization has assigned a pollution category or a provisional pollution category and for which the Organization has assigned a ship type or provisional ship-type requirement, the following procedure may be applied in lieu of 2A.1, subparagraphs .4, .5 and .6:

- .1 the mixtures need only be categorized by the Government of the Party shipping or producing the mixture, by the use of the calculation procedure described in section 5 of the Guidelines for the Provisional Assessment of Liquids Transported in Bulk;

- .2 the mixtures may contain up to 3% unassessed components which should be evaluated by the Government of a Party producing or shipping the mixture. Where evaluation by the use of GESAMP hazard profiles, data or assimilation by analogy from related substances is not possible for a component, classification of such a component should be taken as pollution category A, ship type 2;
- .3 The mixture may contain components which have been identified as having safety hazards ('S' in column d of chapter 17 of the IBC Code) or which would justify inclusion in the Code, so long as it is judged that the dilution of these components results in a mixture that does not possess safety hazards. For purposes of this paragraph, mixtures meeting this characteristic are considered pollutant only mixtures;
- .4 the Government of the Party should notify the Government of the State in whose port the cargo will be received and the Government of the flag State of the assessment; and
- .5 the Government of the Party may authorize the manufacturer to carry out the assignment (n.o.s. number, the appropriate shipping name, viscosity and melting point) on its behalf. In this case the obligation to inform flag States and receiving countries of the performed assignment falls on the authorized manufacturer. The manufacturer should also inform the authorizing Government of the assignment performed along with details of the assessment. The manufacturer should inform IMO if so requested by the Government of the shipping or producing country. Upon request, the manufacturer should provide the Government of the flag State or receiving State with full details of the mixture. Notification of the assignment by the manufacturer should be accompanied by the authorization letter indicating that the manufacturer acts under instruction and on behalf of the Government of the Party.

2A.4 Notwithstanding 2A.2, if a ship is certified fit to carry n.o.s. (not otherwise specified) substances of the provisionally assessed category and ship type, no amendment need be made to the ship's Certificate of Fitness or the ship's P and A Manual.

3 Discharge of residue

Reg. 5

3.1 En route

3.1.1 The term "*en route*" is taken to mean that the ship is under way at sea on a course, or courses, which so far as practicable for navigational purposes will cause any discharge to be spread over as great an area of the sea as is reasonably practicable.

4 Pumping, piping and unloading arrangements

Reg. 5A
(6)(b)(iv)
and (7)(e)

4.1 *Appropriate action in case of exemption*

4.1.1 With regard to the term “appropriate action, if any”, any Party to the Convention that has an objection to the particulars of an exemption submitted by another Party should communicate this objection to the Organization and to the Party which issued the exemption within one year after the Organization circulates the particulars of the exemption to the Parties.

5 Reception facilities

Reg. 7(1)(b)

5.1 *Reception facilities in repair ports*

5.1.1 This regulation is taken to mean that ship repair ports undertaking repairs to chemical tankers should have facilities adequate for the reception of residues and mixtures containing noxious liquid substances as would remain for disposal from ships carrying them as a result of the application of this Annex.

5A Measures of control

Reg. 8
(5)(a)(i)
and
(7)(a)(i)

5A.1 The wording “substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity exceeding the maximum quantity which may be discharged into the sea” of subparagraphs 5(a)(i) and 7(a)(i) of regulation 8 refers to high-viscosity or solidifying substances as defined in paragraphs 1.3.7 and 1.3.9 of the Standards for Procedures and Arrangements.

6 Survey and certification

Reg. 10(1)
(c) and (d)

6.1 *Intermediate and annual surveys for ships not required to hold NLS Certificate*

6.1.1 The applicability of regulation 10(1)(c) and (d) and/or corresponding requirements of the IBC and BCH Codes under regulation 12A to ships which are not required to hold an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk by virtue of regulation 11 should be determined by the Administration.

6A.1 Requirements for minimizing accidental pollution

Reg. 13(4)

6A.1.1 *Ships other than chemical tankers*

- .1 For the purpose of regulation 13(4) of Annex II of MARPOL 73/78, the Organization has developed guidelines for offshore support vessels and ships engaged in dumping at sea.
- .2 For the purpose of that regulation, for ships other than chemical tankers, which are not referred to in paragraph .1 above, all applicable requirements of the IBC or BCH Codes

should be complied with when such ships carry Category A, B or C noxious liquid substances in bulk.

7 Oil-like substances

Reg. 14

7.1 List of oil-like substances

Category C substances

Aviation alkylates
Cycloheptane
Cyclohexane
Cyclopentane
p-Cymene
Diethylbenzene
Dipentene
Ethylbenzene
Ethylcyclohexane
Heptene (all isomers)
Hexane (all isomers)
Hexene (all isomers)
Isopropylcyclohexane
Methylcyclohexane
2-Methyl-1-pentene
Nonane (all isomers)
Octane (all isomers)
Olefin mixtures (C5–C7)
Pentane (all isomers)
Pentene (all isomers)
1-Phenyl-1-xylylethane
Propylene dimer
Tetrahydronaphthalene
Toluene
Xylenes

Category D substances

Alkyl (C9–C17) benzenes
Diisopropyl naphthalene
Dodecane (all isomers)

For each of the above substances, compliance with the oil-like substance criterion 7.2.1.4 given below has to be demonstrated for the particular oil content meter installed.

7.2 Selection criteria

7.2.1 The following criteria define an oil-like Category C or D noxious liquid substance:

- .1 the substance's mass density (specific gravity) is less than 1.0 at 20°C;
- .2 the substance's solubility in seawater at 20°C is less than 0.1%;

- .3 the substance is a hydrocarbon;
- .4 the substance can be monitored by an oil content meter required by regulation 15 of Annex I of MARPOL 73/78;*
- .5 in the case of Category C substances, the ship type requirement, as specified by the Bulk Chemical or International Bulk Chemical Codes, is type 3; and
- .6 the substance is not regulated by the Bulk Chemical or International Bulk Chemical Codes for safety purposes as indicated in chapters VI and 17 of the Codes respectively.

Reg. 14(c) 7.3 *Damage stability calculation*

7.3.1 A new ship of 150 m or more in length under Annex I should be considered to comply with the requirements of regulation 14(c) if compliance with regulation 25 of Annex I has been demonstrated.

Reg. 14(d) 7.4 *Applicability of the waiver under regulation 15(5) of Annex I of MARPOL 73/78 to oil tankers carrying oil-like Annex II substances*

7.4.1 Since regulation 14 of Annex II applies to oil tankers, as defined in Annex I, which are allowed to carry oil-like substances and discharge these under the provisions of Annex I, any waiver granted to such oil tankers in respect of the requirement to be fitted with an oil discharge monitoring and control system encompasses the requirements contained in regulation 14(d) of Annex II. It should be noted, however, that in considering the issuance of a waiver under the provisions of Annex I, an Administration should determine that adequate reception facilities are available to receive the residues and mixtures at loading ports or terminals at which the tanker calls and that the facilities are also suitable for the treatment and ultimate disposal of the oil-like substances received.

* In approving an oil discharge monitoring and control system for the purpose of this regulation, the Administration should ensure through tests that the system can monitor concentrations of each oil-like substance in conformity with the Recommendation on international performance specifications for oily-water separating equipment and oil content meters adopted by the Organization by resolution A.393(X) or the Revised guidelines and specifications for oil discharge monitoring and control systems for oil tankers, resolution A.586(14). If it is necessary to readjust the monitor when changing from oil products to oil-like noxious substances, information on the readjustment should be provided and special operating procedures ensuring that discharges of oil-like noxious substances are measured accurately should be approved by the Administration. When the oil content meter is readjusted an entry should be made in the Oil Record Book.

Appendix to Unified Interpretations of Annex II

Guidelines for the application of amendments to the list of substances in Annex II of MARPOL 73/78 and in the IBC Code and the BCH Code with respect to pollution hazards

1 *General*

1.1 The present guidelines apply to amendments to the list of substances set out in appendices II and III to Annex II of MARPOL 73/78, in chapters 17 and 18 of the IBC Code and in chapters VI and VII of the BCH Code, namely the addition or deletion of substances, and changes of the pollution category or the ship-type requirements on existing substances.

1.2 Regulation 2(7)(a) of Annex II of MARPOL 73/78 stipulates that where an amendment to this Annex and the International Bulk Chemical Code and the Bulk Chemical Code involves changes to the structure or equipment and fittings due to the upgrading of the requirements for the carriage of certain substances, the Administration may modify or delay for a specified period the application of such an amendment to ships constructed before the date of entry into force of that amendment, if the immediate application of such an amendment is considered unreasonable or impracticable. Such relaxation shall be determined with respect to each substance, having regard to the Guidelines developed by the Organization. The present Guidelines have been developed to ensure uniform application of that regulation.

1.3 With respect to the preparation and circulation of proposed amendments to the list of substances, paragraphs 1 to 4 of the Guidelines for future amendments to the IBC Code and the BCH Code (MEPC 25/20, annex 7) should apply.

2 *Definitions*

For the purposes of the present Guidelines, the following definitions apply:

- 2.1 *New ship* means a ship the keel of which is laid or which is at a stage at which:
- .1 construction identifiable with the ship begins; and
 - .2 assembly has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less;

on or after the date of entry into force of the relevant amendment.

2.2 A ship, irrespective of the date of construction, which is converted to a chemical tanker on or after the date of entry into force of the relevant amendment, should be treated as a chemical tanker constructed on the date on which such conversion commences. This conversion provision does not apply to the modification of a ship referred to in regulation 1(12) of Annex II of MARPOL 73/78.

2.3 *Existing ship* means a ship which is not a new ship as defined in paragraph 2.1.

2.4 *Dedicated ship* means a ship built or converted and specifically fitted and certified for the carriage of:

- .1 one named product only; or
- .2 a restricted number of products each in a tank or group of tanks such that each tank or group of tanks is certified for the carriage of one named product only or compatible products not requiring cargo tank washing for change of cargo.

2.5 *Domestic trade* means a trade solely between ports or terminals within the State the flag of which the ship is entitled to fly, without entering into the territorial waters of other States.

2.6 *International trade* means a trade which is not a domestic trade as defined in paragraph 2.5.

2.7 *Structure of a ship* includes only the major structural elements, such as double bottom, longitudinal and transverse bulkheads, essential to the completeness of the hull necessary to meet the ship-type requirements. Piping systems, fittings and equipment such as underwater discharge outlets, stripping systems, high-level alarms, gauging devices etc., are not considered to be part of the structure of a ship.

2.8 *New substance* means a substance which was not previously carried in bulk. A substance which is not included in Annex II of MARPOL 73/78, the IBC Code or the BCH Code but which is transported in bulk may be treated as an existing substance, provided that such substance has been provisionally assessed under the provisions of regulation 3(4) of Annex II of MARPOL 73/78 or is carried in accordance with the provisions of Annex I of MARPOL 73/78.

2.9 *Existing substance* means a substance which is not a new substance.

3 *Application of amendments to new and existing ships*

3.1 All amendments which constitute the inclusion of new substances and those resulting in downgrading of requirements for existing substances should apply to new and existing ships as from the date of entry into force of the amendments.

3.2 Amendments resulting in upgrading of requirements for existing substances:

New ship

3.2.1 All amendments should apply to new ships as from the date of entry into force of the amendments.

Existing ships

3.2.2 All amendments involving only operational requirements should apply to existing ships as from the date of entry into force of the amendments.

3.2.3 The Administration may modify or delay for a specified period the application of amendments involving changes to the structure or equipment and fittings to existing ships, if the immediate application of such amendments is considered unreasonable or impracticable. Such relaxation should be determined with respect to each substance, having regard to such factors as volume of cargo shipped, whether or not dedicated ships are involved, types and ages of ships involved, types of trades (e.g. domestic or international trades), etc.

3.2.4 When allowing such relaxation the following guidelines should apply:

- .1 In the case of amendments affecting the structure of ships:
 - .1.1 existing ships engaged in domestic trades should comply with the amended ship-type requirements not later than the end of the specified period which should not exceed ten years after the date of entry into force of the amendments;
 - .1.2 existing ships engaged on restricted voyages in international trade as determined by the Administration should comply with the amended ship-type requirements not later than the end of the specified period which should not exceed ten years after the date of entry into force of amendments, provided that:
 - .1.2.1 such relaxation is agreed among the Governments of the Parties concerned; and
 - .1.2.2 the Certificate of Fitness is endorsed to the effect that the ship is solely engaged in such restricted voyages;
 - .1.3 existing ships engaged in international trade other than the above should comply with the amended ship-type requirements as from the date of entry into force of the amendments.
- .2 In the case of amendments affecting the equipment and fittings:
 - .2.1 if the amendments necessitate the provision of an underwater discharge outlet, the outlet should be fitted not later than two years following the entry into force of the amendments;
 - .2.2 if the amendments necessitate the efficient stripping system:
 - .2.2.1 until the end of the period of two years following the entry into force of the amendments or until 2 October 1994, whichever occurs later, the ship should comply with the requirements of regulation 5A(2)(b) or 5A(4)(b) of Annex II of MARPOL 73/78, as applicable;
 - .2.2.2 after the above date, the efficient stripping system should be fitted to comply with the applicable requirements of regulation 5A.
 - .2.3 The requirements for the discharge of effluent below the waterline need not apply until the underwater discharge outlet has been fitted.

3.2.5 As a general rule, the relaxation mentioned in paragraph 3.2.4.1 should be accepted only for existing dedicated ships. In exceptional cases, however, where the immediate application of such amendments to existing non-dedicated ships will

create serious difficulties for clear and acceptable reasons, such as very large volumes of cargo being shipped, the application may be delayed for a limited period.

3.2.6 The Certificate of Fitness should be endorsed by the Administration specifying the relaxation allowed.

3.2.7 The Administration allowing a relaxation of the application of amendments should submit to the Organization a report giving details of the ship or ships concerned, the cargoes carried, the trade in which each ship is engaged and the justification for such relaxation.

3.2.8 A Member Government may notify the Organization that it does not accept the relaxation.

3.2.9 The notification made under 3.2.8 and 3.2.9 should be circulated to other Governments.

Standards for procedures and arrangements for the discharge of noxious liquid substances

*(called for by Annex II of MARPOL 73/78,
as amended)*

Preamble

1 Annex 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) and as further amended by the Organization (hereafter referred to as Annex II), *inter alia* provides for the control of operational discharges of noxious liquid substances carried in bulk by ships. *Operational discharges* in this context means the discharges of noxious liquid substances or water contaminated by these substances which are the result of cargo tank and line washing, deballasting of unwashed cargo tanks or cargo pump-room bilge slops.

2 Annex II prohibits the discharge into the sea of noxious liquid substances except when the discharge is made under specified conditions. These conditions vary according to the degree of hazard a noxious liquid substance poses to the marine environment. For this purpose the noxious liquid substances have been divided into four categories, A, B, C and D.

3 Regulation 5 of Annex II specifies the conditions under which discharge of residues of Categories A, B, C and D substances may take place. These conditions, which are not reproduced in this document, include such parameters as: the maximum quantity which may be discharged into the sea, speed of ship, distance from nearest land, depth of water, maximum concentration of substance in ship's wake or dilution of substance prior to discharge.

4 For certain sea areas, referred to as "special areas", more stringent discharge criteria apply.

5 The standards for procedures and arrangements called for by Annex II (hereafter referred to as the Standards) have been developed in response to resolution 13 of the International Conference on Marine Pollution, 1973, and in compliance with regulations 5, 5A and 8 of Annex II. The Standards provide a uniform basis for the guidance of the Parties to MARPOL 73/78

in approving procedures and arrangements for the discharge of noxious liquid substances of a specific ship.

6 The Standards took effect on 6 April 1987, the date of implementation of Annex II, and apply to all ships which carry noxious liquid substances in bulk.

7 The Annex II requirements are not restated in the Standards. To ensure compliance with Annex II, the requirements of Annex II and those contained in the Standards should be considered together.

8 Annex II discharge requirements and certification requirements have been interpreted as requiring each ship to have a Procedures and Arrangements Manual approved by the Administration. The Manual should contain the information specified in the Standards and the requirements of Annex II. Compliance with the procedures and arrangements set out in a ship's Manual will ensure that the discharge requirements of Annex II are met.

9 Regulation 5A of Annex II requires that the efficiency of the cargo pumping system of a tank certified fit to carry Category B or C substances be tested in accordance with standards developed by the Organization. The test procedure is set out in the Standards. The pump stripping efficiency determined by the test will be assumed to be the stripping efficiency achieved when unloading the tank in accordance with the specified procedures.

10 The presence of a "sheen" resulting after discharges of some Category B, C and D substances should not be regarded as contrary to the principles of Annex II, provided that the discharges have been made in accordance with the Standards.

11 Throughout the Standards the word "discharge" is used to refer to the discharge of residues or residue/water mixtures either into the sea or to reception facilities, whilst the word "unloading" is used to refer to the unloading of cargo to receivers, terminals or ports.

Chapter 1

Introduction

1.1 Purpose

The purpose of the Standards is to provide a uniform international basis for approving procedures and arrangements by which ships carrying noxious liquid substances in bulk can satisfy the discharge provisions of Annex II. It is on the basis of these Standards that the Administration should approve the procedures and arrangements necessary for the issue of an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or a Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk or an International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk to each such ship. For that purpose the procedures and arrangements for each ship are to be laid out in an approved Procedures and Arrangements Manual (hereinafter called the Manual) for use on board the ship. It is not intended that these Standards be used by the ship's crew.

1.2 Scope

1.2.1 These Standards apply to all ships which carry Category A, B, C or D noxious liquid substances in bulk, including those provisionally assessed as such.

1.2.2 The Standards have been developed to ensure that the criteria for discharge of noxious liquid substances specified in regulations 5 and 8 will be met. For Category A substances, the Standards identify a prewash procedure which may be used in lieu of measuring the concentration of the effluent from a tank from which tank washings containing a Category A substance are discharged. For Category B and C substances, the Standards identify procedures and arrangements which will ensure that the maximum quantity of residue that may be discharged per tank and the maximum permitted concentration of the substance in the ship's wake are not exceeded. For Category B and C substances, the Standards identify procedures and arrangements for assessing compliance with regulation 5A. For Category A, B, C and D substances, the Standards identify ventilation procedures which may be used to remove residues from cargo tanks. The prewash procedures contained in appendix B to the Standards also enable Administrations to approve the prewash procedure referred to in regulation 5A(6)(b)(i).

1.2.3 The Standards do not cover the means by which the Administration ensures compliance with a ship's approved procedures and arrangements, and neither do they cover details of any constructions or materials used.

1.2.4 Regulation 13 requires, *inter alia*, chemical tankers carrying Category A, B or C noxious liquid substances to comply with the *International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk** (hereinafter referred to as the IBC Code) or the *Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk** (hereinafter referred to as the BCH Code), as may be amended. All constructions, materials and equipment fitted as a requirement of Annex II and of the Standards shall therefore comply with the IBC Code or the BCH Code for all substances of Category A, B or C the chemical tanker is certified fit to carry in accordance with its Certificate of Fitness under that Code.

1.3 Definitions

1.3.1 *New ship* means a ship constructed on or after 1 July 1986.

1.3.2 *Existing ship* means a ship that is not a new ship.

1.3.3 *Residue* means any noxious liquid substance which remains for disposal.

1.3.4 *Residue/water mixture* means residue to which water has been added for any purpose (e.g. tank cleaning, ballasting, bilge slops).

1.3.5 *Miscible* means soluble with water in all proportions at washwater temperatures.

1.3.6 *Associated piping* means the pipeline from the suction point in a cargo tank to the shore connection used for unloading the cargo and includes all ship's piping, pumps and filters which are in open connection with the cargo unloading line.

1.3.7 *Solidifying substance* means a noxious liquid substance which:

- .1 in the case of substances with melting points less than 15°C, is at a temperature, at the time of unloading, of less than 5°C above its melting point; or
- .2 in the case of substances with melting points equal to or greater than 15°C, is at a temperature, at the time of unloading, of less than 10°C above its melting point.

1.3.8 *Non-solidifying substance* means a noxious liquid substance which is not a solidifying substance.

* The IBC and BCH Codes, extended to cover marine pollution aspects, were adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.19(22) and MEPC.20(22) respectively on 5 December 1985; see IMO sales publications IMO-100E and IMO-772E, respectively.

1.3.9 *High-viscosity substance* means:

- .1 in the case of Category A and B substances and in the case of Category C substances within special areas, a substance with a viscosity equal to or greater than 25 mPa·s at the unloading temperature; and
- .2 in the case of Category C substances outside special areas, a substance with a viscosity equal to or greater than 60 mPa·s at the unloading temperature.

1.3.10 *Low-viscosity substance* means a noxious liquid substance which is not a high-viscosity substance.

1.3.11 *Regulation* means a regulation of Annex II to MARPOL 73/78.

1.4 *Equivalents*

1.4.1 The equivalent provisions in regulation 2(5) and (6) are also applicable to the Standards.

1.5 *Certification*

1.5.1 Before issuing the appropriate Certificate referred to in section 1.1, the Administration should examine, and, if satisfied, approve:

- .1 the Manual for compliance with Annex II and the Standards; and
- .2 the equipment and arrangements provided for compliance with the Standards.

1.5.2 Reference to the approved Manual should be made by the Administration in the appropriate Certificate issued to the ship.

1.6 *Responsibilities of the master*

1.6.1 The master must ensure that no discharges into the sea of cargo residues or residue/water mixtures containing Category A, B, C or D substances shall take place, unless such discharges are made in full compliance with the operational procedures contained in the Manual and that the arrangements required by the Manual and needed for such discharges are used.

1.7 *Safety considerations*

1.7.1 The Standards are concerned with the marine environmental aspects of the cleaning of cargo tanks which have contained noxious liquid substances, and the discharge of residues and residue/water mixtures from

these operations. Certain of these operations are potentially hazardous but no attempt is made in the Standards to lay down safety standards covering all aspects of these operations. For a description of potential hazards reference should be made to the IBC or BCH Codes and other documents as developed and published by the relevant associations or organizations, e.g. the Tanker Safety Guide (Chemicals) of the International Chamber of Shipping (ICS). Some potential safety hazards are mentioned below.

1.7.2 *Compatibility* – In mixing residue/water mixtures containing different substances, compatibility should be carefully considered.

1.7.3 *Electrostatic hazards* – The hazards associated with the generation of electrostatic charges during the cargo tank washing should be carefully considered.

1.7.4 *Tank entry hazards* – The safety of persons required to enter cargo tanks or slop tanks for any purpose should be carefully considered.

1.7.5 *Reactivity hazards* – The water washing of cargo tanks and slop tanks containing residues of certain substances may produce dangerous reactions and should be carefully considered.

1.7.6 *Ventilation hazards* – The hazards associated with tank ventilation identified in the ICS Tanker Safety Guide (Chemicals) should be carefully considered.

1.7.7 *Line clearing hazards* – The hazards associated with line clearing identified in the ICS Tanker Safety Guide (Chemicals) should be carefully considered.

1.7.8 *Fire hazards* – The fire hazards associated with the use of cleaning media other than water should be carefully considered.

1.8 *Cleaning agents or additives*

1.8.1 When a washing medium other than water, such as mineral oil or chlorinated solvent, is used instead of water to wash a tank, then its discharge is governed by the provisions of Annex I or Annex II, which would apply respectively if such a medium had been carried as cargo. Tank washing procedures involving the use of such mediums should be set out in the Procedures and Arrangements Manual and be approved by the Administration.

1.8.2 When small amounts of cleaning detergents are added to water in order to facilitate tank washing, no detergents containing pollution category A components should be used except those components that are readily biodegradable and present in a total concentration of less than 10%. No restrictions additional to those applicable to the tank due to the previous cargo should apply.

Chapter 2

Preparation of the Procedures and Arrangements Manual

2.1 Each ship which carries noxious liquid substances in bulk should be provided with a Manual as described in this chapter.

2.2 The main purpose of the Manual is to identify for the ship's officers the physical arrangements and all the operational procedures with respect to cargo handling, tank cleaning, slops handling, and cargo tank ballasting and deballasting which must be followed in order to comply with the requirements of Annex II.

2.3 The Manual should be based on the Standards. It should cover all noxious liquid substances which the ship is certified fit to carry.

2.4 The Manual should as a minimum contain the following information and operational instructions:

- .1 a description of the main features of Annex II, including discharge requirements;
- .2 a table of noxious liquid substances which the ship is certified fit to carry and which specifies information on these substances as detailed in appendix D;
- .3 a description of the tanks carrying noxious liquid substances; and a table identifying in which cargo tanks each noxious liquid substance may be carried;
- .4 a description of all arrangements and equipment including cargo heating and temperature control system, which are on board the ship and for which requirements are contained in chapters 3 or 8 including a list of all tanks that may be used as slop tanks, a description of the discharge arrangements, a schematic drawing of the cargo pumping and stripping systems showing the respective position of pumps and control equipment and identification of means for ensuring that the equipment is operating properly (check lists);
- .5 details of the procedures set out in the Standards as applied to the individual ship which should, where appropriate, include instructions such as:
 - .5.1 methods of stripping cargo tanks and under what restrictions, such as minimum list and trim, the stripping system should be operated;

- .5.2 methods of draining cargo pumps, cargo lines and stripping lines;
- .5.3 cargo tank prewash programmes;
- .5.4 procedures for cargo tank ballasting and deballasting;
- .5.5 procedures for discharge of residue/water mixtures; and
- .5.6 procedures to be followed when a cargo tank cannot be unloaded in accordance with the required procedure;
- .6 for existing ships operating under the provisions of regulation 5A(2)(b) or 5A(4)(b) a residue table developed in accordance with appendix A, which indicates for each tank in which Category B or C substances are to be carried the quantities of residue which will remain in the tank and associated piping system after unloading and stripping;
- .7 a table which indicates the quantities measured as a result of carrying out the water test performed for assessing the “stripping quantity” referred to in paragraph 1.2.1 of appendix A; and
- .8 the responsibility of the master in respect of operational procedures to be followed and the use of the arrangements. The master must ensure that no residues or residue/water mixtures are discharged into the sea, unless the arrangements listed in the Manual and needed for the discharge are used.

2.5 In the case of a ship engaged in international voyages, the Manual should be produced in the standard format as outlined in the attached appendix D. If the language used is neither English nor French, the text should include a translation into one of these languages.

2.6 The Administration may approve a Manual containing only those parts applicable to the substances the ship is certified fit to carry.

2.7 For a ship referred to in regulation 5A(6) or 5A(7), the format and the content of the Manual should be to the satisfaction of the Administration.

2.8 For a ship carrying only Category D substances, the format and the content of the Manual should be to the satisfaction of the Administration.

Chapter 3

Equipment and constructional standards for new ships

3.1 *General*

3.1.1 This chapter contains the standards for the equipment and constructional features enabling a new ship to comply with the residue discharge requirements of Annex II.

3.1.2 The equipment requirements in this chapter should be read in conjunction with the operating requirements in chapters 4, 5, 6 and 7 in order to determine what equipment is needed on the ship.

3.2 *Carriage requirements*

3.2.1 A Category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

3.3 *Cargo unloading system*

3.3.1 The cargo unloading system for Category B and C substances should be capable of unloading the cargo to the residue quantities not in excess of the quantities specified in regulations 5 and 5A. The performance test required by regulation 5A(5) should be carried out in accordance with appendix A.

3.4 *Underwater discharge outlet location*

3.4.1 The underwater discharge outlet (or outlets) should be located within the cargo area in the vicinity of the turn of the bilge and should be so arranged as to avoid the re-intake of residue/water mixtures by the ship's seawater intakes.

3.5 *Underwater discharge outlet size*

3.5.1 The underwater discharge outlet arrangement should be such that the residue/water mixture discharged into the sea in accordance with the Standards will not pass through the ship's boundary layer.

To this end, when the discharge is made normal to the ship's shell plating, the minimum diameter of the discharge outlet is governed by the following equation:

$$D = \frac{Q_D}{5L}$$

where D = minimum diameter of the discharge outlet (m)

L = distance from the forward perpendicular to the discharge outlet (m)

Q_D = the maximum rate selected at which the ship may discharge a residue/water mixture through the outlet (m³/h).

3.5.2 When the discharge is directed at an angle to the ship's shell plating, the above relationship should be modified by substituting for Q_D the component of Q_D which is normal to the ship's shell plating.

3.6 Slop tanks

3.6.1 Although Annex II does not require the fitting of dedicated slop tanks, slop tanks may be needed for certain washing procedures. Cargo tanks may be used as slop tanks.

3.7 Ventilation equipment

3.7.1 If residues from cargo tanks are removed by means of ventilation, ventilation equipment meeting the requirements of appendix C should be provided.

Chapter 4

Operational standards for new ships carrying Category A substances

4.1 General

This chapter applies to any new ship certified fit to carry Category A substances.

4.2 Pumping and stripping

In unloading a cargo tank containing a Category A substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

4.3 Prewash of Category A substances from cargo tanks

4.3.1 Annex II requires that when a cargo tank that has contained a Category A substance is washed, the resulting residue/water mixtures be discharged to a reception facility until the concentration of the substance in the effluent is at or below a specified value and until the tank is empty. Where it is found to be impracticable to measure the concentration of the substance in the effluent, a prewash procedure in accordance with appendix B should be applied in conformity with regulation 8(4).

4.3.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

4.3.3 Any water subsequently introduced into the cargo tank may be discharged into the sea in accordance with the requirements of regulation 5(1) or regulation 5(7) in respect of the ship's position, speed and discharge outlet location.

4.4 Ventilation of Category A substances from cargo tanks

4.4.1 Ventilation procedures may be applied only to those substances having a vapour pressure greater than 5×10^3 Pa at 20°C.

4.4.2 The ventilation procedures set out in appendix C should be followed when a tank is to be ventilated.

4.4.3 In ventilating a tank the associated piping of the tank should be cleared of liquid and the tank should be ventilated until no visible remains of liquid can be observed in the tank. When direct observation is impossible or impracticable, means for detection of liquid remains should be provided.

4.4.4 When the cargo tank has been ventilated dry in accordance with the Standards, any water subsequently introduced into the cargo tank for ballasting or for preparing the tank to receive the next cargo should be regarded as clean and should not be subject to the discharge requirements of Annex II.

Chapter 5

Operational standards for new ships carrying Category B substances

5.1 General

5.1.1 This chapter applies to any new ship certified fit to carry Category B substances.

5.1.2 If a cargo tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 5.2 to 5.7 apply.

5.1.3 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing Category B substances are allowed cannot be met, no such discharges may be made.

5.2 Pumping and stripping

5.2.1 In unloading a cargo tank containing a Category B substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

5.3 Tank washing and residue discharge procedures outside special areas

5.3.1 High-viscosity or solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and
- .3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed, and discharge outlet location.

5.3.2 Low-viscosity, non-solidifying substances

- .1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with

the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

5.4 *Tank washing and residue discharge procedures within special areas*

5.4.1 A prewash procedure as specified in appendix B should be applied.

5.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

5.4.3 Any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(8) in respect of ship's position, speed and discharge outlet location.

5.4.4 Notwithstanding the provisions of paragraphs 5.4.1 to 5.4.3, residues or residue/water mixtures containing only low-viscosity, non-solidifying substances may be retained on board and discharged into the sea outside special areas in accordance with the provisions of paragraphs 5.3.2 or 5.5.2.

5.5 *Discharges from a slop tank*

5.5.1 Residue/water mixtures in a slop tank should not be discharged into the sea within special areas.

5.5.2 Residue/water mixtures in a slop tank which contain only low-viscosity, non-solidifying substances may be discharged into the sea outside special areas at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

5.5.3 Residue/water mixtures in a slop tank which contain high-viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

5.6 *Ventilation of Category B substances from cargo tanks*

5.6.1 When ventilation procedures are used to remove residue from cargo tanks, the requirements set out in section 4.3 apply.

5.7 *Ballasting and deballasting*

5.7.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 5.3 and 5.4.

5.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 m deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 6

Operational standards for new ships carrying Category C substances

6.1 General

6.1.1 This chapter applies to any new ship certified fit to carry Category C substances.

6.1.2 If a cargo tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 6.2 to 6.7 apply.

6.1.3 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing Category C substances are allowed cannot be met, no such discharges may be made.

6.2 Pumping and stripping

6.2.1 In unloading a cargo tank containing a Category C substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

6.3 Tank washing and residue discharge procedures outside special areas

6.3.1 High-viscosity or solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and
- .3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

6.3.2 Low-viscosity, non-solidifying substances

- .1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which

the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

6.4 Tank washing and residue discharge procedures within special areas

6.4.1 High-viscosity* or solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8;
- .3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location; and
- .4 notwithstanding the provisions of paragraphs 6.4.1.1 to 6.4.1.3, residue/water mixtures containing non-solidifying substances with a viscosity less than 60 mPa·s at the unloading temperature may be retained on board and discharged into the sea outside special areas in accordance with the provisions of paragraph 6.3.2.

6.4.2 Low-viscosity,† non-solidifying substances

- .1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location.

* i.e. a substance with a viscosity equal to or greater than 25 mPa·s at the unloading temperature. See definition of a high-viscosity Category C substance discharged within special areas.

† i.e. a substance with a viscosity less than 25 mPa·s at the unloading temperature, within special areas.

6.5 *Discharges from a slop tank*

6.5.1 Residue/water mixtures in a slop tank which contains only low-viscosity,* non-solidifying substances may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulations 5(3) and 5(9) in respect of ship's position, speed and discharge outlet location.

6.5.2 Residue/water mixtures in a slop tank which contains high-viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

6.6 *Ventilation of Category C substances from cargo tanks*

6.6.1 When ventilation procedures are used to remove residue from cargo tanks, the requirements set out in section 4.4 apply.

6.7 *Ballasting and deballasting*

6.7.1 After unloading and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 6.3 and 6.4.

6.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 m deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

* i.e. a substance with a viscosity less than 25 mPa·s at the unloading temperature if discharged within special areas, or a substance with a viscosity less than 60 mPa·s at the unloading temperature if discharged outside special areas.

Chapter 7

Operational standards for new ships carrying Category D substances

7.1 *General*

7.1.1 This chapter applies to any new ship certified fit to carry Category D substances.

7.2 *Discharge of Category D residues*

7.2.1 Although residue(s) of Category D substances is(are) required to be discharged within and outside special areas in a diluted form in accordance with regulation 5(4), such residue(s) may also be discharged in accordance with the operational standards for low-viscosity, non-solidifying Category C substances as specified in chapter 6.

7.3 *Ventilation of Category D substances from cargo tanks*

7.3.1 When ventilation procedures are used to remove residue from cargo tanks the requirements set out in section 4.4 apply.

Chapter 8

Equipment and constructional standards for existing ships

8.1 General

8.1.1 This chapter contains the standards for the equipment and constructional features enabling an existing ship to comply with the residue discharge requirements of Annex II.

8.1.2 The equipment requirements in this chapter should be read in conjunction with the operating requirements in chapters 9, 10, 11 and 12 in order to determine what equipment is needed on the ship.

8.2 Carriage requirements

8.2.1 A Category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

8.3 Cargo unloading system

8.3.1 The cargo unloading system for Category B and C substances should be capable of unloading the cargo to the residue quantities not in excess of the quantities specified in regulations 5 and 5A. The performance test required by regulation 5A(5) should be carried out in accordance with appendix A.

8.4 Residue discharge system

8.4.1 When for the purpose of discharging residues into the sea controlled pumping rates are needed to meet the requirements of chapter 10, one of the following systems should be used:

- .1 a variable rate pumping system in which:
 - .1.1 the capacity is adjusted by varying the pump speed; or
 - .1.2 the capacity is adjusted through the use of a throttling arrangement fitted on the discharge piping;
- .2 a fixed-rate pumping system with a capacity not exceeding the permissible discharge rate as set out under sections 10.5 and 10.6.

8.4.2 If the pumping rates are controlled in accordance with 8.4.1.1, a flow rate indicating device should be provided.

8.5 Underwater discharge outlet location

8.5.1 The underwater discharge outlet (or outlets) should be located within the cargo area in the vicinity of the turn of the bilge and should be so arranged as to avoid the re-intake of residue/water mixtures by the ship's seawater intakes.

8.5.2 If dual outlets are provided to achieve a higher permissible discharge rate, these should be located on opposite sides of the ship.

8.6 Underwater discharge outlet size

8.6.1 The underwater discharge outlet arrangement should be such that the residue/water mixture discharged into the sea in accordance with the Standards will not pass through the ship's boundary layer. To this end, when the discharge is made normal to the ship's shell plating, the minimum diameter of the discharge outlet is governed by the following equation:

$$D = \frac{Q_D}{5L}$$

where D = minimum diameter of the discharge outlet (m)

L = distance from the forward perpendicular to the discharge outlet (m)

Q_D = the maximum rate selected at which the ship may discharge a residue/water mixture through the outlet (m³/h).

8.6.2 When the discharge is directed at an angle to the ship's shell plating, the above relationship should be modified by substituting for Q_D the component of Q_D which is normal to the ship's shell plating.

8.7 Recording devices

8.7.1 When in accordance with chapter 10 it is necessary to record the discharge of residue/water mixtures, means should be provided for recording the start and stop time of the discharge with actual time (GMT or other standard time). The device should be in operation when there is a discharge into the sea which is to be recorded. The date should be recorded either manually or automatically. The record should be identifiable as to time and date and should be kept for at least three years.

8.7.2 When in accordance with chapter 10 it is necessary to record the rate at which residue/water mixtures are discharged, means should be provided for measuring such flow rates. The accuracy of the flow recording unit should be within 15% of the actual flow.

8.7.3 If the recording units described in paragraphs 8.7.1 or 8.7.2 become defective, a manual alternative method should be used. The master should record such a defect in the Cargo Record Book. The defective unit should be made operable as soon as possible but at least within a period of 60 days.

8.8 *Slop tanks*

8.8.1 Although Annex II does not require the fitting of dedicated slop tanks, slop tanks may be needed for certain washing procedures. Cargo tanks may be used as slop tanks.

8.9 *Ventilation equipment*

8.9.1 If residues from cargo tanks are removed by means of ventilation, ventilation equipment meeting the requirements of appendix C should be provided.

Chapter 9

Operational standards for existing ships carrying Category A substances

9.1 General

9.1.1 This chapter applies to any existing ship certified fit to carry Category A substances.

9.2 Prewash of a Category A substance from a cargo tank

9.2.1 Annex II requires that when a tank that has contained a Category A substance is washed, the resulting residue/water mixtures be discharged to a reception facility until the concentration of the substance in the effluent is reduced below a specified value and until the tank is empty. Where it is found to be impracticable to measure the concentration of the substance in the effluent, a prewash procedure in accordance with appendix B should be applied in conformity with regulation 8(4).

9.2.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

9.2.3 Any water subsequently introduced into the cargo tank may be discharged into the sea in accordance with the requirements of regulation 5(1) or regulation 5(7) in respect of the ship's position, speed and discharge outlet location.

9.3 Ventilation of Category A substances from cargo tanks

9.3.1 Ventilation procedures may be applied only to those substances having a vapour pressure greater than 5×10^3 Pa at 20°C.

9.3.2 The ventilation procedures set out in appendix C should be followed when a tank is to be ventilated.

9.3.3 In ventilating a tank the associated piping of the tank should be cleared of liquid and the tank should be ventilated until no visible remains of liquid can be observed in the tank. When direct observation is impossible or impracticable, means for detection of liquid remains should be provided.

9.3.4 When the cargo tank has been ventilated dry in accordance with the Standards, any water subsequently introduced into the cargo tank for ballasting or for preparing the tank to receive the next cargo should be regarded as clean and should not be subject to the discharge requirements of Annex II.

Chapter 10

Operational standards for existing ships carrying Category B substances

10.1 General

10.1.1 This chapter applies to any existing ship certified fit to carry Category B substances.

10.1.2 When a cargo tank on an existing ship is fitted with a cargo unloading system capable of unloading the cargo to the residue quantities not in excess of the quantity specified in regulation 5A(2)(a) and if the tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of chapter 5 apply.

10.1.3 If a tank other than that referred to in paragraph 10.1.2 is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 10.2 to 10.8 apply.

10.1.4 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing Category B substances are allowed cannot be met, no such discharges may be made.

10.2 Pumping and stripping

10.2.1 In unloading a cargo tank containing a Category B substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

10.3 Tank washing and residue discharge procedures outside special areas

10.3.1 High-viscosity or solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and
- .3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.3.2 Low-viscosity, non-solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8 or transferred to a slop tank for subsequent discharge into the sea in accordance with sections 10.5 or 10.6; and
- .3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.4 *Tank washing and residue discharge procedures within special areas*

10.4.1 A prewash procedure as specified in appendix B should be applied.

10.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

10.4.3 Any water subsequently introduced into the tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the requirements of regulation 5(8) in respect of ship's position, speed and discharge outlet location.

10.4.4 Notwithstanding the provisions of paragraphs 10.4.1 to 10.4.3, residue or residue/water mixtures containing only low-viscosity, non-solidifying substances may be retained on board and discharged into the sea outside special areas in accordance with section 10.5 or 10.6.

10.5 *Discharge into the sea of a miscible residue/water mixture from a slop tank*

10.5.1 Prewash residue/water mixtures containing Category B substances should not be discharged into the sea within special areas.

10.5.2 Before a miscible residue/water mixture is discharged into the sea outside special areas, the composite concentration, C_s , should be determined as follows:

$$C_s = n/V_r$$

where n = number of tanks containing Category B residues which have been transferred to the slop tank. (For the sake of simplification, it is assumed that each tank contains 1 m³ of residue.)

V_r = volume of residue/water mixtures in the slop tank prior to discharge (determined from ullage tables) (m³).

10.5.3 The residue/water mixture may be discharged into the sea, provided that the rate does not exceed the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed or that defined by one of the equations below, whichever is smaller:

$$Q_D = \frac{KV^{1.4}L^{1.6}}{C_s} \quad \text{when a single outlet is used; or}$$

$$Q_D = \frac{1.5KV^{1.4}L^{1.6}}{C_s} \quad \text{when dual outlets are used.}$$

where Q_D = rate of discharge of residue/water mixture (m³/h)

V = ship's speed (knots)

L = ship's length (m)

K = 4.3×10^{-5}

C_s = composite concentration referred to in paragraph 10.5.2.

10.5.4 The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.5.5 Residue/water mixtures discharged into the sea in accordance with this section should be recorded using the device referred to in paragraph 8.7.1. If a variable capacity pump is used for the discharge, the flow rate should so be recorded using the device referred to in paragraph 8.7.2.

10.6 *Discharge into the sea of an immiscible residue/water mixture from a slop tank*

10.6.1 Prewash residue/water mixtures containing Category B substances should not be discharged into the sea within special areas.

10.6.2 The residue/water mixture may be discharged into the sea outside special areas, provided that the rate does not exceed the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are)

designed or that defined by one of the equations below, whichever is smaller:

$$Q_D = KV^{1.4}L^{1.6} \quad \text{when a single outlet is used; or}$$

$$Q_D = 1.5KV^{1.4}L^{1.6} \quad \text{when dual outlets are used.}$$

10.6.3 The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.6.4 Residue/water mixtures discharged into the sea in accordance with this section should be recorded using the device referred to in paragraph 8.7.1. If a variable capacity pump is used for the discharge, the flow rate should also be recorded using the device referred to in paragraph 8.7.2.

10.7 *Ventilation of Category B substances from cargo tanks*

10.7.1 When ventilation procedures are used to remove residue from cargo tanks, the requirements set out in section 9.3 apply.

10.8 *Ballasting and deballasting*

10.8.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 10.3 to 10.6.

10.8.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 m deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 11

Operational standards for existing ships carrying Category C substances

11.1 General

11.1.1 This chapter applies to any existing ship certified fit to carry Category C substances.

11.1.2 When a cargo tank on an existing ship is fitted with a cargo unloading system capable of unloading the cargo to the residue quantities not in excess of the quantity specified in regulation 5A(4)(a) and if the tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of chapter 6 apply. However, an existing ship may only discharge residue/water mixtures containing Category C substances within special areas in accordance with paragraph 6.4.2.1 if the cargo unloading system meets the requirements as specified for new ships in regulation 5A(3). If the cargo unloading system does not meet these requirements, discharge of residue/water mixtures within special areas should be carried out in accordance with section 11.4 or 11.5.

11.1.3 If a cargo tank other than that referred to in paragraph 11.1.2 is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 11.2 to 11.7 apply.

11.1.4 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing Category C substances are allowed cannot be met, no such discharges may be made.

11.2 Pumping and strippings

11.2.1 In unloading a cargo tank containing a Category C substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

11.3 Tank washing and residue discharge procedures outside special areas

11.3.1 High-viscosity or solidifying substances

- .1 A prewash procedure as specified in appendix B should be applied;
- .2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and

- .3 any water subsequently introduced into the tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

11.3.2 Low-viscosity, non-solidifying substances

- .1 any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

11.4 *Tank washing and residue discharge procedures within special areas*

11.4.1 A prewash procedure as specified in appendix B should be applied.

11.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

11.4.3 Any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location.

11.4.4 Notwithstanding the provisions of paragraphs 11.4.1 to 11.4.3, residue/water mixtures containing only non-solidifying substances with a viscosity less than 60 mPa·s at the unloading temperature may be retained on board and discharged into the sea outside special areas in accordance with paragraph 11.5.2.

11.5 *Discharges from a slop tank*

11.5.1 Residue/water mixtures in a slop tank should not be discharged into the sea within special areas.

11.5.2 Residue/water mixtures in a slop tank which contain only low-viscosity, non-solidifying substances may be discharged into the sea outside special areas at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of the ship's position, speed and discharge outlet location.

11.5.3 Residue/water mixtures in a slop tank which contain high-viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

11.6 *Ventilation of Category C substances from cargo tanks*

11.6.1 When ventilation procedures are used to remove residue from cargo tanks, the requirements set out in section 9.3 apply.

11.7 *Ballasting and deballasting*

11.7.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 11.3 to 11.4.

11.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 m deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 12

Operational standards for existing ships carrying Category D substances

12.1 *General*

12.1.1 This chapter applies to any existing ship certified fit to carry Category D substances.

12.2 *Discharge of Category D residues*

12.2.1 Although residue(s) of Category D substances is(are) required to be discharged within and outside special areas in a diluted form in accordance with regulation 5(4), such residue(s) may also be discharged in accordance with the operational standards for low-viscosity, non-solidifying Category C substances as specified in chapter 11.

12.3 *Ventilation of Category D substances from cargo tanks*

12.3.1 When ventilation procedures are used to remove residue from cargo tanks the requirements set out in section 9.3 apply.

Appendix A

Assessment of residue quantities in cargo tanks, pumps and piping

1 Introduction

1.1 Purpose

1.1.1 The purpose of this appendix is:

- .1 to provide the procedure for testing the efficiency of cargo pumping systems; and
- .2 to provide the method for calculating the residue quantities on the cargo tank surfaces.

1.2 Background

1.2.1 The ability of the pumping system of a tank to comply with regulation 5A(1), (2), (3) or (4) is determined by performing a test in accordance with the procedure set out in section 3 of this appendix. The quantity measured is termed the “stripping quantity”. The stripping quantity of each tank shall be recorded in the ship’s Manual.

1.2.2 For tanks of existing ships not satisfying the appropriate pumping efficiency requirement of regulation 5A(2)(a) or (4)(a) it is necessary to calculate the quantity of residue remaining on tank surfaces. The method for calculating the clingage residue is given in section 4.

1.2.3 For tanks referred to in 1.2.2, it is necessary to calculate the total quantity of residue remaining in the cargo tanks and its associated piping. The total residue quantity is the sum of the water test result and the calculated clingage quantity.

1.2.4 After having determined the stripping quantity and calculated clingage quantity (when required) of one tank, the Administration may use the determined quantities for a similar tank, provided the Administration is satisfied that the pumping system in that tank is similar and operating properly.

2 Design criteria and performance test

2.1 The cargo pumping systems should be designed to meet the required maximum amount of residue per tank of 0.1 m^3 and 0.3 m^3 or 0.3 m^3 and 0.9 m^3 respectively for Category B or C substances as specified by regulation 5A to the satisfaction of the Administration.

2.2 In accordance with regulation 5A(5), the cargo pumping systems should be tested with water to prove their performance. Such water tests

should, by measurement, show that the system meets the requirements of regulation 5A with the tolerance of 50 l per tank.

3 *Water test procedure*

3.1 **Test condition**

3.1.1 The ship's trim and list should be such as to provide favourable drainage to the suction point. During the water test the ship's trim should not exceed 3° by the stern, and the ship's list should not exceed 1°.

3.1.2 The trim and list chosen for the water test should be the minimum favourable trim and list as given in the ship's Manual for the stripping of the cargo tanks.

3.1.3 During the water test means should be provided to maintain a back-pressure of not less than 1 bar at the cargo tank's unloading manifold (see figures A-1 and A-2).

3.2 **Test procedure**

3.2.1 Ensure that the cargo tank to be tested and its associated piping have been cleaned and that the cargo tank is safe for entry.

3.2.2 Fill the cargo tank with water to a depth necessary to carry out normal end of unloading procedures.

3.2.3 Pump and strip the cargo tank and its associated piping in accordance with the ship's approved Manual.

3.2.4 Collect water remaining in the cargo tank and its associated piping into a calibrated container for measurement. Water residues should be collected from the following points:

- .1 the cargo tank suction and its vicinity;
- .2 any entrapped areas on the cargo tank bottom;
- .3 the low point drain of the cargo pump; and
- .4 all low point drains of piping associated with the cargo tank up to the manifold valve.

3.2.5 The total water volumes collected above determine the stripping quantity for the cargo tank.

3.2.6 Where a group of tanks is served by a common pump or piping, the water test residues associated with the common system(s) may be apportioned equally among the tanks provided that the following operational restriction is included in the ship's approved Manual: "For sequential unloading of tanks in this group, the pump or piping is not to be washed until all tanks in the group have been unloaded."

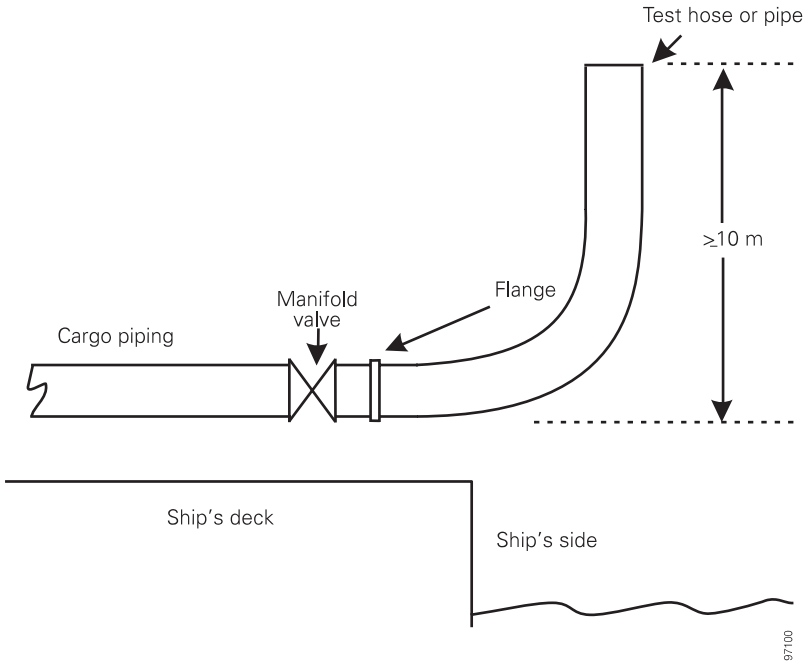


Figure A-1

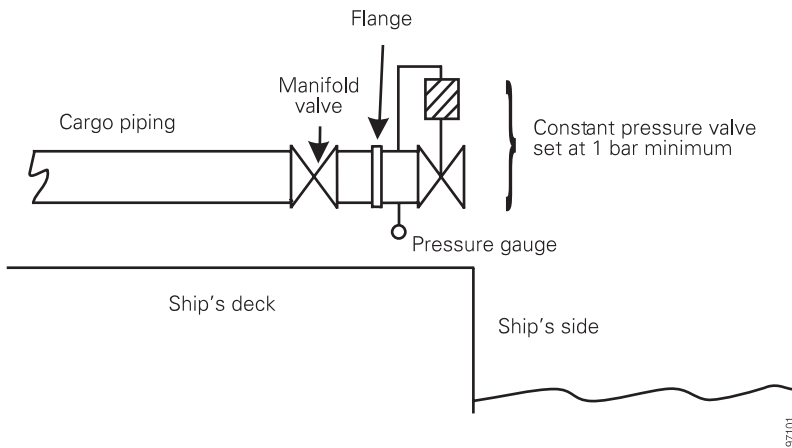


Figure A-2

The above figures illustrate test arrangements that would provide a backpressure of not less than 1 bar at the cargo tank's unloading manifold.

4 Calculation of clingage residues

4.1 Calculate the clingage residues using the following formula:

$$Q_{\text{RES}}^{(\text{surf})} = 1.1 \times 10^{-4} A_{\text{d}} + 1.5 \times 10^{-5} A_{\text{w}} + 4.5 \times 10^{-4} L^{1/2} A_{\text{b}}$$

4.2 Symbols and units used in residue equation:

A_{b} = Area of tank bottom and horizontal components of tank structural members facing upwards (m^2)

A_{d} = Area underdecks and horizontal components of tank structural members facing downwards (m^2)

A_{w} = Surface area of tank walls and vertical components of tank structural members (m^2)

L = Length of tank (m)

$Q_{\text{RES}}^{(\text{surf})}$ = Amount of clingage residue on tank surfaces (m^3).

Notes: 1. For purposes of calculating A_{b} , A_{d} and A_{w} , inclined (greater than 30° from the horizontal) and curved surfaces should be treated as vertical.

2. Methods of approximating A_{b} , A_{d} and A_{w} are permissible. (A method presented in BCH 15/INF.5 by Japan is an example.)

Appendix B

Prewash procedures [Ships built before 1 July 1994]*

In several sections of the Standards a prewash procedure is required in order to meet certain Annex II requirements. This appendix explains how these prewash procedures should be performed.

Prewash procedures for non-solidifying substances

1 Tanks should be washed by means of a rotary water jet, operated at sufficiently high water pressure. In the case of Category A substances washing machines should be operated in such locations that all tank surfaces are washed. In the case of Category B and C substances only one location need be used.

2 During washing the amount of water in the tank should be minimized by continuously pumping out slops and promoting flow to the suction point (positive list and trim). If this condition cannot be met the washing procedure should be repeated three times, with thorough stripping of the tank between washings.

3 Those substances which have a viscosity equal to or greater than 25 mPa·s at 20°C should be washed with hot water (temperature at least 60°C).

4 The number of cycles of the washing machine used should not be less than that specified in table B-1. A washing machine cycle is defined as the period between two consecutive identical orientations of the washing machine (rotation through 360°).

5 After washing, the washing machine(s) should be kept operating long enough to flush the pipeline, pump and filter.

Prewash procedures for solidifying substances

1 Tanks should be washed as soon as possible after unloading. If possible tanks should be heated prior to washing.

2 Residues in hatches and manholes should preferably be removed prior to the prewash.

* The Sub-Committee on Bulk Chemicals decided at its twenty-third session (September 1993) that the new appendix B[†] would be mandatory for new ships built on or after 1 July 1994 but could be applied to existing ships immediately on a voluntary basis, if so approved by the Administration. For ships built before 1 July 1994, therefore, the unamended text of appendix B still applies.

[†] See Revised appendix B.

3 Tanks should be washed by means of a rotary water jet operated at sufficiently high water pressure and in locations to ensure that all tank surfaces are washed.

4 During washing the amount of water in the tank should be minimized by pumping out slops continuously and promoting flow to the suction point (positive list and trim). If this condition cannot be met, the washing procedure should be repeated three times with thorough stripping of the tank between washings.

5 Tanks should be washed with hot water (temperature at least 60°C).

6 The number of cycles of the washing machine used should not be less than that specified in table B-1. A washing machine cycle is defined as the period between two consecutive identical orientations of the machine (rotation through 360°).

7 After washing, the washing machine(s) should be kept operating long enough to flush the pipeline, pump and filter.

**Table B-1 – Number of washing machine cycles
to be used in each location**

Category of substance	Number of washing machine cycles	
	non-solidifying substances	solidifying substances
Category A (residual concentration 0.1% or 0.05%)	1	2
Category A (residual concentration 0.01% or 0.005%)	2	3
Category B	1/2	1
Category C	1/2	1

Note: For an explanation of “residual concentration” see regulation 5(1) and 5(7) of Annex II.

Revised appendix B

Prewash procedures for new ships*

In several sections of the Standards a prewash procedure is required in order to meet certain Annex II requirements. This appendix explains how these prewash procedures should be performed and how the minimum volumes of washing media to be used should be determined. Smaller volumes of washing media may be used based on actual verification testing to the satisfaction of the Administration. Where reduced volumes are approved an entry to that effect must be recorded in the Procedures and Arrangements Manual.

The applicable safety considerations listed in section 1.7 of the Standards should be taken into account when developing procedures employing recycling of wash water, or when washing is conducted with a medium other than water.

If a medium other than water is used for the prewash, the provisions of 1.8.1 of the Standards apply.

Prewash procedures for non-solidifying substances without recycling

1 Tanks should be washed by means of a rotary jet(s), operated at sufficiently high water pressure. In the case of Category A substances washing machines should be operated in such locations that all tank surfaces are washed. In the case of Category B and C substances only one location need be used.

2 During washing the amount of liquid in the tank should be minimized by continuously pumping out slops and promoting flow to the suction point. If this condition cannot be met, the washing procedure should be repeated three times, with thorough stripping of the tank between washings.

3 Those substances which have a viscosity equal to or greater than 25 mPa·s at 20°C should be washed with hot water (temperature at least 60°C), unless the properties of such substances make the washing less effective.

4 The quantities of wash water used should not be less than those specified in paragraph 20 or determined according to paragraph 21.

* The Sub-Committee on Bulk Chemicals decided at its twenty-third session (September 1993) that the new appendix B would be mandatory for new ships built on or after 1 July 1994 but could be applied to existing ships immediately on a voluntary basis, if so approved by the Administration. For ships built before 1 July 1994, therefore, the unamended text of appendix B still applies.

5 After prewashing the tanks and lines should be thoroughly stripped.

Prewash procedures for solidifying substances without recycling

6 Tanks should be washed as soon as possible after unloading. If possible, tanks should be heated prior to washing.

7 Residues in hatches and manholes should preferably be removed prior to the prewash.

8 Tanks should be washed by means of a rotary jet(s) operated at sufficiently high water pressure and in locations to ensure that all tank surfaces are washed.

9 During washing the amount of liquid in the tank should be minimized by pumping out slops continuously and promoting flow to the suction point. If this condition cannot be met, the washing procedure should be repeated three times with thorough stripping of the tank between washings.

10 Tanks should be washed with hot water (temperature at least 60°C), unless the properties of such substances make the washing less effective.

11 The quantities of wash water used should not be less than those specified in paragraph 20 or determined according to paragraph 21.

12 After prewashing the tanks and lines should be thoroughly stripped.

Prewash procedures with recycling of washing medium

13 Washing with a recycled washing medium may be adopted for the purpose of washing more than one cargo tank. In determining the quantity, due regard must be given to the expected amount of residues in the tanks and the properties of the washing medium and whether any initial rinse or flushing is employed. Unless sufficient data are provided, the calculated end concentration of cargo residues in the washing medium should not exceed 5% based on nominal stripping quantities.

14 The recycled washing medium should only be used for washing tanks having contained the same or similar substance.

15 A quantity of washing medium sufficient to allow continuous washing should be added to the tank or tanks to be washed.

16 All tank surfaces should be washed by means of a rotary jet(s) operated at sufficiently high pressure. The recycling of the washing medium may either be within the tank to be washed or via another tank, e.g. a slop tank.

17 The washing should be continued until the accumulated throughput is not less than that corresponding to the relevant quantities given in paragraph 20 or determined according to paragraph 21.

18 Solidifying substances and substances with viscosity equal to or greater than 25 mPa·s at 20°C should be washed with hot water (temperature at least 60°C) when water is used as the washing medium, unless the properties of such substances make the washing less effective.

19 After completing the tank washing with recycling to the extent specified in paragraph 17, the washing medium should be discharged and the tank thoroughly stripped. Thereafter, the tank should be subjected to a rinse, using clean washing medium, with continuous drainage and discharge. The rinse should as a minimum cover the tank bottom and be sufficient to flush the pipelines, pump and filter.

Minimum quantity of water to be used in a prewash

20 The minimum quantity of water to be used in a prewash is determined by the residual quantity of noxious liquid substance in the tank, the tank size, the cargo properties, the permitted concentration in any subsequent wash water effluent, and the area of operation. The minimum quantity is given by the following formula:

$$Q = k(15r^{0.8} + 5r^{0.7} \times V/1000)$$

where

Q = the required minimum quantity in m^3

r = the residual quantity per tank in m^3 . The value of r shall be the value demonstrated in the actual stripping efficiency test, but should not be taken lower than 0.100 m^3 for a tank volume of 500 m^3 and above and 0.040 m^3 for a tank volume of 100 m^3 and below. For tank sizes between 100 m^3 and 500 m^3 the minimum value of r allowed to be used in the calculations is obtained by linear interpolation.

For Category A substances the value of r should either be determined based on stripping tests according to the Standards, observing the lower limits as given above, or be taken to be 0.9 m^3 .

V = tank volume in m^3

k = a factor having values as follows:

Category A, non-solidifying, low-viscosity substance, outside special areas	$k = 1.0$
Category A, non-solidifying, low-viscosity substance, inside special areas	$k = 1.2$
Category A, solidifying or high-viscosity substance, outside special areas	$k = 2.0$

Category A, solidifying or high-viscosity substance, inside special areas	$k = 2.4$
Phosphorus, in all areas	$k = 3.0$
Category B and C, non-solidifying, low-viscosity substance	$k = 0.5$
Category B and C, solidifying or high-viscosity substance	$k = 1.0$

The table below is calculated using the formula with a k factor of 1 and may be used as an easy reference.

Stripping quantity (m ³)	Tank volume (m ³)		
	100	500	3,000
≤ 0.04	1.2	2.9	5.4
0.10	2.5	2.9	5.4
0.30	5.9	6.8	12.2
0.90	14.3	16.1	27.7

21 Verification testing for approval of prewash volumes lower than those given in paragraph 20 may be carried out to the satisfaction of the Administration to prove that the requirements of regulation 5 are met, taking into account the substances the tanker is certified to carry. The prewash volume so verified should be adjusted for other prewash conditions by application of the factor k as defined in paragraph 20.

Appendix C

Ventilation procedures

1 Cargo residues of substances with a vapour pressure greater than 5×10^3 Pa at 20°C may be removed from a cargo tank by ventilation.

2 Before residues of noxious liquid substances are ventilated from a tank the safety hazards relating to cargo flammability and toxicity should be considered. With regard to safety aspects, the operational requirements for openings in cargo tanks in the International Bulk Chemical Code, the Bulk Chemical Code, and the ventilation procedures in the ICS Tanker Safety Guide (Chemicals) should be consulted.

3 Port authorities may also have regulations on cargo tank ventilation.

4 The procedures for ventilation of cargo residues from a tank are as follows:

- .1 the pipelines should be drained and further cleared of liquid by means of ventilation equipment;
- .2 the list and trim should be adjusted to the minimum levels possible so that evaporation of residues in the tank is enhanced;
- .3 ventilation equipment producing an airjet which can reach the tank bottom shall be used. Figure C-1 could be used to evaluate the adequacy of ventilation equipment used for ventilating a tank of a given depth;
- .4 ventilation equipment should be placed in the tank opening closest to the tank sump or suction point;
- .5 ventilation equipment should, when practicable, be positioned so that the airjet is directed at the tank sump or suction point and impingement of the airjet on tank structural members is to be avoided as much as possible; and
- .6 ventilation shall continue until no visible remains of liquid can be observed in the tank. This shall be verified by a visual examination or an equivalent method.

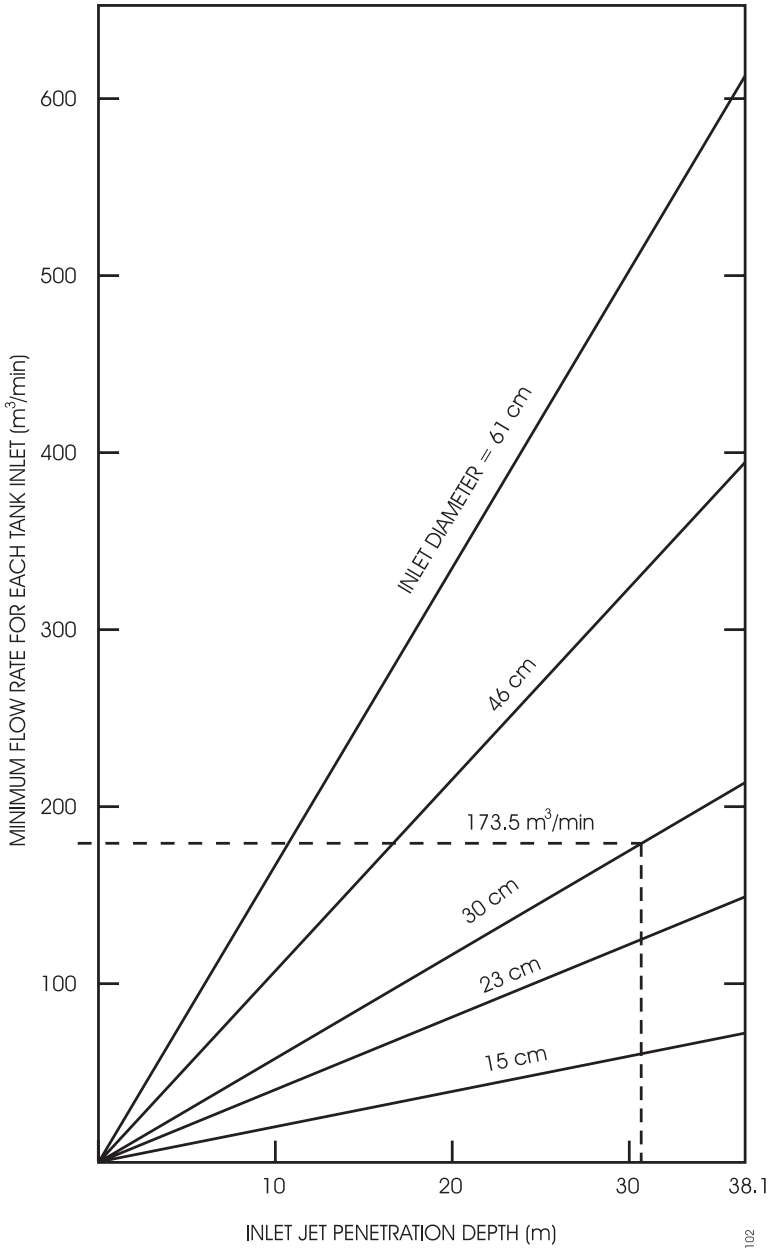


Figure C-1. Minimum flow rate as a function of jet penetration depth. Jet penetration depth should be compared against tank height.

Appendix D

Standard format for the Procedures and Arrangements Manual

Note 1: The standard format consists of a standardized text of an introduction, of an index and of the leading paragraphs to each section. This standardized text should be reproduced in the Manual provided for each ship followed by the information necessary to complete each section as applicable to the particular ship. The necessary information is indicated within with left-hand marking. When a section is not applicable, “NA” should be entered. It is recognized that the content of the Manual will vary depending on the design of the ship, the trade and the types of cargoes intended to be carried.

Note 2: If the Administration requires or accepts information and operational instructions in addition to those outlined in this Standard Format, they should be included in part 2 of the Manual. If no such additional information or operating instructions are required or accepted by the Administration, the Manual will consist of one part only.

STANDARD FORMAT

MARPOL 73/78 ANNEX II PROCEDURES AND ARRANGEMENTS MANUAL

Name of ship:

Distinctive number or letters:

Port of registry:

Approval stamp of Administration:

INTRODUCTION

1. The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as MARPOL 73/78) was established in order to prevent the pollution of the marine environment by discharges into the sea from ships of harmful substances or effluents containing such substances. In order to achieve its aim, MARPOL 73/78 contains five annexes in which detailed regulations are given with respect to the handling on board ships and the discharge into the sea of five main groups of harmful substances, i.e. Annex I (mineral oils), Annex II (noxious liquid substances carried in bulk), Annex III (harmful substances carried in packaged forms), Annex IV (sewage) and Annex V (garbage).

2. Regulation 5 of Annex II prohibits the discharge into the sea of noxious liquid substances of Categories A, B, C and D or of ballast water, tank washings or other residues or mixtures containing such substances, except in compliance with specified conditions including procedures and arrangements based upon standards developed by the International Maritime Organization (IMO) to ensure that the criteria specified for each Category will be met.

3. The Standards for Procedures and Arrangements called for by Annex II of MARPOL 73/78 (as referred to above) require that each ship which is certified for the carriage of noxious liquid substances in bulk shall be provided with a Procedures and Arrangements Manual, hereinafter referred to as the Manual.

4. This Manual has been written in accordance with chapter 2 of the Standards and is concerned with the marine environmental aspects of the cleaning of cargo tanks and the discharge of residues and mixtures from these operations. The Manual is not a safety guide and reference should be made to other publications specifically to evaluate safety hazards.

5. The purpose of [Part 1 of]* the Manual is to identify the arrangements and equipment required to enable compliance with Annex II and to identify for the ship's officers all operational procedures with respect to cargo handling, tank cleaning, slops handling, residue discharging, ballasting and deballasting, which must be followed in order to comply with the requirements of Annex II. [Part 2 of the Manual contains additional information and operational instructions required or accepted by the Administration.]*

6. In addition, this Manual, together with the ship's Cargo Record Book [and International Certificate for the Carriage of Noxious Liquid

* The parts in square brackets in the text or marked in the left margin are to be included only if a Part 2 is incorporated into the Manual.

Substances in Bulk/Certificate of Fitness issued under the International Bulk Chemical Code/Certificate of Fitness issued under the Bulk Chemical Code],* will be used by Administrations for control purposes in order to ensure full compliance with the requirements of Annex II by this ship.

7. The master shall ensure that no discharges into the sea of cargo residues or residue/water mixtures containing Category A, B, C or D substances shall take place, unless such discharges are made in full compliance with the operational procedures contained in this Manual and that the equipment required by this Manual and needed for such discharge is used.

8. This Manual has been approved by the Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration.

* Include only the certificate issued to the particular ship.

INDEX OF SECTIONS

[Part 1]

1	Main features of MARPOL 73/78, Annex II
2	Description of the ship's equipment and arrangements
3	Cargo unloading procedures and tank stripping.
4	Procedures relating to the cleaning of cargo tanks, the discharge of residues, ballasting and deballasting
	Table 1 – List of noxious liquid substances allowed to be carried.
	Table 2 – Cargo tank information
	Addendum A: Flow diagrams
	Addendum B: Prewash procedures
	Addendum C: Ventilation procedures
	Addendum D: Determination of permitted residue discharge rates for Category B substances (if necessary).

Part 2

Additional information and operational instructions required or accepted by the Administration (if necessary).

SECTION 1 – Main features of MARPOL 73/78, Annex II

1.1 The requirements of Annex II apply to all ships carrying noxious liquid substances in bulk. Substances posing a threat of harm to the marine environment are divided into four categories, A, B, C and D, and listed as such in appendix II to Annex II. Category A substances are those posing the greatest threat to the marine environment, whilst Category D substances are those posing the smallest threat.

1.2 Annex II prohibits the discharge into the sea of any effluent containing substances falling under these categories, except when the discharge is made under conditions which are specified in detail for each category. These conditions include, where applicable, such parameters as:

- the maximum quantity of substances per tank which may be discharged into the sea;
- the speed of the ship during the discharge;
- the minimum distance from the nearest land during discharge;
- the minimum depth of water at sea during discharge;
- the maximum concentration of substances in the ship’s wake or the dilution of substances prior to discharge; and
- the need to effect the discharge below the waterline.

1.3 For certain sea areas identified as “special areas” more stringent discharge criteria are given. Under Annex II the special areas are the Baltic Sea area, the Black Sea area, and the Antarctic area.*

1.4 Annex II requires that every ship is provided with pumping and piping arrangements to ensure that each tank designated for the carriage of Category B and C substances does not retain after unloading a quantity of residue in excess of the quantity given in the Annex. For each tank intended for the carriage of such substances an assessment of the residue quantity has to be made. Only when the residue quantity as assessed is less than the quantity prescribed by the Annex may a tank be approved for the carriage of a Category B or a Category C substance.

1.5 In addition to the conditions referred to above, an important requirement contained in Annex II is that the discharge operations of certain cargo residues and certain tank cleaning and ventilation operations may only be carried out in accordance with approved procedures and arrangements based upon standards developed by the International Maritime Organization (IMO).

* MARPOL 73/78, Annex II defines these areas as follows:

- The Baltic Sea area means the Baltic Sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57° 44.8' N.
- The Black Sea area means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41° N.
- The Antarctic area means the sea south of latitude 60° S.

1.6 To enable this requirement to be complied with, this Manual contains in section 2 all particulars of the ship's equipment and arrangements, in section 3 operational procedures for cargo unloading and tank stripping and in section 4 procedures for discharge of cargo residues, tank washing, slops collection, ballasting and deballasting as may be applicable to the substances the ship is certified to carry.

1.7 By following the procedures as set out in this Manual, it will be ensured that the ship complies with all relevant requirements of Annex II to MARPOL 73/78.

SECTION 2 – Description of the ship's equipment and arrangements

2.1 This section contains all particulars of the ship's equipment and arrangements necessary to enable the crew to follow the operational procedures set out in sections 3 and 4.

2.2 General arrangement of ship and description of cargo tanks

This section should contain a brief description of the cargo area of the ship with the main features of the cargo tanks and their positions.

Line or schematic drawings showing the general arrangement of the ship and indicating the position and numbering of the cargo tanks and heating arrangements should be included. Identification of the cargo tanks certified fit to carry noxious liquid substances should be made in conjunction with table 1 of this Manual.

2.3 Description of cargo pumping and piping arrangements and stripping system

This section should contain a description of the cargo pumping and piping arrangements and of the stripping system. Line or schematic drawings should be provided showing the following and be supported by textual explanation where necessary:

- cargo piping arrangements with diameters;
- cargo pumping arrangements with pump capacities;
- piping arrangements of stripping system with diameters;
- pumping arrangements of stripping system with pump capacities;
- location of suction points of cargo lines and stripping lines inside every cargo tank;
- if a suction well is fitted, the location and cubic capacity thereof;
- line draining and stripping or blowing arrangements; and
- quantity and pressure of nitrogen or air required for line blowing if applicable.

2.4 *Description of ballast tanks and ballast pumping and piping arrangements*

This section should contain a description of the ballast tanks and ballast pumping and piping arrangements.

Line or schematic drawings and tables should be provided showing the following:

- a general arrangement showing the segregated ballast tanks and cargo tanks to be used as ballast tanks together with their capacities (cubic metres);
- ballast piping arrangement;
- pumping capacity for those cargo tanks which may also be used as ballast tanks; and
- any interconnection between the ballast piping arrangements and the underwater outlet system.

2.5 *Description of dedicated slop tanks with associated pumping and piping arrangements*

This section should contain a description of the dedicated slop tanks with the associated pumping and piping arrangements. Line or schematic drawings should be provided showing the following:

- which dedicated slop tanks are provided together with the capacities of such tanks;
- pumping and piping arrangements of dedicated slop tanks with piping diameters and their connection with the underwater discharge outlet.

2.6 *Description of underwater discharge outlet for effluents containing noxious liquid substances*

This section should contain information on position and maximum flow capacity of the underwater discharge outlet (or outlets) and the connections to this outlet from the cargo tanks and slop tanks. Line or schematic drawings should be provided showing the following:

- location and number of underwater discharge outlets;
- connections to underwater discharge outlet;
- location of all seawater intakes in relation to underwater discharge outlets.

2.7 *Description of flow rate indicating and recording devices*

This section, which applies only to ships operating under regulation 5A(2)(b), should contain a description of the means of measuring the flow rate, and if required also the means of recording the flow rate and time, and the methods of operation.

A line or schematic drawing showing the position and connections of these devices should be provided.

2.8 *Description of cargo tank ventilation system*

This section should contain a description of the cargo tank ventilation system.

Line or schematic drawings and tables should be provided showing the following and supported by textual explanation if necessary:

- the noxious liquid substances the ship is certified fit to carry having a vapour pressure over 5×10^3 Pa at 20°C suitable for cleaning by ventilation to be listed in table 1;
- ventilation piping and fans;
- position of the ventilation openings;
- the minimum flow rate of the ventilation system to adequately ventilate the bottom and all parts of the cargo tank;
- the location of structures inside the tank affecting ventilation;
- the method of ventilating the cargo pipeline system, pumps, filters, etc; and
- means for ensuring that the tank is dry.

2.9 *Description of tank washing arrangements and washwater heating system*

This section should contain a description of the cargo tank washing arrangements, washwater heating system and all necessary tank washing equipment.

Line or schematic drawings and tables or charts showing the following:

- arrangements of piping dedicated for tank washing with pipeline diameters;
- type of tank washing machines with capacities and pressure rating;
- maximum number of tank washing machines which can operate simultaneously;
- position of deck openings for cargo tank washing;
- the number of washing machines and their location required for ensuring complete coverage of the cargo tank walls;
- maximum capacity of washwater which can be heated to 60°C by the installed heating equipment; and
- maximum number of tank washing machines which can be operated simultaneously at 60°C.

SECTION 3 – Cargo unloading procedures and tank stripping

3.1 This section contains operational procedures in respect of cargo unloading and tank stripping which must be followed in order to ensure compliance with the requirements of Annex II.

3.2 *Cargo unloading*

This section should contain procedures to be followed including the pump and cargo unloading and suction line to be used for each tank. Alternative methods may be given.

The method of operation of the pump or pumps and the sequence of operation of all valves should be given.

The basic requirement is to unload the cargo to the maximum practicable extent.

3.3 *Cargo tank stripping*

This section should contain procedures to be followed during the stripping of each cargo tank.

The procedures should include the following:

- operation of stripping system;
- list and trim requirements;
- line draining and stripping or blowing arrangements if applicable.

3.4 *Cargo temperature*

This section should contain information on the heating requirements of cargoes which have been identified as being required to be at a certain minimum temperature during unloading.

Information should be given on control of the heating system and the method of temperature measurement.

3.5 *Procedures to be followed when a cargo tank cannot be unloaded in accordance with the required procedures*

This section should contain information on the procedures to be followed in the event that the requirements contained in sections 3.3 and/or 3.4 cannot be met due to circumstances such as the following:

- failure of cargo tank stripping system; and
- failure of cargo tank heating system.

3.6 *Cargo Record Book*

The Cargo Record Book should be completed in the appropriate places on completion of cargo unloading.

SECTION 4 – Procedures relating to the cleaning of cargo tanks, the discharge of residues, ballasting and deballasting

4.1 This section contains operational procedures in respect of tank cleaning, ballast and slops handling which must be followed in order to ensure compliance with the requirements of Annex II.

4.2 The following paragraphs outline the sequence of actions to be taken and contain the information essential to ensure that noxious liquid substances are discharged without posing a threat of harm to the marine environment.

4.3 Establish if the last cargo in the tank is included in the ship's approved list of noxious liquid substances (see table 1). If not included, no special tank cleaning, residue discharge, ballasting and deballasting procedures apply under the provisions of Annex II.

4.4 If the last cargo in the tank is included in the above-mentioned list, the information necessary to establish the procedures for discharging the residue of that cargo, cleaning, ballasting and deballasting the tank, should take into account the following:

4.4.1 Category of substance

Obtain the category of the substance from table 1.

4.4.2 Stripping efficiency of tank pumping system

The contents of this section will depend on the design of the ship and whether it is a new ship or existing ship. (See flow diagrams pumping/stripping requirements.)

4.4.3 Vessel within or outside special area

This section should contain instructions on whether the tank washings can be discharged into the sea within a special area (as defined in section 1.3) or outside a special area. The different requirements should be made clear and will depend on the design and trade of the ship.

4.4.4 Solidifying or high-viscosity substance

The properties of the substance should be obtained from the shipping document.

4.4.5 Miscibility in water

This property of the substance should be obtained from table 1.

Note: This section should be completed only for existing ships and only for Category B substances.

4.4.6 *Compatibility with slops containing other substances*

This section should contain instructions on the permissible and non-permissible mixing of cargo slops. Reference should be made to compatibility guides.

4.4.7 *Discharge to reception facility*

This section should identify those substances the residues of which are required to be prewashed and discharged to a reception facility.

4.4.8 *Discharging into the sea*

This section should contain information on the factors to be considered in order to identify whether the residue/water mixtures are permitted to be discharged into the sea.

4.4.9 *Use of cleaning agents or additives*

This section should contain information on the use and disposal of cleaning agents (e.g. solvents used for tank cleaning) and additives to tank washing water (e.g. detergents).

4.4.10 *Use of ventilation procedures for tank cleaning*

This section should make reference to table 1 to ascertain the suitability of the use of ventilation procedures.

4.5 Having assessed the above information, the correct operational procedures to be followed should be identified using the instructions and flow diagrams in this section. Appropriate entries should be made in the Cargo Record Book indicating the procedure adopted.

This section should contain procedures, which will depend on the age of the ship and pumping efficiency, based on the Standards. Examples of flow diagrams referred to in this section are given at addendum A and incorporate comprehensive requirements applicable to both new and existing ships. The Manual for a particular ship should only contain those requirements specifically applicable to that ship. The Manual should contain the following information and procedures:

Table 1: List of noxious liquid substances allowed to be carried.

Table 2: Cargo tank information.

Addendum A: Flow diagrams.

Addendum B: Prewash procedures.

Addendum C: Ventilation procedures.

Addendum D: Determination of permitted residue discharge rates for Category B substances as required.

Outlines of the above tables and addenda follow.

Table 1 – List of noxious liquid substances allowed to be carried

Substance	Category	Tanks (tank groups)* fit for carriage	Melting point °C	Viscosity at 20°C mPa·s			Suitable for ventilation Yes/No	Miscible in water Yes/No
				<25	25-60	≥60		
<p><i>Note:</i> Information need only be inserted in the fourth and fifth columns, relating to melting point and viscosity, for those substances which have a melting point greater than 0°C or a viscosity greater than 25 mPa·s at 20°C. When more than one commercial grade is shipped and the viscosities or the melting points of those commercial grades differ, enter and note that other commercial grades may have lower viscosities or melting points or give the values for each commercial grade which will be shipped.</p>								

* Tank numbers (tank groups) should be identical to those in the ship's Certificate of Fitness.

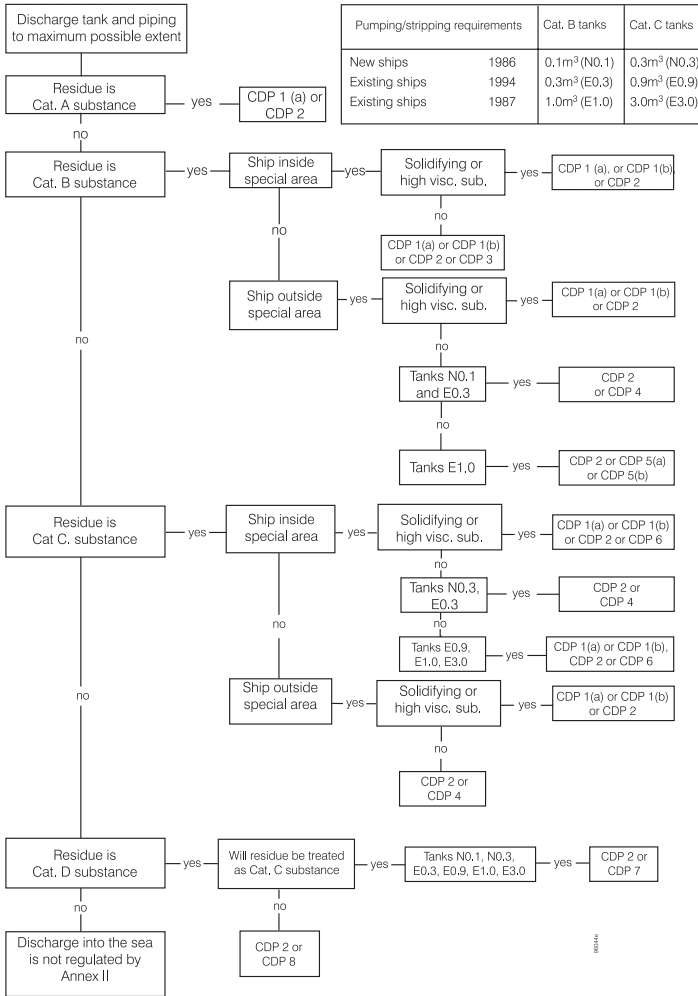
Table 2 – Cargo tank information

Tank no.	Capacity (m ³)	Stripping quantity in litres	Total residue* (m ³)	Approved stripping level under reg. 5A

* For ships referred to in regulation 5A(2)(b) and 5A(4)(b) only.

ADDENDUM A

Flow diagrams – Cleaning of cargo tanks and disposal of tank washings/ballast containing residues of Category A, B, C and D substances



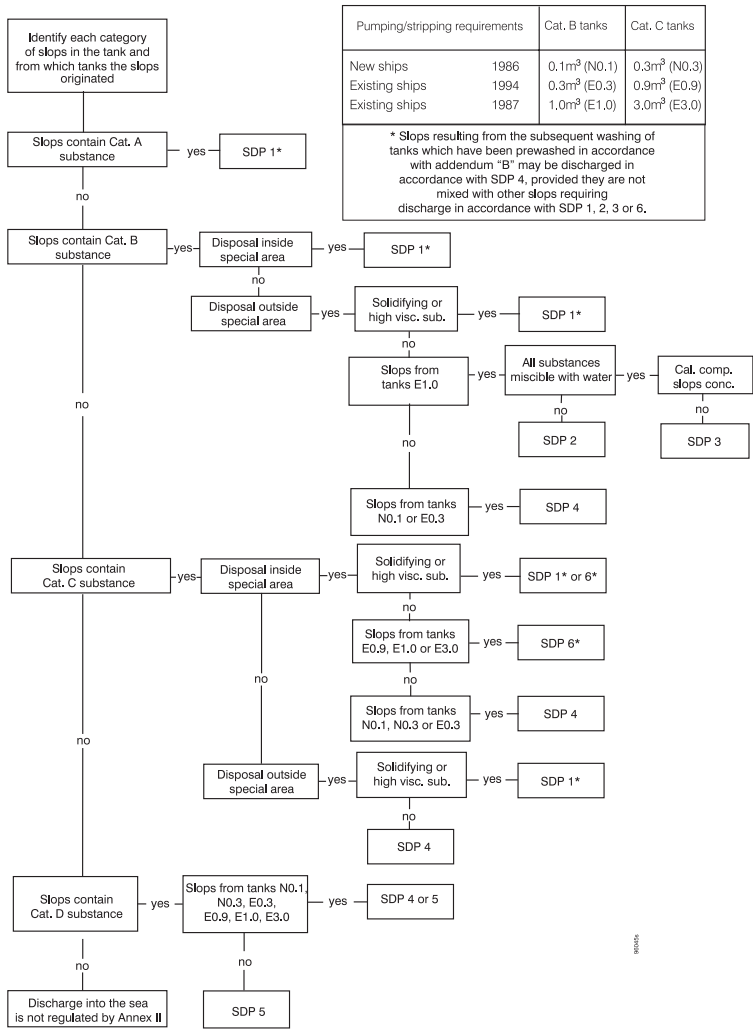
Note: This is a flow diagram giving comprehensive requirements applicable to new and existing ships. The flow diagram for a specific ship should only include parts applicable to that ship.

Appendix D: Standard format for the P & A Manual

Cleaning and disposal procedures (CDP)	Sequence of procedures									
	1(a)	1(b)	2	3	4	5(a)	5(b)	6	7	8
Apply prewash in accordance with appendix B and discharge residue to reception facility	x	x								
Apply prewash in accordance with appendix B and transfer residues to slop tank for discharge to sea in accordance with chapter 10, section 10.5 or 10.6						x	x			
Apply subsequent wash of minimum one cycle		x					x			
Apply ventilation procedures in accordance with appendix C			x							
Residue may be retained on board and discharged outside special area				x						
Residues of substances with viscosities < 60 mPa·s at the unloading temperature may be retained on board and discharged outside special area. Alternatively, tanks may be prewashed and slops discharged ashore								x		
Dilute residue in cargo tanks with water to obtain residue concentration in mixture of 10% or less										x
Ballast tank or, wash tank to commercial requirements	x			x	x	x		x	x	
Conditions for discharge of ballast/residue/water mixtures other than prewash:										
> 12 miles from land	x	x		x	x	x	x	x	x	x
> 7 knots ship's speed	x	x		x	x	x	x	x	x	x
> 25 metres water depth	x	x		x	x	x	x	x		
Using underwater discharge	x	x		x	x	x	x	x	x	
Ballast added to tank		x					x			
Condition for discharge of ballasts:										
> 12 miles from land		x					x			
> 25 metres water depth		x					x			
Alternatively, residue/water mixtures may be discharged ashore (N.B. optional not MARPOL requirement)	x	x		x	x	x	x	x	x	x
Any water subsequently introduced into the tank may be discharged into the sea without restrictions	x	x	x	x	x	x	x	x	x	x

Note: Start at the top of the column under the CDP number specified and complete each procedure in sequence where marked x.

Disposal of prewash or tank washings containing Category A, B, C or D substances from dedicated slop tanks or cargo tanks containing tank washings or slops



Note: This is a flow diagram giving comprehensive requirements applicable to new and existing ships. The flow diagram for a specific ship should only include parts applicable to that ship.

Slops disposal procedures (SDP)	Sequence of procedures					
	1	2	3	4	5	6
Slops must be discharged ashore	x					
Establish discharge rate of miscible residue/water mixture in accordance with addendum D		x				
Divide obtained discharge rate of pure product by composite slops concentration			x			
The figure obtained shows the rate at which discharge is permitted		x	x			
Residues of substances with viscosities < 60 mPa·s at the unloading temperature may be retained on board and discharged outside special area. Alternatively, tanks may be prewashed and slops discharged ashore						x
Dilute slops with water to obtain a solution of 10% or less no restrictions on discharge rate					x	
Discharge rate is maximum permitted by underwater discharge outlet				x		x
Additional discharge conditions						
– ship's speed at least 7 knots		x	x	x	x	x
– outside 12 miles from nearest land		x	x	x	x	x
– depth of water at least 25 m		x	x	x		x
– using underwater discharge		x	x	x		x

Note: Start at the top of the column under the SDP number specified and complete each procedure in sequence where marked x.

ADDENDUM B – Prewash procedures

This addendum to the Manual should contain prewash procedures based on appendix B of the Standards. These procedures should contain specific requirements for the use of the tank washing arrangements and equipment provided on the particular ship and include the following:

- washing machine positions to be used;
- slops pumping out procedure;
- requirements for hot washing;
- number of cycles of washing machine (or time);
- minimum operating pressures.

ADDENDUM C – Ventilation procedures

This addendum to the Manual should contain ventilation procedures based on appendix C of the Standards. The procedures should contain specific requirements for the use of the cargo tank ventilation system, or equipment, fitted on the particular ship and should include the following:

- ventilation positions to be used;
- minimum flow or speed of fans;
- procedures for ventilating cargo pipeline, pumps, filters, etc.;
- procedures for ensuring that tanks are dry on completion.

ADDENDUM D – Determination of permitted residue discharge rates for Category B substances

This addendum to the Manual, which is required only by ships operating under regulation 5A(2)(b), should contain a method for the ship's crew to determine the permitted discharge rates for Category B substances. The method should be based on sections 10.5 and 10.6 of the Standards.

Annex III of MARPOL 73/78
(including amendments)

*Regulations for the Prevention
of Pollution by Harmful
Substances Carried by Sea
in Packaged Form*

Annex III of MARPOL 73/78

(including amendments)

Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form

Regulation 1 *Application*

- (1) Unless expressly provided otherwise, the regulations of this Annex apply to all ships carrying harmful substances in packaged form.
 - (1.1) For the purpose of this Annex, “harmful substances” are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code).*
 - (1.2) Guidelines for the identification of harmful substances in packaged form are given in the appendix to this Annex.
 - (1.3) For the purposes of this Annex, “packaged form” is defined as the forms of containment specified for harmful substances in the IMDG Code.
- (2) The carriage of harmful substances is prohibited, except in accordance with the provisions of this Annex.
- (3) To supplement the provisions of this Annex, the Government of each Party to the Convention shall issue, or cause to be issued, detailed requirements on packing, marking, labelling, documentation, stowage, quantity limitations and exceptions for preventing or minimizing pollution of the marine environment by harmful substances.*

* Refer to the IMDG Code adopted by the Organization by resolution A.716(17), as it has been or may be amended by the Maritime Safety Committee; see IMO sales publications IMO-200E and IMO-210E.

- (4) For the purposes of this Annex, empty packagings which have been used previously for the carriage of harmful substances shall themselves be treated as harmful substances unless adequate precautions have been taken to ensure that they contain no residue that is harmful to the marine environment.
- (5) The requirements of this Annex do not apply to ship's stores and equipment.

Regulation 2

Packing

Packages shall be adequate to minimize the hazard to the marine environment, having regard to their specific contents.

Regulation 3

Marking and labelling

- (1) Packages containing a harmful substance shall be durably marked with the correct technical name (trade names alone shall not be used) and, further, shall be durably marked or labelled to indicate that the substance is a marine pollutant. Such identification shall be supplemented where possible by any other means, for example, by use of the relevant United Nations number.
- (2) The method of marking the correct technical name and of affixing labels on packages containing a harmful substance 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 and labelling, account shall be taken of the durability of the materials used and of the surface of the package.
- (3) Packages containing small quantities of harmful substances may be exempted from the marking requirements.*

Regulation 4[†]

Documentation

- (1) In all documents relating to the carriage of harmful substances by sea where such substances are named, the correct technical name of each such substance shall be used (trade names alone shall not be used) and

* Refer to the specific exemptions provided for in the IMDG Code; see IMO sales publications IMO-200E and IMO-210E.

[†] 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.

the substance further identified by the addition of the words “MARINE POLLUTANT”.

- (2) The shipping documents supplied by the shipper shall include, or be accompanied by, a signed certificate or declaration that the shipment offered for carriage is properly packaged and marked, labelled or placarded as appropriate and in proper condition for carriage to minimize the hazard to the marine environment.
- (3) Each ship carrying harmful substances shall have a special list or manifest setting forth the harmful substances on board and the location thereof. A detailed stowage plan which sets out the location of the harmful substances on board may be used in place of such special list or manifest. Copies of such documents shall also be retained on shore by the owner of the ship or his representative until the harmful substances are unloaded. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.

SEE INTERPRETATION 1.0

- (4) When the ship carries a special list or manifest or a detailed stowage plan, required for the carriage of dangerous goods by the International Convention for the Safety of Life at Sea, 1974, as amended, the documents required by this regulation may be combined with those for dangerous goods. Where documents are combined, a clear distinction shall be made between dangerous goods and harmful substances covered by this Annex.

Regulation 5

Stowage

Harmful substances shall be properly stowed and secured so as to minimize the hazards to the marine environment without impairing the safety of the ship and persons on board.

Regulation 6

Quantity limitations

Certain harmful substances may, for sound scientific and technical reasons, need to be prohibited for carriage or be limited as to the quantity which may be carried aboard any one ship. In limiting the quantity, due consideration shall be given to size, construction and equipment of the ship, as well as the packaging and the inherent nature of the substances.

Regulation 7

Exceptions

- (1) Jettisoning of harmful substances carried in packaged form shall be prohibited, except where necessary for the purpose of securing the safety of the ship or saving life at sea.
- (2) Subject to the provisions of the present Convention, appropriate measures based on the physical, chemical and biological properties of harmful substances shall be taken to regulate the washing of leakages overboard, provided that compliance with such measures would not impair the safety of the ship and persons on board.

Regulation 8

*Port State control on operational requirements**

- (1) A ship when in a port of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by harmful substances.
- (2) In the circumstances given in paragraph (1) of this regulation, the Party 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 this Annex.
- (3) Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
- (4) Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19); see IMO sales publication IMO-650E.

Appendix to Annex III

Guidelines for the identification of harmful substances in packaged form

For the purposes of this Annex, substances identified by any one of the following criteria are harmful substances:

- bioaccumulated to a significant extent and known to produce a hazard to aquatic life or to human health (Hazard Rating “+” in column A*); or
- bioaccumulated with attendant risk to aquatic organisms or to human health with a short retention of the order of one week or less (Hazard Rating “Z” in column A*); or
- liable to produce tainting of seafood (Hazard Rating “T” in column A*); or
- highly toxic to aquatic life, defined by a LC₅₀/96[†] hour less than 1 ppm (Hazard Rating “4” in column B*).

* Refer to the Composite List of Hazard Profiles prepared by the IMO/FAO/UNESCO/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), which is circulated annually by the Organization by means of BLG circulars to all IMO Member States.

[†] The concentration of a substance which will, within the specified time (generally 96 hours), kill 50% of the exposed group of test organisms. LC₅₀ is often specified in milligrams per litre (mg/l) or parts per million (ppm).

Unified Interpretation of Annex III

- Reg. 4.3** 1.0 At any stopover, where any loading or unloading operations, even partial, are carried out, a revision of the documents listing the harmful substances taken on board, indicating their location on board or showing a detailed stowage plan, shall be made available before departure to the person or organization designated by the port State authority.

Annex IV of MARPOL 73/78

*Regulations for the Prevention
of Pollution by Sewage
from Ships*

Annex IV of MARPOL 73/78*

Regulations for the Prevention of Pollution by Sewage from Ships

Regulation 1

Definitions

For the purposes of the present Annex:

- (1) *New ship* means a ship:
 - (a) for which the building contract is placed, or in the absence of a building contract, the keel of which is laid, or which is at a similar stage of construction, on or after the date of entry into force of this Annex; or
 - (b) the delivery of which is three years or more after the date of entry into force of this Annex.
- (2) *Existing ship* means a ship which is not a new ship.
- (3) *Sewage* means:
 - (a) drainage and other wastes from any form of toilets, urinals, and WC scuppers;
 - (b) drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises;
 - (c) drainage from spaces containing living animals; or
 - (d) other waste waters when mixed with the drainages defined above.
- (4) *Holding tank* means a tank used for the collection and storage of sewage.
- (5) *Nearest land*. The term “from the nearest land” means from the baseline from which the territorial sea of the territory in question is established in accordance with international law except that, for the purposes of the present Convention, “from the nearest land” off the

* On the publication date of the 1997 Consolidated Edition, Annex IV had not met the conditions of entry into force. This Annex is under revision by the Marine Environment Protection Committee of the Organization.

north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in

latitude 11°00' S, longitude 142°08' E
to a point in latitude 10°35' S, longitude 141°55' E
thence to a point latitude 10°00' S, longitude 142°00' E
thence to a point latitude 9°10' S, longitude 143°52' E
thence to a point latitude 9°00' S, longitude 144°30' E
thence to a point latitude 13°00' S, longitude 144°00' E
thence to a point latitude 15°00' S, longitude 146°00' E
thence to a point latitude 18°00' S, longitude 147°00' E
thence to a point latitude 21°00' S, longitude 153°00' E
thence to a point on the coast of Australia in
latitude 24°42' S, longitude 153°15' E.

Regulation 2

Application

The provisions of this Annex shall apply to:

- (a) (i) new ships of 200 tons gross tonnage and above;
- (ii) new ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons;
- (iii) new ships which do not have a measured gross tonnage and are certified to carry more than 10 persons; and
- (b) (i) existing ships of 200 tons gross tonnage and above, 10 years after the date of entry into force of this Annex;
- (ii) existing ships of less than 200 tons gross tonnage which are certified to carry more than 10 persons, 10 years after the date of entry into force of this Annex; and
- (iii) existing ships which do not have a measured gross tonnage and are certified to carry more than 10 persons, 10 years after the date of entry into force of this Annex.

Regulation 3

Surveys

- (1) Every ship which is required to comply with the provisions of this Annex and which is engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention shall be subject to the surveys specified below:
 - (a) An initial survey before the ship is put in service or before the certificate required under regulation 4 of this Annex is issued for the first time, which shall include a survey of the ship which shall be such as to ensure:

- (i) when the ship is fitted with a sewage treatment plant the plant shall meet operational requirements based on standards and the test methods developed by the Organization;*
- (ii) when the ship is fitted with a system to comminute and disinfect the sewage, such a system shall be of a type approved by the Administration;
- (iii) when the ship is equipped with a holding tank the capacity of such tank shall be to the satisfaction of the Administration for the retention of all sewage having regard to the operation of the ship, the number of persons on board and other relevant factors. The holding tank shall have a means to indicate visually the amount of its contents; and
- (iv) that the ship is equipped with a pipeline leading to the exterior convenient for the discharge of sewage to a reception facility and that such a pipeline is fitted with a standard shore connection in compliance with regulation 11 of this Annex.

This survey shall be such as to ensure that the equipment, fittings, arrangements and material fully comply with the applicable requirements of this Annex.

- (b) Periodical surveys at intervals specified by the Administration but not exceeding five years which shall be such as to ensure that the equipment, fittings, arrangements and material fully comply with the applicable requirements of this Annex. However, where the duration of the International Sewage Pollution Prevention Certificate (1973) is extended as specified in regulation 7(2) or (4) of this Annex, the interval of the periodical survey may be extended correspondingly.
- (2) The Administration shall establish appropriate measures for ships which are not subject to the provisions of paragraph (1) of this regulation in order to ensure that the provisions of this Annex are complied with.
 - (3) Surveys of the ship as regards enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it. In every case the Administration concerned fully guarantees the completeness and efficiency of the surveys.

* Refer to the Recommendation on international effluent standards and guidelines for performance tests for sewage treatment plants adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.2(VI); see IMO sales publication IMO-592E.

- (4) After any survey of the ship under this regulation has been completed, no significant change shall be made in the equipment, fittings, arrangements, or material covered by the survey without the approval of the Administration, except the direct replacement of such equipment or fittings.

Regulation 4

Issue of certificate

- (1) An International Sewage Pollution Prevention Certificate (1973) shall be issued, after survey in accordance with the provisions of regulation 3 of this Annex, to any ship which is engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention.
- (2) Such certificate shall be issued either by the Administration or by any persons or organization duly authorized by it. In every case the Administration assumes full responsibility for the certificate.

Regulation 5

Issue of a certificate by another Government

- (1) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Sewage Pollution Prevention Certificate (1973) to the ship in accordance with this Annex.
- (2) A copy of the certificate and a copy of the survey report shall be transmitted as early as possible to the Administration requesting the survey.
- (3) A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the certificate issued under regulation 4 of this Annex.
- (4) No International Sewage Pollution Prevention Certificate (1973) shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

Regulation 6

Form of certificate

The International Sewage Pollution Prevention Certificate (1973) shall be drawn up in an official language of the issuing country in the form corresponding to the model given in the appendix to this Annex. If the

language used is neither English nor French, the text shall include a translation into one of these languages.

Regulation 7

Duration of certificate

- (1) The International Sewage Pollution Prevention Certificate (1973) shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue, except as provided in paragraphs (2), (3) and (4) of this regulation.
- (2) If a ship at the time when the certificate expires is not in a port or offshore terminal under the jurisdiction of the Party to the Convention whose flag the ship is entitled to fly, the certificate may be extended by the Administration, but such extension shall be granted only for the purpose of allowing the ship to complete its voyage to the State whose flag the ship is entitled to fly or in which it is to be surveyed and then only in cases where it appears proper and reasonable to do so.
- (3) No certificate shall be thus extended for a period longer than five months and a ship to which such extension is granted shall not on its arrival in the State whose flag it is entitled to fly or the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port or State without having obtained a new certificate.
- (4) A certificate which has not been extended under the provisions of paragraph (2) 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.
- (5) A certificate shall cease to be valid if significant alterations have taken place in the equipment, fittings, arrangement or material required without the approval of the Administration, except the direct replacement of such equipment or fittings.
- (6) A certificate issued to a ship shall cease to be valid upon transfer of such a ship to the flag of another State, except as provided in paragraph (7) of this regulation.
- (7) Upon transfer of a ship to the flag of another Party, the certificate shall remain in force for a period not exceeding five months provided that it would not have expired before the end of that period, or until the Administration issues a replacement certificate, whichever is earlier. As soon as possible after the transfer has taken place the Government of the Party whose flag the ship was formerly entitled to fly shall transmit to the Administration a copy of the certificate carried by the ship before the transfer and, if available, a copy of the relevant survey report.

Regulation 8

Discharge of sewage

- (1) Subject to the provisions of regulation 9 of this Annex, the discharge of sewage into the sea is prohibited, except when:
 - (a) the ship is discharging comminuted and disinfected sewage using a system approved by the Administration in accordance with regulation 3(1)(a) at a distance of more than 4 nautical miles from the nearest land, or sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land, provided that in any case, the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is *en route* and proceeding at not less than 4 knots; the rate of discharge shall be approved by the Administration based upon standards developed by the Organization; or
 - (b) the ship has in operation an approved sewage treatment plant which has been certified by the Administration to meet the operational requirements referred to in regulation 3(1)(a)(i) of this Annex, and
 - (i) the test results of the plant are laid down in the ship's International Sewage Pollution Prevention Certificate (1973);
 - (ii) additionally, the effluent shall not produce visible floating solids in, nor cause discoloration of, the surrounding water; or
 - (c) the ship is situated in the waters under the jurisdiction of a State and is discharging sewage in accordance with such less stringent requirements as may be imposed by such State.
- (2) When the sewage is mixed with wastes or waste water having different discharge requirements, the more stringent requirements shall apply.

Regulation 9

Exceptions

Regulation 8 of this Annex shall not apply to:

- (a) the discharge of sewage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
- (b) the discharge of sewage resulting from damage to a ship or its equipment if all reasonable precautions have been taken before and after the occurrence of the damage, for the purpose of preventing or minimizing the discharge.

Regulation 10

Reception facilities

- (1) The Government of each Party to the Convention undertakes to ensure the provision of facilities at ports and terminals for the reception of sewage, without causing undue delay to ships, adequate to meet the needs of the ships using them.
- (2) The Government of each Party shall notify the Organization for transmission to the Contracting Governments concerned of all cases where the facilities provided under this regulation are alleged to be inadequate.

Regulation 11

Standard discharge connections

To enable pipes of reception facilities to be connected with the ship's discharge pipeline, both lines shall be fitted with a standard discharge connection in accordance with the following table:

Standard dimensions of flanges for discharge connections

<i>Description</i>	<i>Dimension</i>
Outside diameter	210 mm
Inner diameter	According to pipe outside diameter
Bolt circle diameter	170 mm
Slots in flange	4 holes 18 mm in diameter equidistantly placed on a bolt circle of the above diameter, slotted to the flange periphery. The slot width to be 18 mm
Flange thickness	16 mm
Bolts and nuts: quantity and diameter	4, each of 16 mm in diameter and of suitable length
The flange is designed to accept pipes up to a maximum internal diameter of 100 mm and shall be of steel or other equivalent material having a flat face. This flange, together with a suitable gasket, shall be suitable for a service pressure of 6 kg/cm ²	

For ships having a moulded depth of 5 m and less, the inner diameter of the discharge connection may be 38 mm.

Appendix to Annex IV

Form of Sewage Certificate

INTERNATIONAL SEWAGE POLLUTION PREVENTION CERTIFICATE (1973)

Issued under the Provisions of the International Convention for the Prevention of Pollution from Ships, 1973, under the authority of the Government of

.....
(full designation of the country)

by.....
(full designation of the competent person or organization authorized under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973)

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage	Number of persons which the ship is certified to carry

New/existing ship*

Date of building contract

Date on which keel was laid or ship was at a similar stage of construction

Date of delivery

* Delete as appropriate.

Annex IV: Regulations for the Prevention of Pollution by Sewage

THIS IS TO CERTIFY:

(1) The ship is equipped with a sewage treatment plant/comminuter/holding tank* and a discharge pipeline in compliance with regulation 3(1)(a)(i) to (iv) of Annex IV of the Convention as follows:

- * (a) Description of the sewage treatment plant:
Type of sewage treatment plant
Name of manufacturer
The sewage treatment plant is certified by the Administration to meet the following effluent standards[†]
- * (b) Description of comminuter:
Type of comminuter
Name of manufacturer
Standard of sewage after disinfection
- * (c) Description of holding tank equipment:
Total capacity of the holding tank m³
Location
- (d) A pipeline for the discharge of sewage to a reception facility, fitted with a standard shore connection.

(2) The ship has been surveyed in accordance with regulation 3 of Annex IV of the International Convention for the Prevention of Pollution from Ships, 1973, concerning the prevention of pollution by sewage and the survey showed that the equipment of the ship and the condition thereof are in all respects satisfactory and the ship complies with the applicable requirements of Annex IV of the Convention.

This certificate is valid until

Issued at
(place of issue of certificate)

.
(Date of issue) *(Signature of official issuing the certificate)*
(Seal or stamp of the issuing authority, as appropriate)

Under the provisions of regulation 7(2) and (4) of Annex IV of the Convention the validity of this certificate is extended until

.
Signed
(Signature of duly authorized official)
Place
Date
(Seal or stamp of the authority, as appropriate)

* Delete as appropriate.
† Parameters should be incorporated.

Annex V of MARPOL 73/78
(including amendments)

*Regulations for the Prevention
of Pollution by Garbage
from Ships*

Annex V of MARPOL 73/78 (including amendments)

Regulations for the Prevention of Pollution by Garbage from Ships

Regulation 1

Definitions

For the purposes of this Annex:

- (1) *Garbage* means all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention.
- (2) *Nearest land*. The term “from the nearest land” means from the baseline from which the territorial sea of the territory in question is established in accordance with international law except that, for the purposes of the present Convention, “from the nearest land” off the north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in
latitude 11°00' S, longitude 142°08' E
to a point in latitude 10°35' S, longitude 141°55' E,
thence to a point latitude 10°00' S, longitude 142°00' E,
thence to a point latitude 9°10' S, longitude 143°52' E,
thence to a point latitude 9°00' S, longitude 144°30' E,
thence to a point latitude 13°00' S, longitude 144°00' E,
thence to a point latitude 15°00' S, longitude 146°00' E,
thence to a point latitude 18°00' S, longitude 147°00' E,
thence to a point latitude 21°00' S, longitude 153°00' E,
thence to a point on the coast of Australia in
latitude 24°42' S, longitude 153°15' E.
- (3) *Special area* means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by garbage is required. Special areas shall include those listed in regulation 5 of this Annex.

Regulation 2

Application

Unless expressly provided otherwise, the provisions of this Annex shall apply to all ships.

Regulation 3

Disposal of garbage outside special areas

- (1) Subject to the provisions of regulations 4, 5 and 6 of this Annex:
 - (a) the disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags, is prohibited;
 - (b) the disposal into the sea of the following garbage shall be made as far as practicable from the nearest land but in any case is prohibited if the distance from the nearest land is less than:
 - (i) 25 nautical miles for dunnage, lining and packing materials which will float;
 - (ii) 12 nautical miles for food wastes and all other garbage including paper products, rags, glass, metal, bottles, crockery and similar refuse;
 - (c) disposal into the sea of garbage specified in subparagraph(b)(ii) of this regulation may be permitted when it has passed through a comminuter or grinder and made as far as practicable from the nearest land but in any case is prohibited if the distance from the nearest land is less than 3 nautical miles. Such comminuted or ground garbage shall be capable of passing through a screen with openings no greater than 25 mm.
- (2) When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements shall apply.

Regulation 4

Special requirements for disposal of garbage

- (1) Subject to the provisions of paragraph (2) of this regulation, the disposal of any materials regulated by this Annex is prohibited from fixed or floating platforms engaged in the exploration, exploitation and associated offshore processing of sea-bed mineral resources, and from all other ships when alongside or within 500 m of such platforms.
- (2) The disposal into the sea of food wastes may be permitted when they have been passed through a comminuter or grinder from such fixed or

floating platforms located more than 12 nautical miles from land and all other ships when alongside or within 500 m of such platforms. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 mm.

Regulation 5

Disposal of garbage within special areas

- (1) For the purposes of this Annex the special areas are the Mediterranean Sea area, the Baltic Sea area, the Black Sea area, the Red Sea area, the “Gulfs area”, the North Sea area, the Antarctic area and the Wider Caribbean Region, including the Gulf of Mexico and the Caribbean Sea, which are defined as follows:
 - (a) The *Mediterranean Sea area* means the Mediterranean Sea proper including the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41° N parallel and bounded to the west by the Straits of Gibraltar at the meridian 5°36' W.
 - (b) The *Baltic Sea area* means the Baltic Sea proper with the Gulf of Bothnia and the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57°44.8' N.
 - (c) The *Black Sea area* means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41° N.
 - (d) The *Red Sea area* means the Red Sea proper including the Gulfs of Suez and Aqaba bounded at the south by the rhumb line between Ras si Ane (12°28.5' N, 43°19.6' E) and Husn Murad (12°40.4' N, 43°30.2' E).
 - (e) The *Gulfs area* means the sea area located north-west of the rhumb line between Ras al Hadd (22°30' N, 59°48' E) and Ras al Fasteh (25°04' N, 61°25' E).
 - (f) The *North Sea area* means the North Sea proper including seas therein with the boundary between:
 - (i) the North Sea southwards of latitude 62° N and eastwards of longitude 4° W;
 - (ii) the Skagerrak, the southern limit of which is determined east of the Skaw by latitude 57°44.8' N; and
 - (iii) the English Channel and its approaches eastwards of longitude 5° W and northwards of latitude 48°30' N.
 - (g) The *Antarctic area* means the sea area south of latitude 60° S.

- (h) The *Wider Caribbean Region*, as defined in article 2, paragraph 1 of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena de Indias, 1983), means the Gulf of Mexico and Caribbean Sea proper including the bays and seas therein and that portion of the Atlantic Ocean within the boundary constituted by the 30° N parallel from Florida eastward to 77°30' W meridian, thence a rhumb line to the intersection of 20° N parallel and 59° W meridian, thence a rhumb line to the intersection of 7°20' N parallel and 50° W meridian, thence a rhumb line drawn south-westerly to the eastern boundary of French Guiana.
- (2) Subject to the provisions of regulation 6 of this Annex:
 - (a) disposal into the sea of the following is prohibited:
 - (i) all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags; and
 - (ii) all other garbage, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials;
 - (b) except as provided in subparagraph (c) of this paragraph, disposal into the sea of food wastes shall be made as far as practicable from land, but in any case not less than 12 nautical miles from the nearest land;
 - (c) disposal into the Wider Caribbean Region of food wastes which have been passed through a comminuter or grinder shall be made as far as practicable from land, but in any case not less than 3 nautical miles from the nearest land. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 mm.
- (3) When the garbage is mixed with other discharges having different disposal or discharge requirements the more stringent requirements shall apply.
- (4) Reception facilities within special areas:
 - (a) The Government of each Party to the Convention, the coastline of which borders a special area, undertakes to ensure that as soon as possible in all ports within a special area adequate reception facilities are provided in accordance with regulation 7 of this Annex, taking into account the special needs of ships operating in these areas.
 - (b) The Government of each Party concerned shall notify the Organization of the measures taken pursuant to subparagraph (a) of this regulation. Upon receipt of sufficient notifications the Organization shall establish a date from which the requirements

- of this regulation in respect of the area in question shall take effect. The Organization shall notify all Parties of the date so established no less than twelve months in advance of that date.
- (c) After the date so established, ships calling also at ports in these special areas where such facilities are not yet available, shall fully comply with the requirements of this regulation.
- (5) Notwithstanding paragraph 4 of this regulation, the following rules apply to the Antarctic area:
- (a) The Government of each Party to the Convention at whose ports ships depart *en route* to or arrive from the Antarctic area undertakes to ensure that as soon as practicable adequate facilities are provided for the reception of all garbage from all ships, without causing undue delay, and according to the needs of the ships using them.
 - (b) The Government of each Party to the Convention shall ensure that all ships entitled to fly its flag, before entering the Antarctic area, have sufficient capacity on board for the retention of all garbage while operating in the area and have concluded arrangements to discharge such garbage at a reception facility after leaving the area.

Regulation 6

Exceptions

Regulations 3, 4 and 5 of this Annex shall not apply to:

- (a) the disposal of garbage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
- (b) the escape of garbage resulting from damage to a ship or its equipment provided all reasonable precautions have been taken before and after the occurrence of the damage, for the purpose of preventing or minimizing the escape; or
- (c) the accidental loss of synthetic fishing nets, provided that all reasonable precautions have been taken to prevent such loss.

Regulation 7

Reception facilities

- (1) The Government of each Party to the Convention undertakes to ensure the provision of facilities at ports and terminals for the reception of garbage, without causing undue delay to ships, and according to the needs of the ships using them.

- (2) The Government of each Party shall notify the Organization for transmission to the Parties concerned of all cases where the facilities provided under this regulation are alleged to be inadequate.

Regulation 8

*Port State control on operational requirements**

- (1) A ship when in a port of another Party is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of pollution by garbage.
- (2) In the circumstances given in paragraph (1) of this regulation, the Party 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 this Annex.
- (3) Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
- (4) Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

Regulation 9

Placards, garbage management plans and garbage record-keeping

- (1)
 - (a) Every ship of 12 m or more in length overall shall display placards which notify the crew and passengers of the disposal requirements of regulations 3 and 5 of this Annex, as applicable.
 - (b) The placards shall be written in the official language of the State whose flag the ship is entitled to fly and, for ships engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention, in English or French.
- (2) Every ship of 400 tons 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. This plan shall provide written procedures for collecting, storing, processing and disposing of garbage, including the use of the equipment on board. It shall also

* Refer to the Procedures for port State control adopted by the Organization by resolution A.787(19); see IMO sales publication IMO-650E.

designate the person in charge of carrying out the plan. Such a plan shall be in accordance with the guidelines developed by the Organization* and written in the working language of the crew.

- (3) Every ship of 400 tons 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. The Garbage Record Book, whether as a part of the ship's official log-book or otherwise, shall be in the form specified in the appendix to this Annex;
 - (a) each discharge operation, or completed incineration, shall be recorded in the Garbage Record Book and signed for on the date of the incineration or discharge by the officer in charge. Each completed page of the Garbage Record Book shall be signed by the master of the ship. The entries in the Garbage Record Book shall be both in an official language of the State whose flag the ship is entitled to fly, and in English or French. The entries in an official national language of the State whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy;
 - (b) the entry for each incineration or discharge shall include date and time, position of the ship, description of the garbage and the estimated amount incinerated or discharged;
 - (c) the Garbage Record Book shall be kept on board the ship and in such a place as to be available for inspection in a reasonable time. This document shall be preserved for a period of two years after the last entry is made on the record;
 - (d) in the event of discharge, escape or accidental loss referred to in regulation 6 of this Annex an entry shall be made in the Garbage Record Book of the circumstances of, and the reasons for, the loss.
- (4) The Administration may waive the requirements for Garbage Record Books for:
 - (a) any ship engaged on voyages of 1 hour or less in duration which is certified to carry 15 persons or more; or
 - (b) fixed or floating platforms while engaged in exploration and exploitation of the sea-bed.

* Refer to the Guidelines for the development of garbage management plans adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.70(38); see MEPC/Circ.317 and IMO sales publication IMO-656E.

- (5) The competent authority of the Government of a Party to the Convention may inspect the Garbage Record Book on board any ship to which this regulation applies while the ship is in its ports or offshore terminals and may make a copy of any entry in that book, and may require the master of the ship to certify that the copy is a true copy of such an entry. Any copy so made, which has been certified by the master of the ship as a true copy of an entry in the ship's Garbage Record Book, shall be admissible in any judicial proceedings as evidence of the facts stated in the entry. The inspection of a Garbage Record Book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.
- (6) In the case of ships built before 1 July 1997, this regulation shall apply as from 1 July 1998.

Appendix to Annex V

Form of Garbage Record Book

GARBAGE RECORD BOOK

Name of ship: _____

Distinctive number or letters: _____

IMO No.: _____

Period: _____ From: _____ To: _____

1 Introduction

In accordance with regulation 9 of Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78), a record is to be kept of each discharge operation or completed incineration. This includes discharges at sea, to reception facilities, or to other ships.

2 Garbage and garbage management

Garbage includes all kinds of food, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the vessel and liable to be disposed of continuously or periodically except those substances which are defined or listed in other annexes to MARPOL 73/78 (such as oil, sewage or noxious liquid substances).

The Guidelines for the Implementation of Annex V of MARPOL 73/78* should also be referred to for relevant information.

3 Description of the garbage

The garbage is to be grouped into categories for the purposes of this record book as follows:

- 1 Plastics
- 2 Floating dunnage, lining, or packing material
- 3 Ground-down paper products, rags, glass, metal, bottles, crockery, etc.
- 4 Paper products, rags, glass, metal, bottles, crockery, etc.

* Refer to the Guidelines for the Implementation of Annex V of MARPOL 73/78; see IMO sales publication IMO-656E.

- 5 Food waste
- 6 Incinerator ash.

4 Entries in the Garbage Record Book

4.1 Entries in the Garbage Record Book shall be made on each of the following occasions:

- (a) When garbage is discharged into the sea:
 - (i) Date and time of discharge
 - (ii) Position of the ship (latitude and longitude)
 - (iii) Category of garbage discharged
 - (iv) Estimated amount discharged for each category in cubic metres
 - (v) Signature of the officer in charge of the operation.
- (b) When garbage is discharged to reception facilities ashore or to other ships:
 - (i) Date and time of discharge
 - (ii) Port or facility, or name of ship
 - (iii) Category of garbage discharged
 - (iv) Estimated amount discharged for each category in cubic metres
 - (v) Signature of officer in charge of the operation.
- (c) When garbage is incinerated:
 - (i) Date and time of start and stop of incineration
 - (ii) Position of the ship (latitude and longitude)
 - (iii) Estimated amount incinerated in cubic metres
 - (iv) Signature of the officer in charge of the operation.
- (d) Accidental or other exceptional discharges of garbage
 - (i) Time of occurrence
 - (ii) Port or position of the ship at time of occurrence
 - (iii) Estimated amount and category of garbage
 - (iv) Circumstances of disposal, escape or loss, the reason therefor and general remarks.

4.2 Receipts

The master should obtain from the operator of port reception facilities, or from the master of the ship receiving the garbage, a receipt or certificate specifying the estimated amount of garbage transferred. The receipts or certificates must be kept on board the ship with the Garbage Record Book for two years.

4.3 Amount of garbage

The amount of garbage on board should be estimated in cubic metres, if possible separately according to category. The Garbage Record Book contains many references to estimated amount of garbage. It is recognized that the accuracy of estimating amounts of garbage is left to interpretation. Volume estimates will differ before and after processing. Some processing procedures may not allow for a usable estimate of volume, e.g. the continuous processing of food waste. Such factors should be taken into consideration when making and interpreting entries made in a record.

RECORD OF GARBAGE DISCHARGES

Ship's name: _____ Distinctive No., or letters: _____ IMO No.: _____

Garbage categories:

- 1: Plastic.
- 2: Floating dunnage, lining, or packing materials.
- 3: Ground paper products, rags, glass, metal, bottles, crockery, etc.
- 4: Paper products, rags, glass, metal, bottles, crockery, etc.
- 5: Food waste.
- 6: Incinerator ash.

NOTE: THE DISCHARGE OF ANY GARBAGE OTHER THAN FOOD WASTE IS PROHIBITED IN SPECIAL AREAS. ONLY GARBAGE DISCHARGED INTO THE SEA MUST BE CATEGORIZED. GARBAGE OTHER THAN CATEGORY 1 DISCHARGED TO RECEPTION FACILITIES NEED ONLY BE LISTED AS A TOTAL ESTIMATED AMOUNT.

Date/time	Position of the ship	Estimated amount discharged into sea (m ³)					Estimated amount discharged to reception facilities or to other ship (m ³)		Estimated amount incinerated (m ³)	Certification/Signature
		CAT. 2	CAT. 3	CAT. 4	CAT. 5	CAT. 6	CAT. 1	Other		

Master's signature: _____ Date: _____

Annex VI of MARPOL 73/78

*Regulations for the Prevention of
Air Pollution from Ships*

Annex VI of MARPOL 73/78

Regulations for the Prevention of Air Pollution from Ships

Chapter I – General

Regulation 1

Application

The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 18 and 19 of this Annex.

Regulation 2

Definitions

For the purpose of this Annex:

- (1) *A similar stage of construction* means the stage at which:
 - (a) construction identifiable with a specific ship begins; and
 - (b) 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.
- (2) *Continuous feeding* is defined as the process whereby waste is fed into a combustion chamber without human assistance while the incinerator is in normal operating conditions with the combustion chamber operative temperature between 850°C and 1200°C.
- (3) *Emission* means any release of substances, subject to control by this Annex from ships into the atmosphere or sea.
- (4) *New installations*, in relation to regulation 12 of this Annex, means the installation of systems, equipment, including new portable fire-extinguishing units, insulation, or other material on a ship after the date on which this Annex enters into force, but excludes repair or recharge of previously installed systems, equipment, insulation, or other material, or recharge of portable fire-extinguishing units.
- (5) *NO_x Technical Code* means the Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines adopted by Conference resolution 2, as may be amended by the Organization,

provided that such amendments are adopted and brought into force in accordance with the provisions of article 16 of the present Convention concerning amendment procedures applicable to an appendix to an Annex.

- (6) *Ozone-depleting substances* means controlled substances defined in paragraph 4 of article 1 of the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, listed in Annexes A, B, C or E to the said Protocol in force at the time of application or interpretation of this Annex.

Ozone-depleting substances that may be found on board ship include, but are not limited to:

Halon 1211	Bromochlorodifluoromethane
Halon 1301	Bromotrifluoromethane
Halon 2402	1,2-Dibromo-1,1,2,2-tetrafluoroethane (also known as Halon 114B2)
CFC-11	Trichlorofluoromethane
CFC-12	Dichlorodifluoromethane
CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane
CFC-114	1,2-Dichloro-1,1,2,2-tetrafluoroethane
CFC-115	Chloropentafluoroethane

- (7) *Sludge oil* means sludge from the fuel or lubricating oil separators, waste lubricating oil from main or auxiliary machinery, or waste oil from bilge water separators, oil filtering equipment or drip trays.
- (8) *Shipboard incineration* means the incineration of wastes or other matter on board a ship, if such wastes or other matter were generated during the normal operation of that ship.
- (9) *Shipboard incinerator* means a shipboard facility designed for the primary purpose of incineration.
- (10) *Ships constructed* means ships the keels of which are laid or which are at a similar stage of construction.
- (11) *SO_x emission control area* means an area where the adoption of special mandatory measures for SO_x emissions from ships is required to prevent, reduce and control air pollution from SO_x and its attendant adverse impacts on land and sea areas. SO_x emission control areas shall include those listed in regulation 14 of this Annex.
- (12) *Tanker* means an oil tanker as defined in regulation 1(4) of Annex I or a chemical tanker as defined in regulation 1(1) of Annex II of the present Convention.

- (13) *The Protocol of 1997* means the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as amended by the Protocol of 1978 relating thereto.

Regulation 3

General exceptions

Regulations of this Annex shall not apply to:

- (a) any emission necessary for the purpose of securing the safety of a ship or saving life at sea; or
- (b) any emission resulting from damage to a ship or its equipment:
 - (i) provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the emission for the purpose of preventing or minimizing the emission; and
 - (ii) except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result.

Regulation 4

Equivalents

- (1) The Administration may allow any fitting, material, appliance or apparatus to be fitted in a ship as an alternative to that required by this Annex if such fitting, material, appliance or apparatus is at least as effective as that required by this Annex.
- (2) The Administration which allows a fitting, material, appliance or apparatus as an alternative to that required by this Annex shall communicate to the Organization for circulation to the Parties to the present Convention particulars thereof, for their information and appropriate action, if any.

Chapter II – Survey, certification and means of control

Regulation 5

Surveys and inspections

- (1) Every ship of 400 gross tonnage or above and every fixed and floating drilling rig and other platforms shall be subject to the surveys specified below:
 - (a) an initial survey before the ship is put into service or before the certificate required under regulation 6 of this Annex is issued for the first time. This survey shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex;
 - (b) periodical surveys at intervals specified by the Administration, but not exceeding five years, which shall be such as to ensure that the equipment, systems, fittings, arrangements and material fully comply with the requirements of this Annex; and
 - (c) a minimum of one intermediate survey during the period of validity of the certificate which shall be such as to ensure that the equipment and arrangements fully comply with the requirements of this Annex and are in good working order. In cases where only one such intermediate survey is carried out in a single certificate validity period, and where the period of the certificate exceeds 2½ years, it shall be held within six months before or after the halfway date of the certificate's period of validity. Such intermediate surveys shall be endorsed on the certificate issued under regulation 6 of this Annex.
- (2) In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of this Annex are complied with.
- (3) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it. Such organizations shall comply with the guidelines adopted by the Organization.* In every case the Administration concerned shall fully guarantee the completeness and efficiency of the survey.
- (4) The survey of engines and equipment for compliance with regulation 13 of this Annex shall be conducted in accordance with the NO_x Technical Code.

* Refer to the Guidelines for the authorization of organizations acting on behalf of the Administration, adopted by the Organization by resolution A.739(18), and the Specifications on the survey and certification functions of recognized organizations acting on behalf of the Administration, adopted by the Organization by resolution A.789(19).

- (5) The Administration shall institute arrangements for unscheduled inspections to be carried out during the period of validity of the certificate. Such inspections shall ensure that the equipment remains in all respects satisfactory for the service for which the equipment is intended. These inspections may be carried out by their own inspection service, nominated surveyors, recognized organizations, or by other Parties upon request of the Administration. Where the Administration, under the provisions of paragraph (1) of this regulation, establishes mandatory annual surveys, the above unscheduled inspections shall not be obligatory.
- (6) When a nominated surveyor or recognized organization determines that the condition of the equipment does not correspond substantially with the particulars of the certificate, they shall ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken, the certificate should be withdrawn by the Administration. If the ship is in a 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 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.
- (7) The equipment shall be maintained to conform with the provisions of this Annex and no changes shall be made in the equipment, systems, fittings, arrangements, or material covered by the survey, without the express approval of the Administration. The direct replacement of such equipment and fittings with equipment and fittings that conform with the provisions of this Annex is permitted.
- (8) Whenever an accident occurs to a ship or a defect is discovered, which substantially affects the efficiency or completeness of its equipment covered by this Annex, the master or owner of the ship shall report at the earliest opportunity to the Administration, a nominated surveyor, or recognized organization responsible for issuing the relevant certificate.

Regulation 6

Issue of International Air Pollution Prevention Certificate

- (1) An International Air Pollution Prevention Certificate shall be issued, after survey in accordance with the provisions of regulation 5 of this Annex, to:
 - (a) any ship of 400 gross tonnage or above engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties; and

- (b) platforms and drilling rigs engaged in voyages to waters under the sovereignty or jurisdiction of other Parties to the Protocol of 1997.
- (2) Ships constructed before the date of entry into force of the Protocol of 1997 shall be issued with an International Air Pollution Prevention Certificate in accordance with paragraph (1) of this regulation no later than the first scheduled drydocking after entry into force of the Protocol of 1997, but in no case later than three years after entry into force of the Protocol of 1997.
- (3) Such certificate shall be issued either by the Administration or by any person or organization duly authorized by it. In every case the Administration assumes full responsibility for the certificate.

Regulation 7

Issue of a Certificate by another Government

- (1) The Government of a Party to the Protocol of 1997 may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, issue or authorize the issuance of an International Air Pollution Prevention Certificate to the ship in accordance with this Annex.
- (2) A copy of the certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.
- (3) A certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a certificate issued under regulation 6 of this Annex.
- (4) No International Air Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party to the Protocol of 1997.

Regulation 8

Form of Certificate

The International Air Pollution Prevention Certificate shall be drawn up in an official language of the issuing country in the form corresponding to the model given in appendix I to this Annex. If the language used is not English, French, or Spanish, the text shall include a translation into one of these languages.

Regulation 9

Duration and validity of Certificate

- (1) An International Air Pollution Prevention Certificate shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue.
- (2) No extension of the five-year period of validity of the International Air Pollution Prevention Certificate shall be permitted, except in accordance with paragraph (3).
- (3) If the ship, at the time when the International Air Pollution Prevention Certificate expires, is not in a port of the State whose flag it is entitled to fly or in which it is to be surveyed, the Administration may extend the certificate for a period of no more than five months. Such extension shall be granted only for the purpose of allowing the ship to complete its voyage to the State whose flag it is entitled to fly or in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. After arrival in the State whose flag it is entitled to fly or in which it is to be surveyed, the ship shall not be entitled by virtue of such extension to leave the port or State without having obtained a new International Air Pollution Prevention Certificate.
- (4) An International Air Pollution Prevention Certificate shall cease to be valid in any of the following circumstances:
 - (a) if the inspections and surveys are not carried out within the periods specified under regulation 5 of this Annex;
 - (b) if significant alterations have taken place to the equipment, systems, fittings, arrangements or material to which this Annex applies without the express approval of the Administration, except the direct replacement of such equipment or fittings with equipment or fittings that conform with the requirements of this Annex. For the purpose of regulation 13, significant alteration shall include any change or adjustment to the system, fittings, or arrangement of a diesel engine which results in the nitrogen oxide limits applied to that engine no longer being complied with; or
 - (c) upon transfer of the ship to the flag of another State. A new Certificate shall be issued only when the Government issuing the new Certificate is fully satisfied that the ship is in full compliance with the requirements of regulation 5 of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration of the other

Party a copy of the International Air Pollution Prevention Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

Regulation 10

Port State control on operational requirements

- (1) A ship, when in a port or an offshore terminal under the jurisdiction of another Party to the Protocol of 1997, is subject to inspection by officers duly authorized by such Party concerning operational requirements under this Annex, where there are clear grounds for believing that the master or crew are not familiar with essential shipboard procedures relating to the prevention of air pollution from ships.
- (2) In the circumstances given in paragraph (1) of this regulation, the Party 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 this Annex.
- (3) Procedures relating to the port State control prescribed in article 5 of the present Convention shall apply to this regulation.
- (4) Nothing in this regulation shall be construed to limit the rights and obligations of a Party carrying out control over operational requirements specifically provided for in the present Convention.

Regulation 11

Detection of violations and enforcement

- (1) Parties to this Annex shall co-operate in the detection of violations and the enforcement of the provisions of this Annex, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.
- (2) A ship to which the present Annex applies may, in any port or offshore terminal of a Party, be subject to inspection by officers appointed or authorized by that Party for the purpose of verifying whether the ship has emitted any of the substances covered by this Annex in violation of the provision of this Annex. If an inspection indicates a violation of this Annex, a report shall be forwarded to the Administration for any appropriate action.
- (3) Any Party shall furnish to the Administration evidence, if any, that the ship has emitted any of the substances covered by this Annex in violation of the provisions of this Annex. If it is practicable to do so,

the competent authority of the former Party shall notify the master of the ship of the alleged violation.

- (4) Upon receiving such evidence, the Administration so informed shall investigate the matter, and may request the other Party to furnish further or better evidence of the alleged contravention. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken in accordance with its law as soon as possible. The Administration shall promptly inform the Party which has reported the alleged violation, as well as the Organization, of the action taken.
- (5) A Party may also inspect a ship to which this Annex applies when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party together with sufficient evidence that the ship has emitted any of the substances covered by the Annex in any place in violation of this Annex. The report of such investigation shall be sent to the Party requesting it and to the Administration so that the appropriate action may be taken under the present Convention.
- (6) The international law concerning the prevention, reduction, and control of pollution of the marine environment from ships, including that law relating to enforcement and safeguards, in force at the time of application or interpretation of this Annex, applies, *mutatis mutandis*, to the rules and standards set forth in this Annex.

Chapter III – Requirements for control of emissions from ships

Regulation 12

Ozone-depleting substances

- (1) Subject to the provisions of regulation 3, any deliberate emissions of ozone-depleting substances shall be prohibited. Deliberate emissions include emissions occurring in the course of maintaining, servicing, repairing or disposing of systems or equipment, except that deliberate emissions do not include minimal releases associated with the recapture or recycling of an ozone-depleting substance. Emissions arising from leaks of an ozone-depleting substance, whether or not the leaks are deliberate, may be regulated by Parties to the Protocol of 1997.
- (2) New installations which contain ozone-depleting substances shall be prohibited on all ships, except that new installations containing hydrochlorofluorocarbons (HCFCs) are permitted until 1 January 2020.
- (3) The substances referred to in this regulation, and equipment containing such substances, shall be delivered to appropriate reception facilities when removed from ships.

Regulation 13

Nitrogen oxides (NO_x)

- (1) (a) This regulation shall apply to:
 - (i) each diesel engine with a power output of more than 130 kW which is installed on a ship constructed on or after 1 January 2000; and
 - (ii) each diesel engine with a power output of more than 130 kW which undergoes a major conversion on or after 1 January 2000.
- (b) This regulation does not apply to:
 - (i) emergency diesel engines, engines installed in lifeboats and any device or equipment intended to be used solely in case of emergency; and
 - (ii) engines installed on ships solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly, provided that such engines are subject to an alternative NO_x control measure established by the Administration.

-
- (c) Notwithstanding the provisions of sub-paragraph (a) of this paragraph, the Administration may allow exclusion from the application of this regulation to any diesel engine which is installed on a ship constructed, or on a ship which undergoes a major conversion, before the date of entry into force of the present Protocol, provided that the ship is solely engaged in voyages to ports or offshore terminals within the State the flag of which the ship is entitled to fly.
- (2) (a) For the purpose of this regulation, *major conversion* means a modification of an engine where:
- (i) the engine is replaced by a new engine built on or after 1 January 2000, or
 - (ii) any substantial modification, as defined in the NO_x Technical Code, is made to the engine, or
 - (iii) the maximum continuous rating of the engine is increased by more than 10%.
- (b) The NO_x emission resulting from modifications referred to in the sub-paragraph (a) of this paragraph shall be documented in accordance with the NO_x Technical Code for approval by the Administration.
- (3) (a) Subject to the provision of regulation 3 of this Annex, the operation of each diesel engine to which this regulation applies is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO₂) from the engine is within the following limits:
- (i) 17.0 g/kW h when n is less than 130 rpm
 - (ii) $45.0 \times n^{(-0.2)}$ g/kW h when n is 130 or more but less than 2000 rpm
 - (iii) 9.8 g/kW h when n is 2000 rpm or more
- where n = rated engine speed (crankshaft revolutions per minute).
- When using fuel composed of blends from hydrocarbons derived from petroleum refining, test procedure and measurement methods shall be in accordance with the NO_x Technical Code, taking into consideration the test cycles and weighting factors outlined in appendix II to this Annex.
- (b) Notwithstanding the provisions of sub-paragraph (a) of this paragraph, the operation of a diesel engine is permitted when:
- (i) an exhaust gas cleaning system, approved by the Administration in accordance with the NO_x Technical Code, is applied to the engine to reduce onboard NO_x emissions at least to the limits specified in sub-paragraph (a), or

- (ii) any other equivalent method, approved by the Administration taking into account relevant guidelines to be developed by the Organization, is applied to reduce onboard NO_x emissions at least to the limit specified in sub-paragraph (a) of this paragraph.

Regulation 14

Sulphur oxides (SO_x)

General requirements

- (1) The sulphur content of any fuel oil used on board ships shall not exceed 4.5% m/m.
- (2) The worldwide average sulphur content of residual fuel oil supplied for use on board ships shall be monitored taking into account guidelines to be developed by the Organization.

Requirements within SO_x emission control areas

- (3) For the purpose of this regulation, SO_x emission control areas shall include:
 - (a) the Baltic Sea area as defined in regulation 10(1)(b) of Annex I; and
 - (b) any other sea area, including port areas, designated by the Organization in accordance with criteria and procedures for designation of SO_x emission control areas with respect to the prevention of air pollution from ships contained in appendix III to this Annex.
- (4) While ships are within SO_x emission control areas, at least one of the following conditions shall be fulfilled:
 - (a) the sulphur content of fuel oil used on board ships in a SO_x emission control area does not exceed 1.5% m/m;
 - (b) an exhaust gas cleaning system, approved by the Administration taking into account guidelines to be developed by the Organization, is applied to reduce the total emission of sulphur oxides from ships, including both auxiliary and main propulsion engines, to 6.0 g SO_x/kW h or less calculated as the total weight of sulphur dioxide emission. Waste streams from the use of such equipment shall not be discharged into enclosed ports, harbours and estuaries unless it can be thoroughly documented by the ship that such waste streams have no adverse impact on the ecosystems of such enclosed ports, harbours and estuaries, based upon criteria communicated by the authorities of the port State to the Organization. The Organization shall circulate the criteria to all Parties to the Convention; or

- (c) any other technological method that is verifiable and enforceable to limit SO_x emissions to a level equivalent to that described in sub-paragraph (b) is applied. These methods shall be approved by the Administration taking into account guidelines to be developed by the Organization.
- (5) The sulphur content of fuel oil referred to in paragraph (1) and paragraph (4)(a) of this regulation shall be documented by the supplier as required by regulation 18 of this Annex.
- (6) Those ships using separate fuel oils to comply with paragraph (4)(a) of this regulation shall allow sufficient time for the fuel oil service system to be fully flushed of all fuels exceeding 1.5% m/m sulphur content prior to entry into a SO_x emission control area. The volume of low sulphur fuel oils (less than or equal to 1.5% sulphur content) in each tank as well as the date, time, and position of the ship when any fuel-changeover operation is completed, shall be recorded in such log-book as prescribed by the Administration.
- (7) During the first 12 months immediately following entry into force of the present Protocol, or of an amendment to the present Protocol designating a specific SO_x emission control area under paragraph (3)(b) of this regulation, ships entering a SO_x emission control area referred to in paragraph (3)(a) of this regulation or designated under paragraph (3)(b) of this regulation are exempted from the requirements in paragraphs (4) and (6) of this regulation and from the requirements of paragraph (5) of this regulation insofar as they relate to paragraph (4)(a) of this regulation.

Regulation 15

Volatile organic compounds

- (1) If the emissions of volatile organic compounds (VOCs) from tankers are to be regulated in ports or terminals under the jurisdiction of a Party to the Protocol of 1997, they shall be regulated in accordance with the provisions of this regulation.
- (2) A Party to the Protocol of 1997 which designates ports or terminals under its jurisdiction in which VOCs emissions are to be regulated, shall submit a notification to the Organization. This notification shall include information on the size of tankers to be controlled, on cargoes requiring vapour emission control systems, and the effective date of such control. The notification shall be submitted at least six months before the effective date.
- (3) The Government of each Party to the Protocol of 1997 which designates ports or terminals at which VOCs emissions from tankers are to be regulated shall ensure that vapour emission control systems,

approved by that Government taking into account the safety standards developed by the Organization,* are provided in ports and terminals designated, and are operated safely and in a manner so as to avoid undue delay to the ship.

- (4) The Organization shall circulate a list of the ports and terminals designated by the Parties to the Protocol of 1997 to other Parties to the Protocol of 1997 and Member States of the Organization for their information.
- (5) All tankers which are subject to vapour emission control in accordance with the provisions of paragraph (2) of this regulation shall be provided with a vapour collection system approved by the Administration taking into account the safety standards developed by the Organization,* and shall use such system during the loading of such cargoes. Terminals which have installed vapour emission control systems in accordance with this regulation may accept existing tankers which are not fitted with vapour collection systems for a period of three years after the effective date identified in paragraph (2).
- (6) This regulation shall only apply to gas carriers when the type of loading and containment systems allow safe retention of non-methane VOCs on board, or their safe return ashore.

Regulation 16

Shipboard incineration

- (1) Except as provided in paragraph (5), shipboard incineration shall be allowed only in a shipboard incinerator.
- (2)
 - (a) Except as provided in sub-paragraph (b) of this paragraph, each incinerator installed on board a ship on or after 1 January 2000 shall meet the requirements contained in appendix IV to this Annex. Each incinerator shall be approved by the Administration taking into account the standard specifications for shipboard incinerators developed by the Organization.†
 - (b) The Administration may allow exclusion from the application of sub-paragraph (a) of this paragraph to any incinerator which is installed on board a ship before the date of entry into force of the Protocol of 1997, provided that the ship is solely engaged in voyages within waters subject to the sovereignty or jurisdiction of the State the flag of which the ship is entitled to fly.

* Refer to MSC/Circ.585, Standards for vapour emission control systems.

† Refer to resolution MEPC 76(40), Standard specification for shipboard incinerators.

- (3) Nothing in this regulation affects the prohibition in, or other requirements of, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended, and the 1996 Protocol thereto.
- (4) Shipboard incineration of the following substances shall be prohibited:
 - (a) Annex I, II and III cargo residues of the present Convention and related contaminated packing materials;
 - (b) polychlorinated biphenyls (PCBs);
 - (c) garbage, as defined in Annex V of the present Convention, containing more than traces of heavy metals; and
 - (d) refined petroleum products containing halogen compounds.
- (5) Shipboard incineration of sewage sludge and sludge oil generated during the normal operation of a ship may also take place in the main or auxiliary power plant or boilers, but in those cases, shall not take place inside ports, harbours and estuaries.
- (6) Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerators for which IMO Type Approval Certificates have been issued.
- (7) All ships with incinerators subject to this regulation shall possess a manufacturer's operating manual which shall specify how to operate the incinerator within the limits described in paragraph 2 of appendix IV to this Annex.
- (8) Personnel responsible for operation of any incinerator shall be trained and capable of implementing the guidance provided in the manufacturer's operating manual.
- (9) Monitoring of combustion flue gas outlet temperature shall be required at all times and waste shall not be fed into a continuous-feed shipboard incinerator when the temperature is below the minimum allowed temperature of 850°C. For batch-loaded shipboard incinerators, the unit shall be designed so that the temperature in the combustion chamber shall reach 600°C within five minutes after start-up.
- (10) Nothing in this regulation precludes the development, installation and operation of alternative design shipboard thermal waste treatment devices that meet or exceed the requirements of this regulation.

Regulation 17

Reception facilities

- (1) The Government of each Party to the Protocol of 1997 undertakes to ensure the provision of facilities adequate to meet the:

- (a) needs of ships using its repair ports for the reception of ozone-depleting substances and equipment containing such substances when removed from ships;
 - (b) needs of ships using its ports, terminals or repair ports for the reception of exhaust gas cleaning residues from an approved exhaust gas cleaning system when discharge into the marine environment of these residues is not permitted under regulation 14 of this Annex;
without causing undue delay to ships, and
 - (c) needs in ship breaking facilities for the reception of ozone-depleting substances and equipment containing such substances when removed from ships.
- (2) Each Party to the Protocol of 1997 shall notify the Organization for transmission to the Members of the Organization of all cases where the facilities provided under this regulation are unavailable or alleged to be inadequate.

Regulation 18

Fuel oil quality

- (1) Fuel oil for combustion purposes delivered to and used on board ships to which this Annex applies shall meet the following requirements:
- (a) except as provided in sub-paragraph (b):
 - (i) the fuel oil shall be blends of hydrocarbons derived from petroleum refining. This shall not preclude the incorporation of small amounts of additives intended to improve some aspects of performance;
 - (ii) the fuel oil shall be free from inorganic acid;
 - (iii) the fuel oil shall not include any added substance or chemical waste which either:
 - (1) jeopardizes the safety of ships or adversely affects the performance of the machinery, or
 - (2) is harmful to personnel, or
 - (3) contributes overall to additional air pollution; and
 - (b) fuel oil for combustion purposes derived by methods other than petroleum refining shall not:
 - (i) exceed the sulphur content set forth in regulation 14 of this Annex;
 - (ii) cause an engine to exceed the NO_x emission limits set forth in regulation 13(3)(a) of this Annex;
 - (iii) contain inorganic acid; and

- (iv) (1) jeopardize the safety of ships or adversely affect the performance of the machinery, or
 - (2) be harmful to personnel, or
 - (3) contribute overall to additional air pollution.
- (2) This regulation does not apply to coal in its solid form or nuclear fuels.
 - (3) For each ship subject to regulations 5 and 6 of this Annex, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Annex.
 - (4) The bunker delivery note shall be kept on board the ship in such a place as to be readily available for inspection at all reasonable times. It shall be retained for a period of three years after the fuel oil has been delivered on board.
 - (5) (a) The competent authority* of the Government of a Party to the Protocol of 1997 may inspect the bunker delivery notes on board any ship to which this Annex applies while the ship is in its port or offshore terminal, may make a copy of each delivery note, and may require the master or person in charge of the ship to certify that each copy is a true copy of such bunker delivery note. The competent authority may also verify the contents of each note through consultations with the port where the note was issued.
 - (b) The inspection of the bunker delivery notes and the taking of certified copies by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.
 - (6) The bunker delivery note shall be accompanied by a representative sample of the fuel oil delivered, taking into account guidelines to be developed by the Organization. The sample is to be sealed and signed by the supplier's representative and the master or officer in charge of the bunker operation on completion of bunkering operations and retained under the ship's control until the fuel oil is substantially consumed, but in any case for a period of not less than 12 months from the time of delivery.
 - (7) Parties to the Protocol of 1997 undertake to ensure that appropriate authorities designated by them:
 - (a) maintain a register of local suppliers of fuel oil;

* Refer to resolution A.787(19), Procedures for port State control.

- (b) require local suppliers to provide the bunker delivery note and sample as required by this regulation, certified by the fuel oil supplier that the fuel oil meets the requirements of regulations 14 and 18 of this Annex;
 - (c) require local suppliers to retain a copy of the bunker delivery note for at least three years for inspection and verification by the port State as necessary;
 - (d) take action as appropriate against fuel oil suppliers that have been found to deliver fuel oil that does not comply with that stated on the bunker delivery note;
 - (e) inform the Administration of any ship receiving fuel oil found to be non-compliant with the requirements of regulations 14 or 18 of this Annex; and
 - (f) inform the Organization for transmission to Parties to the Protocol of 1997 of all cases where fuel oil suppliers have failed to meet the requirements specified in regulations 14 or 18 of this Annex.
- (8) In connection with port State inspections carried out by Parties to the Protocol of 1997, the Parties further undertake to:
- (a) inform the Party or non-Party under whose jurisdiction a bunker delivery note was issued of cases of delivery of non-compliant fuel oil, giving all relevant information; and
 - (b) ensure that remedial action as appropriate is taken to bring non-compliant fuel oil discovered into compliance.

Regulation 19

Requirements for platforms and drilling rigs

- (1) Subject to the provisions of paragraphs (2) and (3) of this regulation, fixed and floating platforms and drilling rigs shall comply with the requirements of this Annex.
- (2) Emissions directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources are, consistent with article 2(3)(b)(ii) of the present Convention, exempt from the provisions of this Annex. Such emissions include the following:
 - (a) emissions resulting from the incineration of substances that are solely and directly the result of exploration, exploitation and associated offshore processing of sea-bed mineral resources, including but not limited to the flaring of hydrocarbons and the

- burning of cuttings, muds, and/or stimulation fluids during well completion and testing operations, and flaring arising from upset conditions;
 - (b) the release of gases and volatile compounds entrained in drilling fluids and cuttings;
 - (c) emissions associated solely and directly with the treatment, handling, or storage of sea-bed minerals; and
 - (d) emissions from diesel engines that are solely dedicated to the exploration, exploitation and associated offshore processing of sea-bed mineral resources.
- (3) The requirements of regulation 18 of this Annex shall not apply to the use of hydrocarbons which are produced and subsequently used on site as fuel, when approved by the Administration.

Appendices to Annex VI

Appendix I

Form of IAPP Certificate (Regulation 8)

INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE

Issued under the provisions of the Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified of the Protocol of 1978 related thereto (hereinafter referred to as "the Convention") under the authority of the Government of:

.....

(full designation of the country)

by

*(full designation of the competent person or organization
authorized under the provisions of the Convention)*

Name of ship	Distinctive number or letters	IMO number	Port of registry	Gross tonnage

Type of ship:

- tanker
 ships other than a tanker

THIS IS TO CERTIFY:

1. That the ship has been surveyed in accordance with regulation 5 of Annex VI of the Convention; and
2. That the survey shows that the equipment, systems, fittings, arrangements and materials fully comply with the applicable requirements of Annex VI of the Convention.

This certificate is valid until subject to surveys in accordance with regulation 5 of Annex VI of the Convention.

Issued at

(Place of issue of certificate)

.....

(Date of issue)

.....

*(signature of duty authorized official
issuing the certificate)*

*(Seal or stamp of the authority,
as appropriate)*

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by regulation 5 of Annex VI of the Convention the ship was found to comply with the relevant provisions of the Convention:

Annual survey: Signed

(Signature of duly authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

Annual*/Intermediate* survey: Signed

(Signature of duly authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

Annual*/Intermediate* survey: Signed

(Signature of duly authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

Annual survey: Signed

(Signature of duly authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

* Delete as appropriate.

**SUPPLEMENT TO
INTERNATIONAL AIR POLLUTION PREVENTION CERTIFICATE
(IAPP CERTIFICATE)**

RECORD OF CONSTRUCTION AND EQUIPMENT

In respect of the provisions of Annex VI of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as "the Convention").

Notes:

- 1 This Record shall be permanently attached to the IAPP Certificate. The IAPP Certificate shall be available on board the ship at all times.
- 2 If the language of the original Record is not English, French or Spanish, the text shall include a translation into one of these languages.
- 3 Entries in boxes shall be made by inserting either a cross (x) for the answer "yes" and "applicable" or a (-) for the answers "no" and "not applicable" as appropriate.
- 4 Unless otherwise stated, regulations mentioned in this Record refer to regulations of Annex VI of the Convention and resolutions or circulars refer to those adopted by the International Maritime Organization.

1 Particulars of ship

- 1.1 Name of ship
- 1.2 Distinctive number or letters.....
- 1.3 IMO number.....
- 1.4 Port of registry.....
- 1.5 Gross tonnage.....
- 1.6 Date on which keel was laid or ship was at a similar stage of construction.....
- 1.7 Date of commencement of major engine conversion (if applicable) (regulation 13):.....

2 Control of emissions from ships

2.1 Ozone-depleting substances (regulation 12)

2.1.1 The following fire-extinguishing systems and equipment containing halons may continue in service:

System equipment	Location on board

2.1.2 The following systems and equipment containing CFCs may continue in service:

System equipment	Location on board

2.1.3 The following systems containing hydro-chlorofluorocarbons
Nitrogen oxides (NO_x) (regulation 13)

2.2.1 The following diesel engines with power output greater than 130 kW, and installed on a ship constructed on or after 1 January 2000, comply with the emission standards of regulation 13(3)(a) in accordance with the NO_x Technical Code:

Manufacturer and model	Serial number	Use	Power output (kW)	Rated speed (rpm)

2.2.2 The following diesel engines with power output greater than 130 kW, and which underwent major conversion per regulation 13(2) on or after 1 January 2000, comply with the emission standards of regulation 13(3)(a) in accordance with the NO_x Technical Code:

Manufacturer and model
Serial number
Use
Power output (kW)
Rated speed (rpm)

2.2.3 The following diesel engines with a power output greater than 130 kW and installed on a ship constructed on or after 1 January 2000, or with a power output greater than 130 kW and which underwent major conversion per regulation 13(2) on or after 1 January 2000, are fitted with an exhaust gas cleaning system or other equivalent methods in accordance with regulation 13(3), and the NO_x Technical Code:

Manufacturer and model	Serial number	Use	Power output (kW)	Rated speed (rpm)

2.2.4 The following diesel engines from 2.2.1, 2.2.2 and 2.2.3 above are fitted with NO_x emission monitoring and recording devices in accordance with the NO_x Technical Code:

Manufacturer and model	Serial number	Use	Power output (kW)	Rated speed (rpm)

2.3 Sulphur oxides (SO_x) (regulation 14)

2.3.1 When the ship operates within an SO_x emission control area specified in regulation 14(3), the ship uses:

- .1 fuel oil with a sulphur content that does not exceed 1.5% m/m as documented by bunker delivery notes; or
- .2 an approved exhaust gas cleaning system to reduce SO_x emissions below 6.0 g SO_x/kW h; or
- .3 other approved technology to reduce SO_x emissions below 6.0 g SO_x/kW h

2.4 Volatile organic compounds (VOCs) (regulation 15)

2.4.1 The tanker has a vapour collection system installed and approved in accordance with MSC/Circ.585.....

2.5 The ship has an incinerator:

- .1 which complies with resolution MEPC.76(40) as amended
- .2 installed before 1 January 2000 which does not comply with resolution MEPC.76(40) as amended.....

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 authority, as appropriate)

Appendix II

Test cycles and weighting factors (Regulation 13)

The following test cycles and weighting factors should be applied for verification of compliance of marine diesel engines with the NO_x limits in accordance with regulation 13 of this Annex using the test procedure and calculation method as specified in the NO_x Technical Code.

- .1 For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 should be applied.
- .2 For variable-pitch propeller sets test cycle E2 should be applied.
- .3 For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 should be applied.
- .4 For constant-speed auxiliary engines test cycle D2 should be applied.
- .5 For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 should be applied.

Test cycle for *constant-speed main propulsion* application
(including diesel-electric drive or variable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Test cycle for *propeller-law-operated main and propeller-law-operated auxiliary engine* application

Test cycle type E3	Speed	100%	91%	80%	63%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Appendices to Annex VI

Test cycle for *constant-speed auxiliary engine* application

Test cycle type D2	Speed	100%	100%	100%	100%	100%
	Power	100%	75%	50%	25%	10%
	Weighting factor	0.05	0.25	0.3	0.3	0.1

Test cycle for *variable-speed and -load auxiliary engine* application

Test cycle type C1	Speed	Rated				Intermediate			Idle
	Torque	100%	75%	50%	10%	100%	75%	50%	0%
	Weighting factor	0.15	0.15	0.15	0.1	0.1	0.1	0.1	0.15

Appendix III

Criteria and procedures for designation of SO_x emission control areas (Regulation 14)

1 Objectives

1.1 The purpose of this appendix is to provide the criteria and procedures for the designation of SO_x emission control areas. The objective of SO_x emission control areas is to prevent, reduce, and control air pollution from SO_x emissions from ships and their attendant adverse impacts on land and sea areas.

1.2 A SO_x emission control area should be considered for adoption by the Organization if supported by a demonstrated need to prevent, reduce, and control air pollution from SO_x emissions from ships.

2 Proposal criteria for designation of a SO_x emission control area

2.1 A proposal to the Organization for designation of a SO_x emission control area may be submitted only by Contracting States to the Protocol of 1997. Where two or more Contracting States have a common interest in a particular area, they should formulate a co-ordinated proposal.

2.2 The proposal shall include:

- .1 a clear delineation of the proposed area of application of controls on SO_x emissions from ships, along with a reference chart on which the area is marked;
- .2 a description of the land and sea areas at risk from the impacts of ship SO_x emissions;
- .3 an assessment that SO_x emissions from ships operating in the proposed area of application of the SO_x emission controls are contributing to air pollution from SO_x, including SO_x deposition, and their attendant adverse impacts on the land and sea areas under consideration. Such assessment shall include a description of the impacts of SO_x emissions on terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The sources of relevant data, including methodologies used, shall be identified;

- .4 relevant information pertaining to the meteorological conditions in the proposed area of application of the SO_x emission controls and the land and sea areas at risk, in particular prevailing wind patterns, or to topographical, geological, oceanographic, morphological, or other conditions that may lead to an increased probability of higher localized air pollution or levels of acidification;
- .5 the nature of the ship traffic in the proposed SO_x emission control area, including the patterns and density of such traffic; and
- .6 a description of the control measures taken by the proposing Contracting State or Contracting States addressing land-based sources of SO_x emissions affecting the area at risk that are in place and operating concurrent with the consideration of measures to be adopted in relation to provisions of regulation 14 of Annex VI of the present Convention.

2.3 The geographical limits of an SO_x emission control area will be based on the relevant criteria outlined above, including SO_x emission and deposition from ships navigating in the proposed area, traffic patterns and density, and wind conditions.

2.4 A proposal to designate a given area as an SO_x emission control area should be submitted to the Organization in accordance with the rules and procedures established by the Organization.

3 *Procedures for the assessment and adoption of SO_x emission control areas by the Organization*

3.1 The Organization shall consider each proposal submitted to it by a Contracting State or Contracting States.

3.2 A SO_x emission control area shall be designated by means of an amendment to this Annex, considered, adopted and brought into force in accordance with article 16 of the present Convention.

3.3 In assessing the proposal, the Organization shall take into account the criteria which are to be included in each proposal for adoption as set forth in section 2 above, and the relative costs of reducing sulphur depositions from ships when compared with land-based controls. The economic impacts on shipping engaged in international trade should also be taken into account.

4 *Operation of SO_x emission control areas*

4.1 Parties which have ships navigating in the area are encouraged to bring to the Organization any concerns regarding the operation of the area.

Appendix IV

Type approval and operating limits for shipboard incinerators (Regulation 16)

(1) Shipboard incinerators described in regulation 16(2) shall possess an IMO type approval certificate for each incinerator. In order to obtain such certificate, the incinerator shall be designed and built to an approved standard as described in regulation 16(2). Each model shall be subject to a specified type approval test operation at the factory or an approved test facility, and under the responsibility of the Administration, using the following standard fuel/waste specification for the type approval test for determining whether the incinerator operates within the limits specified in paragraph (2) of this appendix:

Sludge oil consisting of:	75% sludge oil from HFO; 5% waste lubricating oil; and 20% emulsified water
Solid waste consisting of:	50% food waste 50% rubbish containing approx. 30% paper, approx. 40% cardboard, approx. 10% rags, approx. 20% plastic The mixture will have up to 50% moisture and 7% incombustible solids.

(2) Incinerators described in regulation 16(2) shall operate within the following limits:

O ₂ in combustion chamber:	6–12%
CO in flue gas maximum average:	200 mg/MJ
Soot number maximum average:	Bacharach 3 or Ringelman 1 (20% opacity) (A higher soot number is acceptable only during very short periods such as starting up)
Unburned components in ash residues:	maximum 10% by weight
Combustion chamber flue gas outlet temperature range:	850–1200°C

Appendix V

Information to be included in the bunker delivery note (Regulation 18(3))

Name and IMO number of receiving ship

Port

Date of commencement of delivery

Name, address, and telephone number of marine fuel oil supplier

Product name(s)

Quantity (metric tons)

Density at 15°C (kg/m³)*

Sulphur content (% m/m)†

A declaration signed and certified by the fuel oil supplier's representative that the fuel oil supplied is in conformity with regulation 14 (1) or (4)(a) and regulation 18(1) of this Annex.

* Fuel oil should be tested in accordance with ISO 3675.

† Fuel oil should be tested in accordance with ISO 8754.

Additional information

1

List of unified interpretations of Annexes I, II and III of MARPOL 73/78

1 List of unified interpretations of Annex I of MARPOL 73/78

MEPC/Circ.97, annex 2	Uniform interpretation of provisions of Annex I
MEPC 17/21, paragraph 5.17 MEPC 18/18, annex 5	Unified interpretation
MEPC 19/18, annex 3	Unified interpretation
MEPC 20/19, annex 5	Unified interpretation
MEPC 21/19, annex 11	Unified interpretation of regulations 9(1) and 10(3) of Annex I and interpretation of Assembly resolution A.541(13) (not included in this book)
MEPC 25/20, paragraph 5.7 MEPC 26/25, annex 5	Agreed amendment to and interpretation of regulation 17 of Annex I
MEPC 27/16, annex 7	Unified interpretation of regulation 17 of Annex I
MEPC 30/24, annex 7	Unified interpretation of regulation 1(1) of Annex I
MEPC 31/21, annex 5	Unified interpretation of regulation 1(17) of Annex I
MEPC 32/20, paragraph 5.2 and annex 3	Unified interpretation of regulation 26 of Annex I
MEPC 33/20, paragraph 4.5 and annex 5	Unified interpretation of regulations 9(4), 10(3), 16(1) and 16(2) of Annex I
MEPC 34/23, paragraph 7.2.2 and annex 6	Unified interpretations of regulations 7, 12(2), 13, 13G, 13F(3)(d), 13G(4), 15(7), 16(6) and 21 of Annex I
MEPC 35/21, paragraph 8.10 and annex 5	Unified interpretation of regulation 15(7) of Annex I
MEPC 36/22, paragraph 9.38 and annex 7	Unified interpretation of regulation 15(5) of Annex I
MEPC 38/20, paragraphs 3.9 and 8.14	Unified interpretation of regulations 13F(3)(d) and 13F of Annex I

Additional information

MEPC 40/21, paragraphs 8.2 and 9.3 and annex 4 Unified interpretations of regulation 13(3)(b) and of regulation 25A(2) of Annex I

2 List of unified interpretations of Annex II of MARPOL 73/78

MEPC 22/21, annex 7 Texts of agreed unified interpretations of Annex II

MEPC 23/22, annex 6 Unified interpretations of the provisions of Annex II

MEPC 23/22, annex 7 Interpretation of Annex II in respect of incinerator ships (not included in this book)

MEPC 24/19, annex 2 Unified interpretations of the provisions of Annex II

MEPC 24/19, annex 3 Extension of the unified interpretation of regulation 3(4) of Annex II

MEPC 25/20, annex 4 Unified interpretation of the provisions of Annex II

MEPC 25/20, annex 5 Interpretation of Annex II in respect of ships engaged in dumping operations and explanatory notes thereto (not included in this book)

MEPC 29/22, annex 2 Unified interpretation of regulations of Annex II

MEPC 30/24, annex 11 Unified interpretation of regulation 3(4) of Annex II

MEPC 33/20, paragraph 3.19 Unified interpretation of regulation 3(4) of Annex II

3 List of unified interpretations of Annex III of MARPOL 73/78

MEPC 36/22, paragraph 9.42 and annex 7 Unified interpretation of regulation 4.3 of Annex III

2

List of related documents

1 The following is a list of related documents which have been incorporated into this book.

<i>Reference</i>	<i>Document</i>
International Convention for the Prevention of Pollution from Ships, 1973	
Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973	
Protocol of 1997 to amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto	
Protocol I: Provisions concerning reports on incidents involving harmful substances	MEPC 22/21, annex 10
– 1996 amendment to article II(1)	MEPC 38/20, annex 2
Protocol II: Arbitration	
Annex I	
– 1984 Amendments	MEPC 20/19, annex 4
– 1987 Amendments	MEPC 25/20, annex 9
– 1990 Amendments	MEPC 30/24, annex 5
– 1991 Amendments	MEPC 31/21, annex 6
– 1992 Amendments	MEPC 32/20, annexes 5 & 6
– 1994 Amendments	MP/CONF.2/8
– 1997 Amendments	MEPC 40/21, annex 5
Annex II	
– 1985 Amendments	MEPC 22/21, annex 2
– 1989 Amendments	MEPC 27/16, annex 5
– 1992 Amendments	MEPC 33/20, annex 8
– 1994 Amendments	MP/CONF.2/8

Additional information

- Standards for procedures and arrangements for the discharge of noxious liquid substances
 - 1992 Amendments MEPC 33/20, annex 3
 - 1994 Amendments MEPC 35/21, annex 2
 - 1995 Amendments MEPC 37/22/Add.1, annex 4

Annex III

- Draft revised Annex III of MARPOL 73/78
 - 1992 Amendments MEPC 33/20, annex 9
 - 1994 Amendments MP/CONF.2/8

Annex V

- 1989 Amendments MEPC 28/4, annex 2
- 1994 Amendments MP/CONF.2/8
- 1995 Amendments MEPC 37/22/Add.1, annex 13

Annex VI

2 The following is a list of related documents which have not been included in this book.

Reference

*Document or
IMO publication
sales number*

Protocol I

- 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 IMO-516E
- Provisions concerning the reporting of incidents involving harmful substances under MARPOL 73/78 (1999 edition) IMO-516E

Annex I

- Guidelines for surveys under Annex I of MARPOL 73/78 (1983 edition) IMO-526E
- Guidelines for the development of shipboard oil pollution emergency plans (1992 edition) IMO-586E

- Crude oil washing systems (1983 edition) IMO-617E
- Dedicated clean ballast tanks (1982 edition) IMO-619E
- Inert gas systems (1990 edition) IMO-860E
- Guidelines on enhanced programme of inspections during surveys of bulk carriers and oil tankers Resolution A.744(18)

Annex II

- Guidelines for the provisional assessment of liquids transported in bulk IMO-653E
 - Annex 1 – Flow chart for provisional assessment of liquids transported in bulk
 - Annex 2 – Unified interpretations of the provisions of Annex II of MARPOL 73/78
 - Annex 3 – Example of an amendment sheet to the ship's Certificate of Fitness and Procedures and Arrangements Manual
 - Annex 4 – Interpretation of the Guidelines for the categorization of noxious liquid substances
 - Annex 5 – Abbreviated legend to the hazard profiles
 - Annex 6 – Criteria for establishing ship type requirements from the marine pollution point of view
 - Annex 7 – Telex/Telefax format for proposing tripartite agreement for provisional assessment of liquid substances
 - Annex 8 – Format for assessment of liquid chemicals
 - Annex 9 – Examples of the calculation method
 - Annex 10 – Interpretation for assigning the minimum carriage requirements for mixtures involving products included in the IBC/BCH Codes for safety reasons

Additional information

– International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) (1998 edition)	IMO-100E
– Guidelines for surveys under Annex II of MARPOL 73/78 (1987 edition)	IMO-508E
– Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) (1993 edition)	IMO-772E
Annex III	
– International Maritime Dangerous Goods Code (IMDG Code) (1992 edition)	IMO-200E
Annex V	
– Guidelines for the implementation of Annex V	IMO-656E
– Appendix 1 – Form for reporting alleged inadequacy of port reception facilities for garbage	
– Appendix 2 – Standard specification for shipboard incinerators	
General	
– Control of ships and discharges (1986 edition)	IMO-601E
– Procedures for port State control	IMO-650E
– Comprehensive manual on port reception facilities	IMO-597E
– Pollution prevention equipment required under MARPOL 73/78 (1996 edition)	IMO-646E
– MARPOL - How to do it	IMO-636E

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List of MEPC resolutions

		<i>IMO publication sales number</i>
MEPC.1(II)*	Resolution on establishment of the list of substances to be annexed to the Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil	—
MEPC.2(VI)	Recommendation on international effluent standards and guidelines for performance tests for sewage treatment plants	IMO-592E
MEPC.3(XII)	Recommendation on the standard format for the crude oil washing operations and equipment manual	IMO-617E
MEPC.4(XIII)	Recommendation regarding acceptance of oil content meters in oil tankers	—
MEPC.5(XIII)	Specification for oil/water interface detectors	IMO-608E (Oily-Water Separators and Monitoring Equipment)
MEPC.6(XIV)	Application of the provisions of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto on the discharge of oil in the Baltic Sea area	—

* Roman or Arabic figures in brackets show the session number, and the texts of these resolutions are annexed to the MEPC report of that session.

Additional information

MEPC.7(XV)	Entries in oil record books on methods of disposal of residue	–
MEPC.8(XVI)	Discharge of oils not specified by the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended in 1962 and 1969	–
MEPC.9(17)	Application of the provisions of Annex V of MARPOL 73/78 on the discharge of garbage in the Baltic Sea area	–
MEPC.10(18)	Application scheme for oil discharge monitoring and control systems	–
MEPC.11(18)	Guidelines for surveys under Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto	IMO-526E
MEPC.12(18)	Regional arrangements for combating major incidents of marine pollution	–
MEPC.13(19)	Guidelines for plan approval and installation survey of oil discharge monitoring and control systems for oil tankers and environmental testing of control sections thereof	IMO-608E (Oily-Water Separators and Monitoring Equipment)
MEPC.14(20)	Adoption of amendments to Annex I of MARPOL 73/78	–
MEPC.15(21)	Installation of oil discharge monitoring and control systems in existing oil tankers	–
MEPC.16(22)	Adoption of amendments to Annex II of MARPOL 73/78	–
MEPC.17(22)	Implementation of Annex II of MARPOL 73/78	–

MEPC.18(22)	Adoption of the standards for procedures and arrangements for the discharge of noxious liquid substances	–
MEPC.19(22)	Adoption of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	IMO-100E
MEPC.20(22)	Adoption of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	IMO-772E
MEPC.21(22)	Adoption of amendments to Protocol I to MARPOL 73/78 and the text of the Protocol, as amended, annexed thereto	–
MEPC.22(22)	Adoption of guidelines for reporting incidents involving harmful substances and the text of guidelines annexed thereto	–
MEPC.23(22)	The application of Annex II of MARPOL 73/78 on the discharge of noxious liquid substances in the Baltic Sea area	–
MEPC.24(22)	Adoption of amendments to the Revised guidelines and specifications for oil discharge monitoring and control systems for oil tankers as adopted by the Organization by resolution A.586(14) and to the Recommendation on international performance and test specifications for oily-water separating equipment and oil content meters adopted by the Organization by resolution A.393(X)	IMO-608E (Oily-Water Separators and Monitoring Equipment)

Additional information

MEPC.25(23)	Guidelines for surveys under Annex 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)	IMO-508E
MEPC.26(23)	Procedures for the control of ships and discharges under Annex 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)	IMO-601E (Control of Ships and Discharges)
MEPC.27(23)	Categorization of liquid substances	—
MEPC.28(24)	Compliance with Annex II of MARPOL 73/78	—
MEPC.29(25)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, (designation of the Gulf of Aden as a special area)	—
MEPC.30(25)	Guidelines for reporting incidents involving harmful substances	—
MEPC.31(26)	Establishment of the date of application of the provisions of regulation 5 of Annex V of the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto on the discharge of garbage in the Baltic Sea area	—

MEPC.32(27)	Adoption of amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	IMO-100E
MEPC.33(27)	Adoption of amendments to the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	IMO-772E
MEPC.34(27)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Appendices II and III of Annex II of MARPOL 73/78)	—
MEPC.35(27)	Implementation of Annex III of MARPOL 73/78	—
MEPC.36(28)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Amendments to Annex V of MARPOL 73/78)	—
MEPC.37(28)	Establishment of the date of application of the provisions of regulation 5 of Annex V of the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto on the discharge of garbage in the North Sea area	—
MEPC.38(29)	Application of the provisions of Annex IV of the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto on the discharge of sewage in the Baltic Sea area	—

Additional information

MEPC.39(29)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Introduction of the Harmonized System of Survey and Certification to Annexes I and II of MARPOL 73/78)	–
MEPC.40(29)	Adoption of amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) (Harmonized System of Survey and Certification)	–
MEPC.41(29)	Adoption of amendments to the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) (Harmonized System of Survey and Certification)	–
MEPC.42(30)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Designation of Antarctic area as a special area under Annexes I and V of MARPOL 73/78)	–
MEPC.43(30)	Prevention of pollution by garbage in the Mediterranean	–
MEPC.44(30)	Identification of the Great Barrier Reef region as a particularly sensitive area	–
MEPC.45(30)	Protection of the Great Barrier Reef region	–
MEPC.46(30)	Measures to control potential adverse impacts associated with use of tributyl tin compounds in anti-fouling paints	–

MEPC.47(31)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (new regulation 26 and other amendments to Annex I of MARPOL 73/78)	–
MEPC.48(31)	Adoption of amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (designation of the Wider Caribbean area as a special area under Annex V of MARPOL 73/78)	–
MEPC.49(31)	Revision of the list of substances to be annexed to the Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other Than Oil, 1973	–
MEPC.50(31)	Guidelines for preventing the introduction of unwanted aquatic organisms and pathogens from ships' ballast water and sediment discharges	
MEPC.51(32)	Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Discharge criteria of Annex I of MARPOL 73/78)	IMO-520E
MEPC.52(32)	Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (New regulations 13F and 13G and related amendments to Annex I of MARPOL 73/78)	IMO-520E

Additional information

MEPC.53(32)	Development of the capacity of ship scrapping for the smooth implementation of the amendments to Annex I of MARPOL 73/78	–
MEPC.54(32)	Guidelines for the development of shipboard oil pollution emergency plans	IMO-586E
MEPC.55(33)	Adoption of amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	–
MEPC.56(33)	Adoption of amendments to the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	–
MEPC.57(33)	Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Designation of the Antarctic area as a special area and lists of liquid substances in Annex II)	IMO-544E
MEPC.58(33)	Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Revised Annex III)	IMO-544E
MEPC.59(33)	Revised guidelines for the implementation of Annex V of MARPOL 73/78	IMO-544E IMO-656E
MEPC.60(33)	Guidelines and specifications for pollution prevention equipment for machinery space bilges of ships	IMO-646E
MEPC.61(34)	Visibility limits of oil discharges of Annex I of MARPOL 73/78	–
MEPC.62(35)	Amendments to the standards for procedures and arrangements for the discharge of noxious liquid substances	–

MEPC.63(36)	Oil tanker stability, operational safety and protection of the marine environment	–
MEPC.64(36)	Guidelines for approval of alternative structural or operational arrangements as called for in regulation 13G(7) of Annex I of MARPOL 73/78	–
MEPC.65(37)	Amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Amendments to regulation 2 and new regulation 9 of Annex V)	–
MEPC.66(37)	Interim Guidelines for the approval of alternative methods of design and construction of oil tankers under regulation 13F(5) of Annex I of MARPOL 73/78	–
MEPC.67(37)	Guidelines on application of the precautionary approach	–
MEPC.68(38)	Amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Amendments to Protocol I)	–
MEPC.69(38)	Amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	–
MEPC.70(38)	Amendments to the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	–
MEPC.71(38)	Guidelines for the development of garbage management plans	–

Additional information

MEPC.72(38)	Revision of the list of substances to be annexed to the Protocol relating to the Intervention on the High Seas in cases of Marine Pollution by Substances other than oil	–
MEPC.73(39)	Amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) (Vague expressions)	–
MEPC.74(40)	Identification of the Archipelago of Sabana-Camagüey as a particularly sensitive sea area	–
MEPC.75(40)	Amendments to Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973	–
MEPC.76(40)	Standard specification for shipboard incinerators	–
MEPC.77(41)	Establishment of the date on which the amendments to regulation 10 of Annex I of MARPOL 73/78 in respect of the North West European Waters as a special area shall take effect	–
MEPC.78(43)	Amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973	–
MEPC.79(43)	Amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	–
MEPC.80(43)	Amendments to the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	–
MEPC.81(43)	Amendments to section 9 of the Standard Format for the COW Manual (resolution MEPC.3(XII))	–

MEPC.82(43) Guidelines for monitoring the —
worldwide average sulphur content
of residual fuel oils supplied for use
on board ships

4

Status of MARPOL 73/78, amendments and related instruments

This list show the dates of entry into force of MARPOL 73/78, its protocols, annexes and amendments as at 1 January 2000.

Details of the amendments may be found in the list of MEPC resolutions.

International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 thereto (MARPOL (amended) 73/78).

Entry into force:	2 October 1983
Annex I	2 October 1983
Annex II	6 April 1987
Annex III	1 July 1992
Annex IV	<i>not yet in force</i>
Annex V	31 December 1988
Annex VI	<i>not yet in force</i>
1984 amendments (MEPC.14(20)) (extensive amendments to Annex I which had been agreed over the years)	7 January 1986
1985 amendments (MEPC.16(22)) (extensive amendments to Annex II in preparation for its implementation – pumping, piping, control, etc.)	6 April 1987
1985 (Protocol I) amendments (MEPC.21(22)) (Reporting Protocol)	6 April 1987
1987 (Annex I) amendments (MEPC.29(25)) (designation of the Gulf of Aden as a special area)	1 April 1989
1989 (IBC Code) amendments (MEPC.32(27)) (list of chemicals)	13 October 1990
1989 (BCH Code) amendments (MEPC.33(27)) (list of chemicals)	13 October 1990
1989 (Annex II) amendments (MEPC.34(27)) (list of chemicals)	13 October 1990
1989 (Annex V) amendments (MEPC.36(28)) (designation of the North Sea as a special area)	18 February 1991
1990 (Annexes I and II) amendments (MEPC.39(29)) (harmonized system of survey and certification)	3 February 2000

Status of MARPOL 73/78, amendments and related instruments

1990 (IBC Code) amendments (MEPC.40(29)) (harmonized system of survey and certification)	3 February 2000
1990 (BCH Code) amendments (MEPC.41(29)) (harmonized system of survey and certification)	3 February 2000
1990 (Annexes I and V) amendments (MEPC.42(30)) (designation of the Antarctic area as a special area)	17 March 1992
1991 (Annex I) amendments (MEPC.47(31)) (new regulation 26 (Shipboard Oil Pollution Emergency Plan) and other amendments)	4 April 1993
1991 (Annex V) amendments (MEPC.48(31)) (designation of the Wider Caribbean area as a special area)	4 April 1993
1992 (Annex I) amendments (MEPC.51(32)) (discharge criteria)	6 July 1993
1992 (Annex I) amendments (MEPC.52(32)) (oil tanker design)	6 July 1993
1992 (IBC Code) amendments (MEPC.55(33)) (lists of chemicals, cargo tank venting and gas-freeing arrangements and other amendments)	1 July 1994
1992 (BCH Code) amendments (MEPC.56(33)) (lists of chemicals and other amendments)	1 July 1994
1992 (Annex II) amendments (MEPC.57(33)) (lists of chemicals and the designation of the Antarctic area as a special area)	1 July 1994
1992 (Annex III) amendments (MEPC.58(33)) (total revision of Annex III with the IMDG Code as a vehicle for its implementation)	28 February 1994
1994 (Annexes I, II, III and V) amendments (Conference resolutions 1-3) (Port State control on operational requirements)	3 March 1996
1995 (Annex V) amendments (MEPC.65(37)) (Application, placards, management plans and record keeping)	1 July 1997
1996 (Protocol I) amendments (MEPC.68(38)) (article II – when to make reports)	1 January 1998
1996 (IBC Code) amendments (MEPC.69(38)) (lists of chemicals)	1 July 1998
1996 (BCH Code) amendments (MEPC.70(38)) (lists of chemicals)	1 July 1998

Additional information

1997 (IBC Code) amendments (MEPC.73(39)) (vague expressions)	10 July 1998
1997 (Annex I) amendments (MEPC.75(40)) (designation of North West European waters as a special area; new regulation 25A)	1 February 1999
1999 (Annexes I and II) amendments (MEPC.78(43)) (amendments to regulations 13G and 26 and IOPP Certificate of Annex I and addition of new regulation 16 to Annex II)	[1 January 2001]
1999 (IBC Code) amendments (MEPC.79(43)) (cargo-tank venting and gas-freeing arrangements)	[1 July 2002]
1999 (BCH Code) amendments (MEPC.80(43)) (cargo containment)	[1 July 2002]

5

Introduction of the harmonized system of survey and certification to Annexes I and II of MARPOL 73/78

By the date of publication of this Consolidated Edition, the amendments to MARPOL 73/78 adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC.39(29), Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from ships, 1973 (Introduction of the harmonized system of survey and certification to Annexes I and II of MARPOL 73/78), had not entered into force. The entry into force date of these amendments will coincide with the entry into force date of the 1988 SOLAS Protocol and the 1988 Load Line Protocol, which is 3 February 2000. Therefore, for ease of reference, resolution MEPC.39(29) is reprinted in its entirety.

Resolution MEPC.39(29)

Adoption of amendments to the annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973

(Introduction of the harmonized system of survey and certification to Annexes I and II of MARPOL 73/78)

adopted on 16 March 1990

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING article 16 of the International Convention for the Prevention of Pollution from Ships, 1973 (hereinafter referred to as the “1973 Convention”), and article VI of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973

Additional information

(hereinafter referred to as the “1978 Protocol”), which confer upon the appropriate body of the Organization the function of considering and adopting amendments to the 1973 Convention, as modified by the 1978 Protocol (MARPOL 73/78),

RECALLING that the International Conference on Tanker Safety and Pollution Prevention, 1978, by resolution 10, recommended that IMO take the necessary action to amend the International Convention for the Safety of Life at Sea, 1974 (the 1974 SOLAS Convention), the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL 73/78), and the International Convention on Load Lines, 1966 (the 1966 Load Line Convention), with a view to standardizing the periods of validity of the certificates as well as the intervals of surveys required by these Conventions,

NOTING FURTHER that the International Conference on the Harmonized System of Survey and Certification, 1988, had adopted the Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974 (the 1988 SOLAS Protocol), and the Protocol of 1988 relating to the International Convention on Load Lines, 1966 (the 1988 Load Line Protocol), which introduce, *inter alia*, the harmonized system of survey and certification under the 1974 SOLAS Convention and the 1966 Load Line Convention, and that the Conference recommended the Maritime Safety Committee and the Marine Environment Protection Committee to take the necessary action:

- (a) to amend MARPOL 73/78, the IBC Code, the BCH Code and the IGC Code in order to harmonize their survey and certification requirements with those of the 1988 SOLAS Protocol and the 1988 Load Line Protocol and,
- (b) to bring those amendments into force on the same date, or on a date as close as possible to the date on which the 1988 SOLAS Protocol and the 1988 Load Line Protocol enter into force.

HAVING CONSIDERED, at its twenty-ninth session, amendments to the 1978 Protocol proposed and circulated in accordance with article 16(2)(a) of the 1973 Convention,

1. ADOPTS, in accordance with article 16(2)(d) of the 1973 Convention, amendments to the Annex of the 1978 Protocol, the text of which is set out in the Annex to the present resolution;
2. REQUESTS the Secretary-General, in conformity with article 16(2)(e) of the 1973 Convention, to transmit to all Parties to the 1978 Protocol certified copies of the present resolution and the text of the amendments contained in the Annex;

3. DETERMINES, in accordance with article 16(2)(f)(ii) and (iii) of the 1973 Convention, that the amendments shall be deemed to have been accepted six months after the date on which the conditions for the entry into force of both the 1988 SOLAS Protocol and the 1988 Load Line Protocol are met, provided that the date of acceptance is not before 1 August 1991, unless prior to that date, objections are communicated to the Organization as provided for in article 16(2)(f)(iii);
4. INVITES the Parties to note that, in accordance with article 16(2)(g)(ii) of the 1973 Convention, the amendments shall enter into force six months after their acceptance in accordance with the preceding paragraph;
5. REQUESTS the Secretary-General to inform all Parties when the conditions for the entry into force of both the 1988 SOLAS Protocol and the 1988 Load Line Protocol are met and, in conformity with article 16(8) of the Convention, when the amendments to the 1978 Protocol contained in the Annex to the present resolution will enter into force;
6. FURTHER REQUESTS the Secretary-General to transmit to the Members of the Organization which are not Parties to the 1978 Protocol copies of the resolution and its Annex and to inform them when the amendments enter into force.

Annex

Amendments to Annexes I and II of MARPOL 73/78

1 MARPOL 73/78, ANNEX I

Regulation 1

Definitions

New definition is added as follows:

“(31) *Anniversary date* means the day and the month of each year which will correspond to the date of expiry of the International Oil Pollution Prevention Certificate.”

Regulation 4

Surveys and Inspections

The existing title is replaced by the following:

“*Surveys*”.

The existing text is replaced by the following:

“(1) Every oil tanker of 150 tons gross tonnage and above, and every other ship of 400 tons gross tonnage and above shall be subject to the surveys specified below:

- (a) An initial survey before the ship is put in service or before the Certificate required under regulation 5 of this Annex is issued for the first time, which shall include a complete survey of its structure, equipment, systems, fittings, arrangements and material in so far as the ship is covered by this Annex. This survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex.
- (b) A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation 8(2), 8(5), 8(6) or 8(7) of this Annex is applicable. The renewal survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with applicable requirements of this Annex.
- (c) 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 Certificate which shall take the place of one of the annual surveys specified in paragraph (1)(d) of this regulation. The intermediate survey shall be such as to ensure that the equipment and associated pump and piping systems, including oil discharge monitoring and control systems, crude oil washing systems, oily-water separating equipment and oil filtering systems, fully comply with the applicable requirements of this Annex and are in good working order. Such intermediate surveys shall be endorsed on the Certificate issued under regulation 5 or 6 of this Annex.
- (d) An annual survey within three months before or after each anniversary date of the Certificate, including a general inspection of the structure, equipment, systems, fittings, arrangements and material referred to in paragraph (1)(a) of this regulation to ensure that they have been maintained in accordance with paragraph (4) of this regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the Certificate issued under regulation 5 or 6 of this Annex.
- (e) An additional survey either general or partial, according to the circumstances, shall be made after a repair resulting from investigations prescribed in paragraph (4) of this regulation, 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 requirements of this Annex.

- (2) The Administration shall establish appropriate measures for ships which are not subject to the provisions of paragraph (1) of this regulation in order to ensure that the applicable provisions of this Annex are complied with.
- (3) (a) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.
- (b) An Administration nominating surveyors or recognizing organizations to conduct surveys as set forth in subparagraph (a) of this paragraph shall, as a minimum, empower any nominated surveyor or recognized organization to:
- (i) require repairs to a ship; and
 - (ii) carry out 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 the nominated surveyors or recognized organizations, for circulation to Parties to the present Protocol for the information of their officers.

- (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 presenting an unreasonable threat of harm to the marine environment, 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 Certificate should be withdrawn and the Administration shall be notified immediately; and if the ship is in a 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 applicable, the Government of the port State concerned shall take such steps as

will ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without presenting an unreasonable threat of harm to the marine environment.

- (d) In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.
- (4)
- (a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment.
 - (b) After any survey of the ship under paragraph (l) of this regulation has been completed, no change shall be made in the structure, equipment, systems, fittings, arrangements or material covered by the survey, without the sanction of the Administration, except the direct replacement of such equipment and fittings.
 - (c) Whenever an accident occurs to a ship or a defect is discovered which substantially affects the integrity of the ship or the efficiency or completeness of its equipment covered by this Annex the master or owner of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant Certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph (l) of this regulation is necessary. If the ship is in a port of another Party, 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 report has been made”.

Regulation 5

Issue of Certificate

The existing heading is replaced by the following:

“Issue or Endorsement of Certificate”.

The existing text is replaced by the following:

“(1) An International Oil Pollution Prevention Certificate shall be issued, after an initial or renewal survey in accordance with the provisions of regulation 4 of this Annex, to any oil tanker of 150 tons gross tonnage and above and any other ships of 400 tons gross tonnage and above which are

engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention.

(2) Such Certificate shall be issued or endorsed either by the Administration or by any persons or organization duly authorized by it. In every case the Administration assumes full responsibility for the Certificate.

(3) Notwithstanding any other provisions of the amendments to this Annex adopted by the Marine Environment Protection Committee (MEPC) by resolution MEPC.39(29), any International Oil Pollution Prevention Certificate, which is current when these amendments enter into force, shall remain valid until it expires under the terms of this Annex prior to the amendments entering into force.”

Regulation 6

Issue of Certificate by another Government

The existing heading is replaced by the following:

“Issue or Endorsement of a Certificate by another Government”.

The existing text is replaced by the following:

“(1) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Oil Pollution Prevention Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that Certificate on the ship, in accordance with this Annex.

(2) A copy of the Certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

(3) A Certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the Certificate issued under regulation 5 of this Annex.

(4) No International Oil Pollution Prevention Certificate shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.”

Regulation 7

Form of Certificate

The existing text is replaced by the following:

“The International Oil Pollution Prevention Certificate shall be drawn up in a form corresponding to the model given in appendix II to this

Annex. If the language used is neither English nor French, the text shall include a translation into one of these languages.”

Regulation 8

Duration of Certificate

The existing heading is replaced by the following:

“*Duration and Validity of Certificate*”.

The existing text is replaced by the following:

“(1) An International Oil Pollution Prevention Certificate shall be issued for a period specified by the Administration which shall not exceed five years.

- (2) (a) Notwithstanding the requirements of paragraph (1) of this regulation, 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 a date not exceeding five years from the date of expiry of the existing Certificate.
- (b) 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 a date not exceeding five years from the date of expiry of the existing Certificate.
- (c) 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 a date not exceeding five years from the date of completion of the renewal survey.

(3) If a 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 (1) of this regulation, provided that the surveys referred to in regulation 4(1)(c) and 4(1)(d) of this Annex applicable when a Certificate is issued for a period of five years are carried out as appropriate.

(4) 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 five months from the expiry date.

(5) 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 a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.

(6) 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 a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.

(7) 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 paragraph (2)(b), (5) or (6) of this regulation. In these special circumstances, the new Certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.

(8) If an annual or intermediate survey is completed before the period specified in regulation 4 of this Annex, then:

- (a) the anniversary date shown on the 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;
- (b) the subsequent annual or intermediate survey required by regulation 4 of this Annex shall be completed at the intervals prescribed by that regulation using the new anniversary date;
- (c) the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation 4 of this Annex are not exceeded.

(9) A Certificate issued under regulation 5 or 6 of this Annex shall cease to be valid in any of the following cases:

- (a) if the relevant surveys are not completed within the periods specified under regulation 4(1) of this Annex;
- (b) if the Certificate is not endorsed in accordance with regulation 4(1)(c) or 4(1)(d) of this Annex.

- (c) 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 4(4)(a) and 4(4)(b) of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.”

Appendix II

Form of Certificate

The existing Form of Certificate is replaced by the following:

“INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE

(Note: This certificate shall be supplemented by a Record of Construction and Equipment)

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, and as amended by resolution MEPC.39(29), (hereinafter referred to as “the Convention”) under the authority of the Government of:

.....
(full designation of the country)

by.....
(full designation of the competent person or organization authorized under the provisions of the Convention)

Particulars of ship*

Name of ship
Distinctive number or letters
Port of registry
Gross tonnage
Deadweight of ship (metric tons)†
IMO Number‡.

* Alternatively, the particulars of the ship may be placed horizontally in boxes.

† For oil tankers.

‡ In accordance with resolution A.600(15), IMO Ship Identification Number Scheme, this information may be included voluntarily.

Additional information

Type of ship:*

Oil tanker

Ship other than an oil tanker with cargo tanks coming under regulation 2(2) of Annex I of the Convention

Ship other than any of the above

THIS IS TO CERTIFY:

1. That the ship has been surveyed in accordance with regulation 4 of Annex I of the Convention.
2. That the survey shows that the structure, equipment, systems, fittings, arrangement and material of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the applicable requirements of Annex I of the Convention.

This certificate is valid until †
subject to surveys in accordance with regulation 4 of Annex I 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 authority, as appropriate)

* Delete as appropriate.

† Insert the date of expiry as specified by the Administration in accordance with regulation 8(1) of Annex I of the Convention. The day and the month of this date correspond to the anniversary date as defined in regulation 1(31) of Annex I of the Convention, unless amended in accordance with regulation 8(8) of Annex I of the Convention.

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by regulation 4 of Annex I of the Convention the ship was found to comply with the relevant provisions of the Convention:

Annual survey: Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate* survey: Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

Annual/Intermediate* 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)

* Delete as appropriate.

**ANNUAL/INTERMEDIATE SURVEY IN ACCORDANCE
WITH REGULATION 8(8)(c)**

THIS IS TO CERTIFY that, at an annual/intermediate* survey in accordance with regulation 8(8)(c) of Annex I of the Convention, the ship was found to comply with the relevant provisions 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 8(3) APPLIES**

The ship complies with the relevant provisions of the Convention, and this Certificate shall, in accordance with regulation 8(3) of Annex I 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 8(4) APPLIES**

The ship complies with the relevant provisions of the Convention, and this Certificate shall, in accordance with regulation 8(4) of Annex I of the Convention, be accepted as valid until

Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

* 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 8(5) OR 8(6) APPLIES**

This Certificate shall, in accordance with regulation 8(5) or 8(6)* of Annex I 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 8(8) APPLIES**

In accordance with regulation 8(8) of Annex I 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 8(8) of Annex I of the Convention, the new anniversary date is

Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)"

* Delete as appropriate.

2 MARPOL 73/78, ANNEX II

Regulation 1

Definitions

A new definition is added as follows:

“(14) *Anniversary date* means the day and the month of each year which will correspond to the date of expiry of the International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk”.

Regulation 10

Surveys

The existing text is replaced by the following:

“(1) Ships carrying noxious liquid substances in bulk shall be subject to the surveys specified below:

- (a) An initial survey before the ship is put in service or before the Certificate required under regulation 11 of this Annex is issued for the first time, which shall include a complete survey of its structure, equipment, systems, fittings, arrangements and material in so far as the ship is covered by this Annex. This survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex.
- (b) A renewal survey at intervals specified by the Administration, but not exceeding 5 years, except where regulation 12(2), 12(5), 12(6) or 12(7) of this Annex is applicable. The renewal survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with applicable requirements of this Annex.
- (c) An intermediate survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Certificate which shall take the place of one of the annual surveys specified in paragraph (1)(d) of this regulation. The intermediate survey shall be such as to ensure that the equipment and associated pump and piping systems fully comply with the applicable requirements of this Annex and are in good working order. Such intermediate surveys shall be endorsed on the Certificate issued under regulation 11 of this Annex.

- (d) An annual survey within 3 months before or after each anniversary date of the Certificate including a general inspection of the structure, equipment, systems, fittings, arrangements and material referred to in paragraph (1)(a) of this regulation to ensure that they have been maintained in accordance with paragraph (3) of this regulation and that they remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the Certificate issued under regulation 11 of this Annex.
 - (e) In additional survey either general or partial, according to the circumstances, shall be made after a repair resulting from investigations prescribed in paragraph (3) of this regulation, 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 requirements of this Annex.
- (2) (a) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.
- (b) An Administration nominating surveyors or recognizing organizations to conduct surveys as set forth in subparagraph (a) of this paragraph shall, as a minimum, empower any nominated surveyor or recognized organization to:
- (i) require repairs to a ship; and
 - (ii) carry out 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 the nominated surveyors or recognized organizations, for circulation to Parties to the present Convention for the information of their officers.

- (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 presenting an unreasonable threat of harm to the marine environment, 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 Certificate should be withdrawn and the Administration

shall be notified immediately; and if the ship is in a 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 applicable, the Government of the port State concerned shall take such steps as will ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without presenting an unreasonable threat of harm to the marine environment.

- (d) In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation.
- (3)
- (a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment.
 - (b) After any survey of the ship under paragraph (1) of this regulation has been completed, no change shall be made in the structure, equipment, systems, fittings, arrangements or material covered by the survey, without the sanction of the Administration, except the direct replacement of such equipment and fittings.
 - (c) Whenever an accident occurs to a ship or a defect is discovered which substantially affects the integrity of the ship or the efficiency or completeness of its equipment covered by this Annex, the master or owner of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant Certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph (1) of this regulation is necessary. If the ship is in a port of another Party, 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 report has been made.”

Regulation 11

Issue of Certificate

The existing heading is replaced by the following:

“Issue or Endorsement of Certificate”.

The existing text is replaced by the following:

“(1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued, after an initial or renewal survey in accordance with the provisions of regulation 10 of this Annex, 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 the Convention.

(2) Such Certificate shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the Certificate.

(3) (a) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk to the ship and, where appropriate, endorse or authorize the endorsement of that Certificate on the ship, in accordance with this Annex.

(b) A copy of the Certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

(c) A Certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the Certificate issued under paragraph (1) of this regulation.

(d) No International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

(4) The International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be drawn up in the form corresponding to the model given in appendix V to this Annex. If the language used is neither English nor French, the text shall include a translation into one of these languages.

(5) Notwithstanding any other provisions of the amendments to this Annex adopted by the Marine Environment Protection Committee (MEPC) by resolution MEPC.39(29), any International Pollution Preven-

tion Certificate for the Carriage of Noxious Liquid Substances in Bulk, which is current when these amendments enter into force, shall remain valid until it expires under the terms of this Annex prior to the amendments entering into force.”

Regulation 12

Duration of Certificate

The existing heading is replaced by the following:

“Duration and Validity of Certificate”.

The existing text is replaced by the following:

“(1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued for a period specified by the Administration which shall not exceed 5 years.

(2) (a) Notwithstanding the requirements of paragraph (1) of this regulation, when the renewal survey is completed within 3 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 a date not exceeding 5 years from the date of expiry of the existing Certificate.

(b) 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 a date not exceeding 5 years from the date of expiry of the existing Certificate.

(c) When the renewal survey is completed more than 3 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 a date not exceeding 5 years from the date of completion of the renewal survey.

(3) If a Certificate is issued for a period of less than 5 years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in paragraph (1) of this regulation, provided that the surveys referred to in regulation 10(1)(c) and 10(1)(d) of this Annex applicable when a Certificate is issued for a period of 5 years are carried out as appropriate.

(4) 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.

(5) 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 3 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 a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

(6) 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 a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

(7) 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 paragraph (2)(b), (5) or (6) of this regulation. In these special circumstances, the new Certificate shall be valid to a date not exceeding 5 years from the date of completion of the renewal survey.

(8) If an annual or intermediate survey is completed before the period specified in regulation 10 of this Annex, then:

- (a) the anniversary date shown on the Certificate shall be amended by endorsement to a date which shall not be more than 3 months later than the date on which the survey was completed;
- (b) the subsequent annual or intermediate survey required by regulation 10 of this Annex shall be completed at the intervals prescribed by that regulation using the new anniversary date;
- (c) the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation 10 of this Annex are not exceeded.

(9) A Certificate issued under regulation 11 of this Annex shall cease to be valid in any of the following cases:

- (a) if the relevant surveys are not completed within the periods specified under regulation 10(1) of this Annex;
- (b) if the Certificate is not endorsed in accordance with regulation 10(1)(c) or 10(1)(d) of this Annex;

- (c) 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 10(4)(a) and 10(4)(b) of this Annex. In the case of a transfer between Parties, if requested within 3 months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.”

Appendix V

Form of Certificate

The existing Form of Certificate is replaced by the following:

**“INTERNATIONAL POLLUTION PREVENTION CERTIFICATE
FOR THE CARRIAGE OF NOXIOUS LIQUID SUBSTANCES IN BULK**

Issued under the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, and as amended by resolution MEPC.39(29), (hereinafter referred to as “the Convention”) under the authority of the Government of:

.....
(full designation of the country)

by.....
*(full designation of the competent person or organization
authorized under the provisions of the Convention)*

Particulars of ship*

Name of ship.....
Distinctive number or letters.....
Port of registry.....
Gross tonnage.....
IMO Number†.....

* Alternatively, the particulars of the ship may be placed horizontally in boxes.

† In accordance with resolution A.600(15), IMO Ship Identification Number Scheme, this information may be included voluntarily.

**ANNUAL/INTERMEDIATE SURVEY IN ACCORDANCE
WITH REGULATION 12(8)(c)**

THIS IS TO CERTIFY that, at an annual/intermediate* survey in accordance with regulation 12(8)(c) of Annex II of the Convention, the ship was found to comply with the relevant provisions 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 12(3) APPLIES**

The ship complies with the relevant provisions of the Convention, and this Certificate shall, in accordance with regulation 12(3) of Annex II 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 12(4) APPLIES**

The ship complies with the relevant provisions of the Convention, and this Certificate shall, in accordance with regulation 12(4) of Annex II of the Convention, be accepted as valid until

Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

* 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 12(5) OR 12(6) APPLIES**

This Certificate shall, in accordance with regulation 12(5) or 12(6)* of Annex II 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 12(8) APPLIES**

In accordance with regulation 12(8) of Annex II 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 12(8) of Annex II of the Convention, the new anniversary date is

Signed
(Signature of authorized official)

Place

Date

(Seal or stamp of the authority, as appropriate)

* Delete as appropriate.

**Interpretations
of the
International Convention
for the Prevention of
Pollution from Ships,
1973 as modified by
the Protocol of
1978 relating thereto
and its Annexes**

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MPC1	Periodical surveys of oil content meters	1988
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MPC 31 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 1.2.1	July 2004
MPC 32 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 1.3.2.2	July 2004
MPC 33 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.2.4	Rev.1 Mar 2006
MPC 34 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.2.5	July 2004
MPC 35 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.2.8	Rev.1 Mar 2006
MPC 36 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.2.9	July 2004
MPC 37 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.4	July 2004
MPC 38 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.5	July 2004
MPC 39 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.6	Rev.1 Mar 2006
MPC 40 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.11	July 2004
MPC 41 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.12	July 2004
MPC 42 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.3.13	Rev.1 Mar 2006
MPC 43 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.11	Rev.1 Mar 2006

MPC 44	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.1.5	July 2004
MPC 45	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.1.7	July 2004
MPC 46	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.2	July 2004
MPC 47	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.4.3	July 2004
MPC 48	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 2.4.5	July 2004
MPC 49	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 3.1.1	July 2004
MPC 50	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 3.1.3	July 2004
MPC 51	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 3.2.1	July 2004
MPC 52	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 3.2.3	July 2004
MPC 53	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.1.1, 4.1.2, 4.1.3, 4.1.4	July 2004
MPC 54	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.3.1, 4.4.1	July 2004
MPC 55	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.3.7, 4.3.10.6, 4.4.8	July 2004
MPC 56	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.3.9.1, 4.4.7	July 2004
MPC 57	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 4.3.9.2	July 2004
MPC 58	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.3.10.2, 4.3.10.3	July 2004
MPC 59	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapters 4.4.5.2, 4.4.5.3	July 2004
MPC 60	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.2.2.2	July 2004
MPC 61	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.2.5	July 2004
MPC 62	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.4.2	Rev.1 Mar 2006

MPC 63	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.5.3	July 2004
MPC 64	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.6 Permissible deviations of instruments for engine-related parameters and other essential parameters	July 2004
MPC 65	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.1.2	July 2004
MPC 66	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.2	Rev.1 Mar 2006
MPC 67	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.2.3	July 2004
MPC 68	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.3.1	July 2004
MPC 69	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.3.2	July 2004
MPC 70	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.6.1	July 2004
MPC 71	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.6.2	July 2004
MPC 72	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.7	Rev.1 Mar 2006
MPC 73	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.9.9	July 2004
MPC 74	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.10.1	July 2004
MPC 75	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.11 Deviation evaluation for gaseous emissions	July 2004
MPC 76	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 5.12.4.1	July 2004
MPC 77	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 6.2.1.2	July 2004
MPC 78	Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 6.2.3.4.2	Rev.1 Mar 2006

MPC 79 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines Chapter 6.2.3.5	Rev.1 Mar 2006
MPC 80 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines <i>Appendix 4</i> Calibration of the analytical instruments (Refer to the chapter 5 of the NO _x Technical Code) 1 Introduction	Rev.1 Mar 2006
MPC 81 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines <i>Appendix 4</i> Calibration of the analytical instruments (Refer to the chapter 5 of the NO _x Technical Code) 8.1	July 2004
MPC 82 Regulation 14, Annex VI of MARPOL 73/78	Sept 2005
MPC 83 Regulation 18, Annex VI of MARPOL 73/78	Sept 2005
MPC 84 Regulation 16(9) Annex VI of MARPOL 73/78	Nov 2005
MPC 85 Regulation 22(5), Annex I of MARPOL 73/78 as amended by resolution MEPC.117(52)	Rev.4 Sept 2008
MPC86 Annex IV of MARPOL 73/78 Regulation 10.1 as amended by Resolution MEPC.115(51)	Corr.1 Oct 2007
MPC87 Annex I of MARPOL 73/78 Regulation 12A as amended by Resolution MEPC.141(54)	Jan 2007
MPC88 Annex IV of MARPOL 73/78 Regulation 9.1.1	Feb 2007
MPC 89	
MPC 90 Annex I of MARPOL 73/78 Regulation 1 as amended by Resolution MEPC.117(52)	Sept 2007
MPC 91 Annex IV of MARPOL 73/78	Sept 2007
MPC 92 Tonnage to be used when applying MARPOL Annex VI	Oct 2007
MPC 93 Annex I of MARPOL 73/78 Regulation 23 Accidental oil outflow performance, as amended by Resolution MEPC.117 (52)	July 2008
MPC 94 Annex I of MARPOL 73/78 Regulation 12A.6-8 and 11.8 Oil Fuel Tank Protection, as amended by Resolution MEPC.141(54)	July 2008
MPC 95 Measurement of Distances	Aug 2008
MPC96 Initial Statutory Surveys at New Construction	Apr 2009

MPC1 Periodical surveys of oil content meters

(1988)

(Annex I, Regulation 15(3))

A periodical survey of an oil discharge monitoring and control system would include a functional test as described in Resolution MEPC 13(19) but not a test with oil to verify the continuing accuracy of the oil content meter.



MPC2 Operational manuals for oil discharge monitoring and control systems

(1988)

(Annex I, Regulation 15(3) (c))

For compliance with Regulation 15(3) (a) and (c) of MARPOL 73/78 - Annex I and IMO Resolutions A 496 (XII) and MEPC 13 (19), the Oil Discharge Monitoring and Control System Operational Manual is to contain all the details necessary to operate and maintain the system and should include at least the following information. The information may be grouped as indicated, or in an equivalent manner.

Introduction : Particulars of the ship, together with the date on which the system was/is to be installed and index to remainder of manual.
Text of Regulations 15(3) (a) and 9(1) to be quoted in full.

Section 1 : Manufacturer's equipment manuals for major components of the system. These may include installation, commissioning, operating and fault finding procedures for the oil content monitor.

Section 2 : Operations manual comprising a description of the ship's cargo ballast systems, designated overboard discharges with sampling points, normal operational procedures, automatic inputs, manual inputs (as applicable), starting interlock and discharge valve control (as applicable), override system, audible and visual alarms, outputs recorded and, where required for manual input, flow rate when discharging by gravity and when pumping ballast overboard. It should also include instructions for the discharge of oily water following mal-function of the equipment.
The above information is to be supported by copies of relevant approved diagrams.
Reference may be made to Section 1, where applicable.

Section 3 : Technical manual comprising fault finding schedules, maintenance record and electrical, pneumatic and hydraulic schematic diagrams and descriptions of the complete system.
Reference may be made to Section 1, where applicable.

Section 4 : Test and check-out procedures to include a functional test at installation and guidance notes for the Surveyors carrying out initial and in-service surveys.
Reference may be made to Section 1, where applicable.

Appendix I : Technical installation specification including location and mounting of components, arrangements for maintaining integrity of 'safe' zones, safety requirements for electrical equipment installed in hazardous zones supported by copies of approved drawings, sample piping layout and sample delay calculations, design and arrangements of sampling probes, flushing arrangements and zero setting.
Reference may be made to Section 1, where applicable.

Appendix II : Copy of Type Approval Certificate and Workshop Certificates for major components.



MPC3 Machinery space oil discharge monitoring and control systems

(1988)

(Annex I, Regulation 16(5))

As neither Regulation 16(5) nor Resolution A444(XI) specifically require it, a Classification Society cannot insist on automatic recording of date and time in an oil discharge monitoring and control system provided for 100 ppm oily water separating equipment.



MPC4 Discharge of segregated ballast

(1988)

(Annex I, Regulation 18(6))

For new construction ships, an overboard discharge outlet for segregated ballast should be provided above the deepest ballast waterline in order to facilitate compliance with Regulation 18(6).

For other ships (without this facility), the Regulation requires that the surface of the ballast water be examined immediately before discharge, to ensure that no contamination with oil has taken place. Further guidance from the Committee on how this should be done would be appreciated, particularly in the case of double bottom tanks. One solution could be the provision of a sampling line to the oil content meter or an arrangement similar to a part flow system.



MPC5 Minimum vertical depth of each double bottom tank or space

(1990)

(Annex I, Regulation 13E (4) (b))

For the purpose of determining the minimum vertical depth of each double bottom tank or space to be taken into account when calculating the protecting area PAg, suction wells may be neglected, provided such wells are not excessive in area and extend below the cargo tank for a minimum distance and in no case more than half the height of the double bottom tank or space.



MPC6 Calculation of the aggregate capacity of SBT

(1997)

(Regulation 13F (3) (d) 4.12)

In calculating the aggregate capacity under regulation 13F (3) (d), the following should be taken into account:

- .1 the capacity of engine-room ballast tanks should be excluded from the aggregate capacity of ballast tanks;
- .2 the capacity of ballast tank located inboard of double hull should be excluded from the aggregate capacity of ballast tanks (see figure 1).

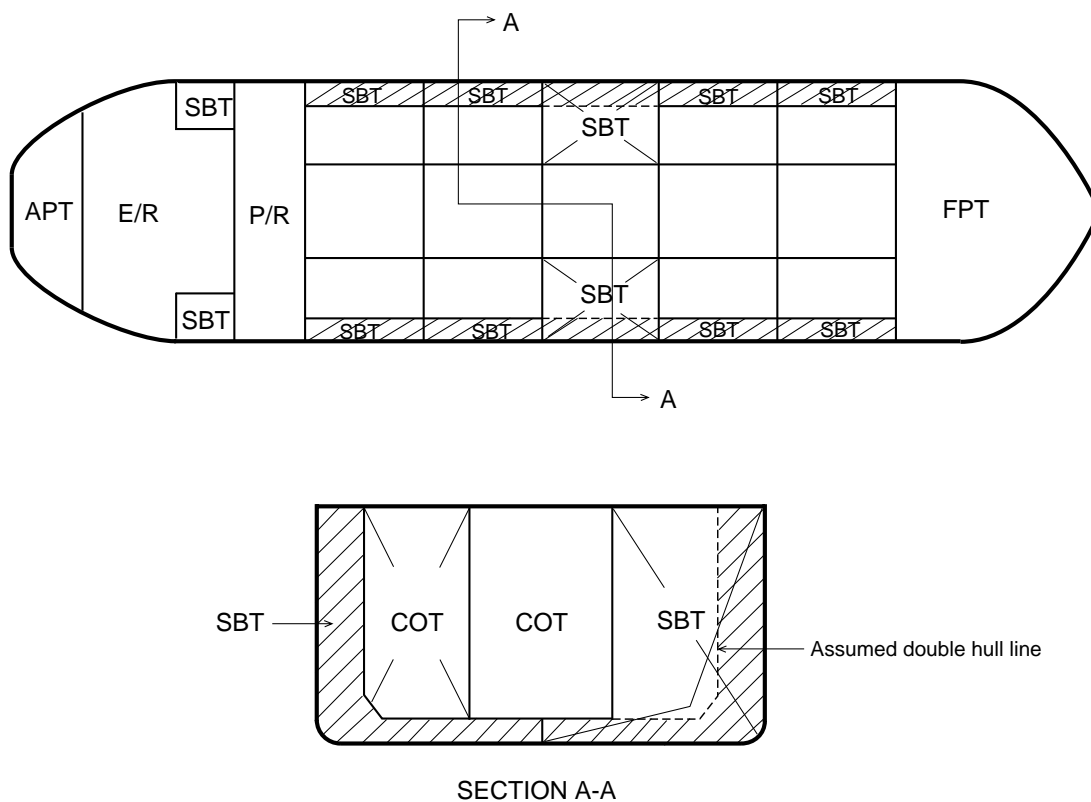


Fig. 1

Note: This IACS Unified Interpretation was submitted to IMO and is contained in MEPC/Circ. 316 of 25th July 1996.



MPC6
(1997)

.3 spaces such as void spaces located in the double hull within the cargo tank length should be included in the aggregate capacity of ballast tanks (see figure 2).

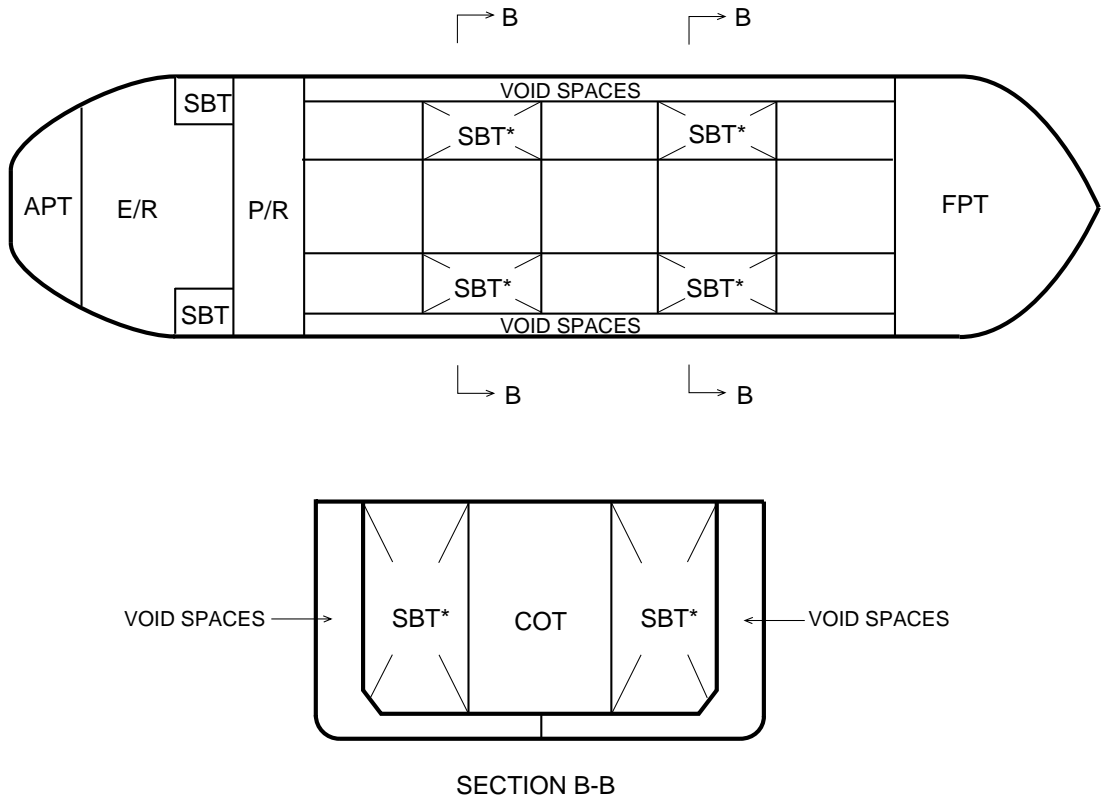


Fig. 2



MPC7 Hydrostatic Balance Loading

(May 1998)
(Corr.1
Feb. 1999)

(Annex 1, Regulation 13 G(7)- Guidelines for approval of alternative structural or operational method, IMO Resolution MEPC 64(36))

Damage and outflow criteria (as per 4 of the IMO Guidelines)

- .1 The original configuration is the configuration of the vessel, as covered by the IOPP certificate and the current G.A. plan prior to the application of MARPOL Regulation 13G(7).

In the case of a product/crude oil carrier which operates alternatively with CBT when trading as product tanker or with COW when trading as a crude-oil tanker, the assessment in accordance with MEPC.64(36) should be done for each mode separately.

Calculation of base EOS number as per 4.1 of the IMO Guidelines (EOS1)

- .2 When calculating first EOS number (EOS1) as defined in 4.1 of the Guidelines, the ship is assumed to be loaded at Summer Water Line with zero trim, without consumable or ballast.
- .3 For the purpose of calculating EOS1, the volume of the cargo being carried by the ship is 98% of the volume of cargo and fuel oil tanks within L_t as per the original configuration of the ship. Refer to the Annex.
- .4 Nominal density of the cargo, ρ_c
The nominal density of the cargo to be used in the calculation of EOS1, EOS2 and EOS3 is given by the following formula :

$$\rho_c = \frac{\Delta (\text{summer}) - LSW}{V_{98\% \text{ (original cargo and fuel oil tanks configuration within } L_t \text{)}}}$$

where

$\Delta(\text{summer})$: Displacement of the ship corresponding to the maximum assigned summer load line with zero trim.

LSW : Light ship weight.

$V_{98\% \text{ (original cargo and fuel oil tanks configuration within } L_t \text{)}}$: 98% of the cargo and fuel oil tanks volume within L_t , in ship's original configuration.

Footnote: Written applications for evaluation of tanker arrangements under MEPC.64(36) received on or after 8 MAY 1998 will be evaluated in accordance with this unified interpretation unless advised otherwise by the flag Administration.



MPC7

(cont'd)

Calculation of second EOS number for the ship arranged with non-cargo side tanks as referred to in regulation 13 G(4) as per 4.2 of the IMO Guidelines (EOS2)

- .5 For the purpose of calculations, in the second EOS number (EOS2), the tanker is assumed to have side protection only as referred to in paragraph 4.2 of MEPC.64(36).
- .6 For the purpose of calculating EOS2, hypothetical side protection may be considered provided that the assumed positions of the longitudinal and transverse bulkheads provide at least the minimum side protection required by Reg.13G(4) and are placed in the locations which lead to the lowest EOS2.
For volumes and measurement of parameters, please refer to figure 1 below.

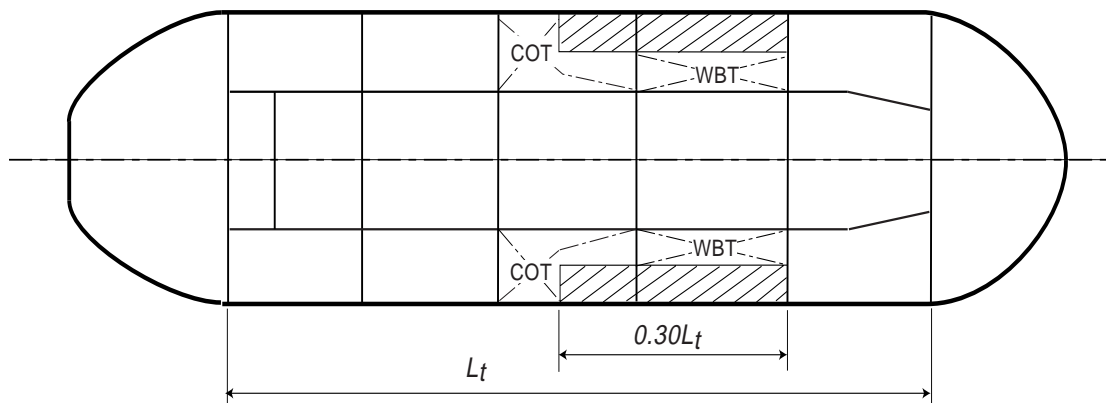


FIGURE. 1

The remaining volumes of the tanks covered by hypothetical side protection are assumed to carry the same type of contents as before (i.e. water ballast tanks remain water ballast tanks and cargo oil tanks remain cargo oil tanks in remaining part).

The size of the remaining part of cargo oil and/or fuel oil tanks are as follows :

l_i : not modified.

b_i : reduced if hypothetical side protection is provided throughout the entire l_i .
not modified if hypothetical side protection is provided for partial l_i .

V_i : volume of cargo in the remaining cargo oil and/or fuel oil tanks.

- .7 Draft and trim requirements of MARPOL, Annex I need not be taken into account for the purpose of calculating EOS2.

Refer to the Annex.



MPC7 (cont'd)

- .8 When calculating EOS2, the ship is assumed evenkeel at the draft of the loaded condition corresponding to the ship so arranged to comply with Reg.13G(4) without any consumable nor ballast.
Refer to paragraph .6 and to the Annex.

Calculation of third EOS number for hydrostatic balance method as per 4.3 of the IMO Guidelines (EOS3).

- .9 For the purpose of calculating EOS3, the draft is that corresponding to the Hydrostatic Balance Loading (HBL) configuration. Ballast may be used to achieve an increased draft only in determining EOS3.

Filling levels in the tanks identified for HBL should be equal to the maximum level determined by the formula shown in the Appendix to the Guidelines using uniform nominal oil density and corresponding draft.

Refer to the Annex.

Calculation of outflow in case of side damage as per 5.2 of the IMO Guidelines.

- .10 Distance from the hull boundary to the tank plating, s_i :

s_i is the minimum distance from the hull plating to the tank boundary measured at right angle to the centerline and at the level corresponding to the maximum assigned summer load line.

- .11 Cargo volume in tank number i , V_i :

The maximum volume of V_i is 98% of the volume of the tank.

Calculation of outflow in case of bottom damage as per 5.3 of the IMO Guidelines.

- .12 Width of tank i , b_i :

- for tanks adjacent to the side shell, b_i is the width of the tank, measured inboard at $l_i/2$, at right angle to the centre line and at the level of the maximum assigned summer load line
- for a centre tank, b_i is the width of the tank bottom measured at $l_i/2$.

- .13 Width of the cargo tank area, B_t :

B_t is the maximum breadth as defined by Annex 1, Regulation .1(21) measured within L_t .

- .14 Height of double bottom, h_i :

h_i is the minimum height of the double bottom measured from the base line.

Refer to figures 2 and 3.



MPC7 .15 Height of the cargo column above the cargo tank bottom, h_c :

(cont'd)

h_c is the height of the cargo column measured from the cargo tank bottom at the point where h_i is measured. Refer to figure 2.

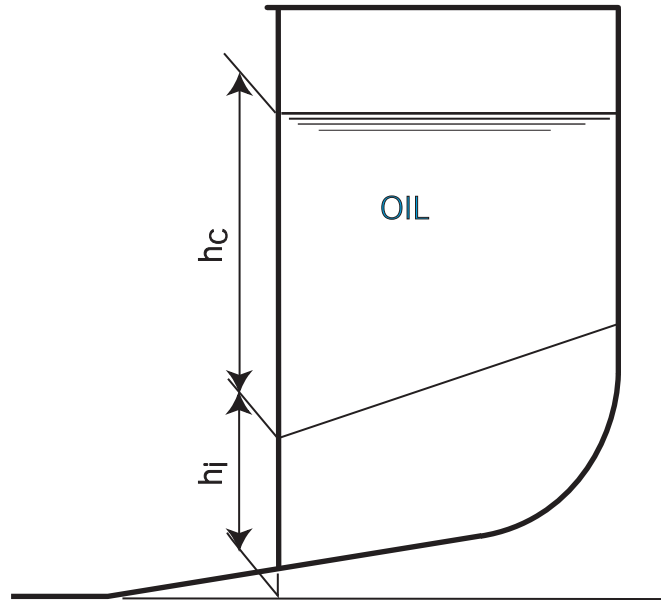


FIGURE 2

Where a double bottom does not exist, then h_c is to be taken at its maximum value considering any deadrise of the ship. Refer to figure 3.

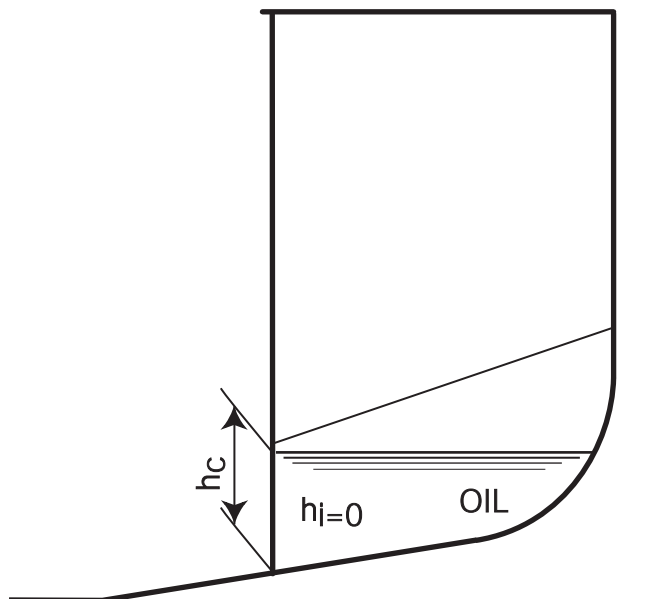


FIGURE 3



MPC7 Calculation of total hypothetical outflow as per 5 of the IMO Guidelines.

(cont'd)

- .16 When investigating outflow due to side damage, the side offering the more unfavourable EOS number should only be used.

Requirements for application of hydrostatic balance loading in cargo tanks as per the Appendix to the IMO Guidelines.

- .17 The number of tanks to be HBL is determined by the conditions underlined by EOS 3 not being greater than EOS 2 for the ship arranged with non-cargo side tanks and furthermore not being greater than 85% of the EOS 1. Once it has been established that these conditions have been met, with zero trim, adjusted V_i , nominal density and maximum cargo level as per the Appendix formula, the configuration is considered having been validated and there is no need to recalculate EOS3 for the actual loading conditions corresponding to that configuration.

Filling levels in HBL tanks for the actual loading conditions are determined by the HBL formula of the Appendix to the Guidelines using actual density and draft at each HBL tank location.

- .18 Partial filling less than HBL height may alternatively be considered. In such conditions, the cargo height in the selected cargo tanks is to be determined based on EOS 3 compliance with the criteria, with zero trim, nominal density, and draft corresponding to adjusted V_i .

Where cargo levels less than maximum cargo level calculated by the HBL formula of the Appendix to the Guidelines are used for EOS3 calculation, the actual filling levels will be calculated as follows :

$$(h_c \times K) \times \rho_c \times g + 100\Delta P \leq (d - h_i) \times \rho_s \times g$$

where K is a correction factor $h_{(HBL)} / h_{(PF)}$

with :

$h_{(PF)}$: maximum cargo height in partial filling condition, leading to a satisfactory EOS3 for the selected configuration (with nominal density, assumed zero trim, corresponding draft $d_{(PF)}$, adjusted V_i).

$H_{(HBL)}$: maximum HBL cargo height for the selected configuration at draft $d_{(PF)}$.

Thus :

$$K = ((d_{(PF)} - h_i) \times \rho_s \times g - 100 \Delta P) / (\rho_n \times g \times h_{(PF)})$$



MPC7

(cont'd)

ANNEX

MATRIX OF PARAMETERS

EOS (see nota 1)	Assumed trim	Draft	Density	Loaded oil volume	Consumables and ballast
EOS 1	0	Maximum assigned summer water line	Nominal	V ₁	none
EOS 2	0	Corresponding draft	Nominal	V ₂	none
EOS 3	0	Corresponding draft	Nominal	V ₃	See note 2

Where :

V₁: 98% of cargo and fuel oil tanks volumes within L_t in the original configuration.

V₂: V₁ minus 98% volume of side protection tanks corresponding to 13 G(4), in way of cargo tanks.

V₃: Oil volume of full cargo and fuel oil tanks within L_t (at 98 %) and of HBL and/or partially loaded tanks.

Note 1:

$$EOS = \frac{O_{tot}}{V_1}$$

Note 2: Ballast may be used to achieve an increased draft only in determining EOS3.



MPC8 Interpretation of “installed on board”

(Oct.1999)

(MARPOL 73/78, Annex VI/16(2)(a))

Deleted in Oct 2005

MPC9 Interpretation of Width of Wing Tanks and
(June 2002) Height of Double Bottom Tanks at Turn of the
Bilge Area

(MARPOL 73/78, Annex I/13 F (3)(c))

The requirements of Reg. 13F(3)(c) at turn of the bilge areas are applicable throughout the entire tank length.

Note: 1. This UI MPC 9 is to be uniformly implemented by IACS Members and Associates from 1 January 2003.



SC183
(Nov 2003)
(Rev.1, Nov.
2005)

Endorsement of Certificates with the Date of Completion of the Survey on which they are Based

LL67
(Nov 2003)
(Rev.1, Nov.
2005)

MPC10
(Nov 2003)
(Rev.1, Nov.
2005)

“Resolutions MSC.170(79), MSC.171(79), MSC.172(79), MSC.174(79) through MSC.179(79) and MSC.181(79) through MSC.187(79) require that the identified certificates include the statement:

“Completion date of the survey on which this certificate is based:
dd/mm/yyyy”.

Interpretation

For application of the above resolutions, the following IACS Unified Interpretation applies:

The “Completion date of the survey on which this certificate is based”, is the date of the last **initial/renewal** survey visit on which all statutory and class items, required to be surveyed, have been surveyed (regardless if they were found satisfactory or with minor deficiency).

Note:

1. This UI is to be uniformly implemented by IACS Members and Associates from 1 March 2004.
2. Revision 1 of this UI is to be uniformly implemented by IACS Members and Associates from 1 July 2006.



MPC 11

(May 2004)

Interpretation to MARPOL I/25A

Regulation 25A:

“Intact stability

- (1) This regulation shall apply to oil tankers of 5,000 tons deadweight and above
- (a) for which the building contract is placed on or after 1 February 1999, or
 - (b) in the absence of a building contract, the keels of which are laid or which are at a similar stage of construction on or after 1 August 1999, or
 - (c) the delivery of which is on or after 1 February 2002, or
 - (d) which have undergone a major conversion
 - (i) for which the contract is placed after 1 February 1999, or
 - (ii) in the absence of a contract, the construction work of which is begun after 1 August 1999, or
 - (iii) which is completed after 1 February 2002.

(2) Every oil tanker shall comply with the intact stability criteria specified in subparagraphs (a) and (b) of this paragraph, as appropriate, for any operating draught under the worst possible conditions of cargo and ballast loading, consistent with good operational practice, including intermediate stages of liquid transfer operations. Under all conditions the ballast tanks shall be assumed slack.

- (a) In port, the initial metacentric height GMO_0 , corrected for free surface measured at 0_j heel, shall be not less than 0.15m,
- (b) At sea, the following criteria shall be applicable
 - (i) the area under the righting lever curve (GZ curve) shall be not less than 0.055 m.rad up to $\vartheta = 30^\circ$ angle of heel and not less than 0.09 m.rad up to $\vartheta = 40^\circ$ or other angle of flooding ϑ_f^* if this angle is less than 40° . Additionally, the area under the righting lever curve (GZ curve) between the angles of heel of 30° and 40° or between 30° and ϑ_f , if this angle is less than 40° , shall be not less than 0.03 m.rad;

* ϑ_f is the angle of heel at which openings in the hull, superstructures or deck-houses, which cannot be closed weathertight, immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open.

Note:

1. This UI is to be uniformly implemented by IACS Members and Associates from 1 April 2005.
2. The damage stability requirements in MARPOL I/13F and I/25 shall not apply for the purpose of demonstrating compliance with MARPOL Reg. I/25A. ►

MPC 11

(cont d)

- (ii) the righting lever GZ shall be at least 0.20 m at an angle of heel equal to or greater than 30°;
 - (iii) the maximum righting arm shall occur at an angle of heel preferably exceeding 30° but not less than 25°; and
 - (iv) the initial metacentric height GMo, corrected for free surface measured at 0° heel, shall be not less than 0.15m.
- (3) The requirements of paragraph (2) shall be met through design measures. For combination carriers simple supplementary operational procedures may be allowed.
- (4) Simple supplementary operational procedures for liquid transfer operations referred to in paragraph (3) shall mean written procedures made available to the master which:
- (a) are approved by the Administration;
 - (b) indicate those cargo and ballast tanks which may, under any specific condition of liquid transfer and possible range of cargo densities, be slack and still allow the stability criteria to be met. The slack tanks may vary during the liquid transfer operations and be of any combination provided they satisfy the criteria;
 - (c) will be readily understandable to the officer-in-charge of liquid transfer operations;
 - (d) provide for planned sequences of cargo/ballast transfer operations;
 - (e) allow comparisons of attained and required stability using stability performance criteria in graphical or tabular form;
 - (f) require no extensive mathematical calculations by the officer-in-charge;
 - (g) provide for corrective actions to be taken by the officer-in-charge in case of departure from recommended values and in case of emergency situations; and
 - (h) are prominently displayed in the approved trim and stability booklet and at the cargo/ballast transfer control station and in any computer software by which stability calculations are performed.”

Interpretation:

For proving compliance with Reg.1/25A, as an alternative to the loading case described in MARPOL Unified Interpretation 11A it is accepted to carry out an extensive analysis covering all possible combinations of cargo and ballast tank loading. For such extensive analysis conditions it is considered that:

- (a) Weight, centre of gravity co-ordinates and free surface moment for all tanks should be according to the actual content considered in the calculations.



**MPC
11**
cont

- (b) The extensive calculations should be carried out in accordance with the following:
1. The draughts are to be varied between light ballast and scantling draft.
 2. Consumables including but not restricted to fuel oil, diesel oil and fresh water corresponding to 97%, 50% and 10% content should be considered.
 3. For each draught and variation of consumables, the available deadweight is to comprise ballast water and cargo, such that combinations between maximum ballast and minimum cargo and vice-versa, are covered. In all cases the number of ballast and cargo tanks loaded should be chosen to reflect the worst combination of VCG and free surface effects. Operational limits on the number of tanks considered to be simultaneously slack and exclusion of specific tanks are not permitted. All ballast tanks are to have at least 1% content.
 4. Cargo densities between the lowest and highest intended to be carried should be considered.
 5. Sufficient steps between all limits should be examined to ensure that the worst conditions are identified. A minimum of 20 steps for the range of cargo and ballast content, between 1% and 99% of total capacity, should be examined. More closely spaced steps near critical parts of the range may be necessary.

At every stage the criteria described in MARPOL Reg. I/25A paragraph 2 are to be met.



MPC 12 Annex VI of MARPOL 73/78

Regulation 1

(July 2004) *Application*
(Rev.1
Mar 2006)

Regulation 1 reads as follows:

The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 18 and 19 of this Annex.

Interpretation:

For application of this regulation the term “all ships” shall be interpreted as applicable to all ships (as defined by MARPOL 73 Article 2 (4)).
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC Annex VI of MARPOL 73/78

13

Regulation 2 (4)

(July 2004)
(Rev.1
Mar 2006)

Ozone depleting substances

Regulation 2 (4) reads as follows:

New installations, in relation to Regulation 12 of this Annex, means the installation of systems, equipment, including new portable fire extinguishing units, insulation, or other material on a ship after the date on which this Annex enters into force, but excludes repair or recharge of previously installed systems, equipment, insulation, or other material, or recharge of portable fire extinguishing units.

Interpretation:

For application of this regulation the term “new installations” shall be interpreted as follows:

- (a) For new ships, installations on board ships the keels of which are laid or which are at a similar stage of construction on or after 19 May 2005.
- (b) For existing ships, new installations with a contractual delivery date to the ship on or after the entry into force date or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 19 May 2005.

The same interpretation shall apply with regard to new HCFC installations but with the substitution of ‘1 January 2020’ in place of the ‘19 May 2005’.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC Annex VI of MARPOL 73/78

14

Regulation 1 / Regulation 5

Application / Surveys and Inspections

(July 2004)

Regulation 1 reads as follows:

The provisions of this Annex shall apply to all ships, except where expressly provided otherwise in regulations 3, 5, 6, 13, 15, 18 and 19 of this Annex.

Regulation 5 (2) reads as follows:

In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of this Annex are complied with.

Interpretation:

It shall be interpreted that all marine diesel engines over 130 kW except those exempted by Regulation 13 and Regulation 19 are to comply with the Regulation 13 limit regardless of the gross tonnage of the ship onto which the engine is installed. In this context such engines must have an approved Technical File and must be issued with an EIAPP certificate in accordance with the NO_x Technical Code in all cases.

However the application of the ship surveys as given in Regulation 5 to ships under 400 GT would be at the discretion of the relevant Administration.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 15 Annex VI of MARPOL 73/78

Regulation 9 (4) (b)

(July 2004) Regulation 9

Duration and validity of Certificate

Regulation 9 (4) (b) reads as follows:

An International Air Pollution Prevention Certificate shall cease to be valid if significant alterations have taken place to the equipment, systems, fittings, arrangements or material to which this Annex applies without the express approval of the Administration, except the direct replacement of such equipment or fittings with equipment or fittings that conform with the requirements of this Annex. For the purpose of Regulation 13, significant alteration shall include any change or adjustment to the system, fittings, or arrangement of a diesel engine which results in the nitrogen oxide limits applied to that engine no longer being complied with.

Interpretation:

For application of this regulation the term “significant alteration” shall be interpreted as relating to a change that is outside the scope of the approved Technical File. Any such changes are to be approved as part of the existing Engine Group / Engine Family or, if that is not possible, a new Engine Group / Engine Family shall be established.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 16 Annex VI of MARPOL 73/78

Regulation 13 (1) (a) (i)

(July 2004)

Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (1) (a) (i) reads as follows:

This regulation shall apply to each diesel engine with a power output of more than 130kW which is installed on a ship constructed on or after 1 January 2000.

Interpretation:

For application of this regulation it shall be interpreted that the term “installed” relates to an engine that is permanently secured or connected to the ship’s structure, fuel / coolant / exhaust systems or power systems.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC Annex VI of MARPOL 73/78

17 Regulation 13 (1) (a) (ii)

(July 2004)

Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (1) (a) (ii) reads as follows:

This regulation shall apply to each diesel engine with a power output of more than 130kW which undergoes a major conversion on or after 1 January 2000.

Interpretation:

For application of this regulation the date of commencement of the “major conversion” shall be that detailed in the contract for conversion or, in the absence of a contractual commencement date, the actual date the engine was made unavailable for normal operational service according to the ship’s log.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 18 Annex VI of MARPOL 73/78

Regulation 13 (1) (b) (i)

(July 2004)
(Rev.1
Mar 2006)

Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (1) (b) (i) reads as follows:

This regulation does not apply to emergency diesel engines, engines installed in lifeboats and any device or equipment intended to be used solely in case of emergency.

Interpretation:

Regulation 13 does not apply to an engine which is used solely in response to emergencies on the ship on which the engine is installed.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 19 Annex VI of MARPOL 73/78

Regulation 13 (1) (c)

(July 2004) Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (1) (c) reads as follows:

Notwithstanding the provisions of sub-paragraph (a) of this paragraph, the Administration may allow exclusion from the application of this regulation to any diesel engine which is installed on a ship constructed, or on a ship which undergoes a major conversion, before the entry into force of the present Protocol, provided that the ship is solely engaged in voyages to ports or offshore terminals within the State of the flag of which the ship is entitled to fly.

Interpretation:

For application of this regulation the term “on a ship which undergoes a major conversion,” shall be interpreted as an error inserting the concept of ‘ship’ in place of ‘engine’, ship conversion is not given elsewhere within the Annex. In order to be consistent with regulation 13 (1) (a) (i) & (ii) this shall be read as “or engine which undergoes a major conversion”.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 20 Annex VI of MARPOL 73/78

Regulation 13 (2) (a) (i)

(July 2004)

Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (2) (a) (i) reads as follows:

For the purpose of this regulation, *major conversion* means a modification of an engine where the engine is replaced by a new engine built on or after 1 January 2000.

Interpretation:

This section shall be interpreted as follows:

- (a) For application of this regulation the term “replaced” shall be interpreted as being applicable to an engine installed either as a direct replacement for an existing engine or one installed as an addition to the original engine complement as at 1 January 2000 to meet revised ship requirements; and,
- (b) For application of this regulation the term “new” shall be interpreted as applying to engines that left the manufacturer’s works for the first time on or after 1 January 2000.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 21 Annex VI of MARPOL 73/78

Regulation 13 (2) (a) (iii)

(July 2004)
(Rev.1
Mar 2006)

Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (2) (a) (iii) reads as follows:

For the purpose of this regulation, *major conversion* means a modification of an engine where the maximum continuous rating of the engine is increased by more than 10%.

Interpretation:

For application of this regulation in the case of ships built before 1 January 2000 the term “by more than 10%” shall be interpreted as applicable to the pre 1 January 2000 maximum continuous rating.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 22 Annex VI of MARPOL 73/78

Regulation 13 (3) (a)

(July 2004) Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (3) (a) reads as follows:

Subject to the provision of regulation 3 of this Annex, the operation of each diesel engine to which this regulation applies is prohibited, except when the emission of nitrogen oxides (calculated as the total weighted emission of NO₂) from the engine is within the following limits:

- (i) 17.0 g/kWh when n is less than 130 rpm
- (ii) $45.0 \times n^{-0.2}$ g/kWh when n is 130 or more but less than 2000 rpm
- (iii) 9.8 g/kWh when n is 2000 rpm or more

where n = rated engine speed (crankshaft revolutions per minute).

When using fuel composed of blends from hydrocarbons derived from petroleum refining, test procedure and measurement methods shall be in accordance with the NO_x Technical Code, taking into consideration the test cycles and weighting factors outlined in appendix II to this Annex.

Interpretation:

For application of this regulation it shall be interpreted that the limit and determined NO_x values, in g/kWh for the appropriate application cycle, are to be given and compared to a precision of one decimal place.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 23 Annex VI of MARPOL 73/78

Regulation 13 (3) (b)

(July 2004) Regulation 13 Nitrogen oxides (NO_x)

Regulation 13 (3) (b) reads as follows:

Notwithstanding the provisions of sub-paragraph (a) of this paragraph, the operation of a diesel engine is permitted when:

- (i) an exhaust gas cleaning system, approved by the Administration in accordance with the NO_x Technical Code, is applied to the engine to reduce onboard NO_x emissions at least to the limits specified in sub-paragraph (a), or
- (ii) any other equivalent method, approved by the Administration taking into account relevant guidelines to be developed by the Organization, is applied to reduce onboard NO_x emissions at least to the limit specified in sub-paragraph (a) of this paragraph.

Interpretation:

For application of this sub part (i) of this regulation it shall be interpreted that approval in accordance with the NO_x Technical Code be on the basis of the complete assembly of engine and NO_x reduction device. Consequently item 1.15 of the Supplement to EIAPP Certificate shall give the actual NO_x emission value (g/kWh) for the engine with the NO_x reduction device in operation.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 24 Annex VI of MARPOL 73/78

Regulation 14 (6)

(July 2004)

Regulation 14 Sulphur oxides (SO_x)

Regulation 14 (6) reads as follows:

Those ships using separate fuel oils to comply with paragraph (4) (a) of this regulation shall allow sufficient time for the fuel oil service system to be fully flushed of all fuels exceeding 1.5% m/m sulphur content prior to entry into a SO_x emission control area. The volume of the low sulphur fuel oils (less than or equal to 1.5% sulphur content) in each tank as well as the date, time, and position of the ship when any fuel-changeover operation is completed, shall be recorded in such log-book as prescribed by the Administration.

Interpretation:

For application of this regulation the term “prior to entry into a SO_x emission control area” shall, in accordance with the term “when any fuel-changeover operation is completed”, be interpreted as a requirement to record the defined details in the log book also on exit from the SO_x emission control area, prior to commencing change over.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC Annex VI of MARPOL 73/78 25

(July 2004) **Regulation 16 (2) (a)**

Regulation 16 Shipboard incineration

Regulation 16 (2) (a) reads as follows:

Except as provided in sub-paragraph (b) of this paragraph, each incinerator installed on board a ship on or after 1 January 2000 shall meet the requirements contained in appendix IV to this Annex. Each incinerator shall be approved by the Administration taking into account the standard specifications for shipboard incinerators developed by the Organisation*.

*Refer to resolution MEPC 76(40), Standard specification for shipboard incinerators.

Interpretation:

For application of this regulation the term “installed on board a ship on or after 1 January 2000” shall be interpreted as follows:

- (a) For new ships, installations on board ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2000.
- (b) For existing ships, new installations with a contractual delivery date to the ship on or after 1 January 2000 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 1 January 2000.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 26 Annex VI of MARPOL 73/78

(July 2004) **Regulation 16 (6)**

Regulation 16 Shipboard incineration

Regulation 16 (6) reads as follows:

Shipboard incineration of polyvinyl chlorides (PVCs) shall be prohibited, except in shipboard incinerators for which IMO Type Approval Certificates have been issued.

Interpretation:

For application of this regulation it shall be interpreted as applicable to incinerators meeting either MEPC 59(33) or MEPC 76(40) specifications.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 27 Annex VI of MARPOL 73/78

(July 2004) **Regulation 16 (7)**

Regulation 16 Shipboard incineration

Regulation 16 (7) reads as follows:

All ships with incinerators subject to this regulation shall possess a manufacturer's operating manual which shall specify how to operate the incinerator within the limits described in paragraph 2 of appendix IV to this Annex.

Interpretation:

For application of this regulation it shall be interpreted that possession of an operating manual is applicable only to MEPC 76(40) incinerators installed on or after 1 January 2000.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 28 Annex VI of MARPOL 73/78

Deleted in Dec. 2005

(July 2004)

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 29 Annex VI of MARPOL 73/78

Regulation 18 (3)

(July 2004) Regulation 18 Fuel oil quality

Regulation 18 (3) reads as follows:

For each ship subject to regulations 5 and 6 of this Annex, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Annex.

Interpretation:

For application of this regulation it shall be interpreted as applicable to all ships of 400 gross tonnage or above and, at the Administration's discretion, for ships of less than 400 gross tonnage.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 30 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)

Table 3 – Symbols and subscripts for terms and variables used in the formulae for the test-bed measurement methods

Table 3 gives:

Symbol	Term	Dimension
p_a	Saturation vapour pressure of the engine intake air (in ISO 3046-1, 1995: $p_{sy} = PSY$, test ambient vapour pressure)	kPa
p_B	Total barometric pressure (in ISO 3046-1, 1995: $p_x = PX$, site ambient total pressure; $p_y = PY$, test ambient total pressure)	kPa
p_s	Dry atmospheric pressure	kPa
R_a	Relative humidity of the intake air	%
T_a	Absolute temperature of the intake air	K

Interpretation:

For application of the term “ p_s ” it shall be interpreted that the dry atmospheric pressure is determined in accordance with the following formula:

$$p_s = p_B - \frac{R_a \cdot p_a}{100}$$

It shall also be interpreted that the p_a term be determined using a temperature value for the intake air measured at the same physical location as the measurements for p_B and R_a .

Interpretation:

For application of the term “ T_a ” it shall be interpreted that the temperature of the intake air temperature is that determined at the engine / turbocharger intake suction filter.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC Resolution 2 of the 1997 MARPOL Conference

31 Technical Code on Control of Emission of

(July 2004) **Nitrogen Oxides from Marine Diesel Engines**

Chapter 1.2.1

Chapter 1.2 Application

Chapter 1.2.1 reads as follows:

This Code applies to all diesel engines with a power output of more than 130 kW which are installed, or are designed and intended for installation, on board any ship subject to Annex VI, with the exception of those engines described in paragraph 1(b) of regulation 13. Regarding the requirements for survey and certification under regulation 5 of Annex VI, this Code addresses only those requirements applicable to an engine's compliance with the NO_x emission limits.

Interpretation:

For application of this section the term "installed" shall be interpreted as per IACS UI MPC Nos. 14, 16, 17 & 18.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 32 Resolution 2 of the 1997 MARPOL Conference

Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)

Chapter 1.3.2.2

Chapter 1.3 Definitions

Chapter 1.3.2.2 reads as follows:

For engines installed on ships constructed before 1 January 2000, *substantial modification* means any modification made to an engine which increases its existing emission characteristics established by the simplified measurement method as described in 6.3 in excess of the allowances set out in 6.3.11. These changes include, but are not limited to, changes in its operations or in its technical parameters (e.g., changing camshafts, fuel injection systems, air systems, combustion chamber configuration, or timing calibration of the engine).

Interpretation:

For application of this section it shall be interpreted that an increase in “emission characteristics” relates to an increase in the application average cycle weighted NO_x emission value.

Furthermore it shall also be interpreted that any modification made on or after 1 January 2000 to such an engine involving alternative duty cycle, rating, components or settings that were available, but not necessarily utilised, prior to 1 January 2000 shall not be considered as representing a “substantial modification” to that engine.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 33 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)
(Rev.1
Mar 2006)

Chapter 2.2.4

Chapter 2.2 Procedures for pre-certification of an Engine Group

Chapter 2.2.4 reads as follows:

There are engines which, due to their size, construction and delivery schedule, cannot be pre-certified on a test-bed. In such cases, the engine manufacturer, shipowner or ship builder shall make application to the Administration requesting an on-board test (see 2.1.2.2). The applicant must demonstrate to the Administration that the on-board test fully meets all of the requirements of a test-bed procedure as specified in chapter 5 of this Code. Such a survey may be accepted for one engine or for an engine group represented by the parent engine only, but it shall not be accepted for an engine family certification. In no case shall an allowance be granted for possible deviations of measurements if an initial survey is carried on board a ship without any valid pre-certification test.

Interpretation:

For engines undergoing an on-board certification test, to be issued with an EIAPP Certificate, the same procedure apply as if the engine had been pre-certified on a test-bed:

- (a) the survey on-board meets the pre-certification survey requirements; and
- (b) the on-board test fully meets all of the requirements of a test-bed procedure as specified in chapter 5 of the NO_x Technical Code; and
- (c) the application average weighted NO_x emission value meets the requirements of Regulation 13 of Annex VI; and
- (d) the engine has an approved Technical File.

(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 34 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.2.5

Chapter 2.2 Procedures for pre-certification of an Engine Group

Chapter 2.2.5 reads as follows:

If the pre-certification test results show that an engine fails to meet the NO_x emission limits as required by regulation 13 of Annex VI, a NO_x-reducing device may be installed. This device, when installed on the engine, must be recognised as an essential component of the engine and its presence will be recorded in the engine's technical file. To receive an EIAPP Certificate for this assembly, the engine, including the reducing device, as installed, must be re-tested to show compliance with the NO_x emission limits. However, in this case, the assembly may be retested in accordance with the simplified measurement method addressed in 6.3. The NO_x-reducing device shall be included on the EIAPP Certificate together with all other records requested by the Administration. The engine's technical file shall also contain on-board NO_x verification procedures for the device to ensure it is operating correctly.

Interpretation:

This section shall be interpreted as follows:

- (a) An engine does not need to be shown, at the pre-certification survey, to fail to meet the Regulation 13 NO_x emission limit requirements before a NO_x reducing device is installed. Where it is intended from the outset that a NO_x reducing device is to be fitted in accordance with Regulation 13(3)(b)(i) then the whole assembly shall be tested in accordance with the requirements of the test bed procedure as specified in Chapter 5.

In those cases where it is proposed that the engine with a NO_x-reducing device is to be tested onboard to demonstrate compliance, as a 'Parent Engine + device' the requirements of 2.2.4 shall apply.

- (b) Where the pre-certification test of an engine, undertaken in accordance with Chapter 5, shows that a NO_x reducing device would need to be fitted in order to meet the Regulation 13 NO_x emission limit requirements, and the whole assembly is subsequently retested in accordance with the simplified measurement method, the test reports from both the engine pre-certification test and the subsequent simplified measurement method test shall be included in the Technical File.

Where the simplified measurement method is used to verify that the whole assembly meets the Regulation 13 NO_x emission limit requirements the allowances as given under 6.3.11 shall not be granted.

- (c) In cases (a) and (b) the approval is on the basis of the complete assembly of engine and NO_x reduction device. Consequently Item 1.15 of the Supplement to EIAPP Certificate shall give the actual NO_x emission value (g/kWh) for the engine with the NO_x reduction device in operation.
- (d) The efficiency of the NO_x-reducing device (as demonstrated) shall be considered as unique to the Engine Group as tested and therefore non-transferable. Hence should the same NO_x - reducing device be used for another Engine Group the whole assemblage (engine + NO_x reducing device) shall be tested. An after-treatment device shall not be certified independent of the engine to which it is to be coupled.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 35 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)
(Rev.1
Mar 2006)

Chapter 2.2.8

Chapter 2.2 Procedures for pre-certification of an Engine Group

Chapter 2.2.8 reads as follows:

A flow chart providing guidance for compliance with the requirements of a pre-certification survey for marine diesel engines intended for installation on board of ships is provided in figure 1 of appendix 2 of this Code.

Interpretation:

The text in chapter 2 gives the certification procedures which shall be followed. Where discrepancies exist with figure 1, the text of chapter 2 takes precedence.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC Resolution 2 of the 1997 MARPOL Conference 36 Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.2.9

Chapter 2.2 Procedures for pre-certification of an Engine Group

Chapter 2.2.9 reads as follows:

A model form of an EIAPP Certificate is attached as appendix 1 to this Code.

Interpretation:

The model form *Supplement to Engine International Air Pollution Prevention Certificate* particulars indicated below shall be interpreted as follows:

- (a) 1.12 Specification(s) of test fuel

The particular ISO 8217 grade specification applicable to the fuel oil used at the relevant Parent Engine test (i.e. DMA, DMB, DMC) shall be given on all (Parent and Member Engine) EIAPP Certificates within that Engine Group / Engine Family.

- (b) 1.14 Applicable NO_x emission limit (g/kWh) (regulation 13 of Annex VI)

The limit value given here shall be the limit value for the Engine Group / Engine Family based on the highest engine speed to be included in that Engine Group / Engine Family (in accordance with Regulation 13(3)(a)), irrespective of the rated speed of the Parent Engine or the rated speed of the particular engine as given on the EIAPP Certificate.

- (c) 1.15 Engine's actual NO_x emission value (g/kW h)

The appropriate application average weighted NO_x emission value(s) determined at the Parent Engine test shall be given on all (Parent and Member Engine) EIAPP Certificates. In the case of an Engine Group / Engine Family which is approved to more than one application cycle the Parent Engine value shall, as a minimum, be given for the particular application cycle applicable to the specific engine to which the EIAPP Certificate refers.

In those cases where the Technical File includes tolerances in respect of NO_x emission settings then the effect upon the as measured emission value of those tolerances shall be stated and the basis of the emission value, as stated under 1.15 of the EIAPP Certificate, be given. In no cases shall the effect tolerances be such as to exceed the limit value as stated under 1.14 of the EIAPP Certificate.

Where the installation includes a NO_x-reducing device the actual NO_x emission value (g/kWh) for the engine with the NO_x reduction device in operation shall be given.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 37 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.3.4

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.4 reads as follows:

The shipowner shall have the option of direct measurement of NO_x emissions during engine operation. Such data may take the form of spot checks logged with other engine operating data on a regular basis and over the full range of engine operation or may result from continuous monitoring and data storage. Data must be current (taken within the last 30 days) and must have been acquired using the test procedures cited in this NO_x Technical Code. These monitoring records shall be kept on board for three months for verification purposes by the Parties to the Protocol of 1997. Data shall also be corrected for ambient conditions and fuel specification, and measuring equipment must be checked for correct calibration and operation, in accordance with the procedures specified by the measurement equipment manufacturer in the engine's technical file. Where exhaust gas after-treatment devices are fitted which influence the NO_x emissions, the measuring point(s) must be located downstream of such devices.

Interpretation:

For application of this section it shall be interpreted that any system or procedure utilised to monitor engine NO_x emissions by the direct measurement method shall meet the requirements of MEPC Resolution 103(49) 'Guidelines for On-board NO_x Verification Procedure – Direct Measurement and Monitoring Method'.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 38 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)

Chapter 2.3.5

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.5 reads as follows:

To demonstrate compliance by the direct measurement method, sufficient data shall be collected to calculate the weighted average NO_x emissions in accordance with this Code.

Interpretation:

For application of this section it shall be interpreted that sufficient data shall be collected by the direct measurement method to enable the weighted average NO_x emissions to be determined in accordance with MEPC Resolution 103(49) 'Guidelines for On-board NO_x Verification Procedure – Direct Measurement and Monitoring Method'.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 39 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)
(Rev.1
Mar 2006)

Chapter 2.3.6

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.6 reads as follows:

Every marine diesel engine installed on board a ship shall be provided with a technical file. The technical file shall be prepared by the engine manufacturer and approved by the Administration, and required to accompany an engine throughout its life on board ships. The technical file shall contain information as specified in 2.4.1.

Interpretation:

For application of this section it shall be interpreted that the term “engine manufacturer” is the entity which applied for the engine certification.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 40 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.3.11

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.11 reads as follows:

If any adjustment or modification is made which is outside the approved limits documented in the technical file, the IAPP Certificate may be issued only if the overall NO_x emission performance is verified to be within the required limits by: a direct on-board NO_x monitoring, as approved by the Administration; a simplified on-board NO_x measurement; or, reference to the test-bed testing for the relevant engine group approval showing that the adjustments or modifications do not exceed the NO_x emission limits.

Interpretation:

This section shall be interpreted as follows:

- (a) Verification by the direct on-board NO_x monitoring method is only applicable to the re-issue of IAPP Certificates at periodical surveys or their endorsement at intermediate / annual surveys.
- (b) The demonstration of compliance in accordance with either direct on-board NO_x monitoring or simplified on-board NO_x measurement does not establish a new Engine Group but does define the on-board verification procedure to be used thereafter to verify continuing compliance for that particular engine.

In these instances it shall be understood that the Parent Engine emission value, as given in the EIAPP Certificate, thereafter only relates to the condition of that engine at the Pre-certification Survey stage.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 41 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.3.12

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.12 reads as follows:

The Administration may, at its own discretion, abbreviate or reduce all parts of the survey on board, in accordance with this Code, to an engine which has been issued an EIAPP Certificate. However, the entire survey on board must be completed for at least one cylinder and/or one engine in an engine family or engine group, or spare part, if applicable, and the abbreviation may be made only if all the other cylinders and/or engines or spare parts are expected to perform in the same manner as the surveyed engine and/or cylinder or spare part.

Interpretation:

For application of this section it shall be interpreted that a physical verification must be completed prior to the issue or endorsement of an IAPP Certificate. This verification may be completed on a spare part representative of the working component (at the Administration's discretion) but such a component must be suitably defined in the Technical File on-board NO_x verification procedures.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 42 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)
(Rev.1
Mar 2006)

Chapter 2.3.13

Chapter 2.3 Procedures for certification of an engine

Chapter 2.3.13 reads as follows:

Flow charts providing guidance for compliance with the requirements of an initial, periodical and intermediate surveys for certification of marine diesel engines installed on board ships are provided in figures 2 and 3 of appendix 2 of this Code.

Interpretation:

This section shall be interpreted as follows:

The text in chapter 2 gives the certification procedures which shall be followed. Where discrepancies exist with figure 2 and 3, the text of chapter 2 takes precedence.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 43 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)
(Rev.1
Mar 2006)

Chapter 2.4.1.1

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.1.1 reads as follows:

To enable an Administration to perform the engine surveys described in 2.1, the technical file required by 2.3.6 shall, at a minimum, contain the identification of those components, settings and operating values of the engine which influences its NO_x emissions.

Interpretation:

This section shall be interpreted as follows:

Where a NO_x reducing device or system is fitted in order to achieve compliance with regulation 13 (in accordance with paragraph 2.2.5), these shall be identified in the Technical File.

(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 44 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) Nitrogen Oxides from Marine Diesel Engines

Chapter 2.4.1.5

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.1.5 reads as follows:

To enable an Administration to perform the engine surveys described in 2.1, the technical file required by 2.3.6 shall, at a minimum, contain a copy of the test report required in 5.10.

Interpretation:

For application of this section it shall be interpreted that:

- (a) The copy of the test report to be included in the Technical File of every engine shall provide, as a minimum, the data necessary to verify the relevant Parent Engine's actual NO_x emission value as detailed under item 1.15 of the EIAPP Certificate; and,
- (b) In those cases where the Engine Group / Engine Family is certified for more than one application cycle the Technical File is to include, as a minimum, the Parent Engine Test report(s) for those duty cycles for which the particular engine is certified – as given on the engine's EIAPP Certificate and detailed under items 1.9, 1.14 and 1.15 of the Supplement to the EIAPP Certificate.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 45 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) **Nitrogen Oxides from Marine Diesel Engines**

Chapter 2.4.1.7

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.1.7 reads as follows:

To enable an Administration to perform the engine surveys described in 2.1, the technical file required by 2.3.6 shall, at a minimum, contain the specifications of those spare parts/components which, when used in the engine, according to those specifications, will result in continued compliance of the engine with the NO_x emission limits.

Interpretation:

For application of this section the term “according to those specifications” shall be interpreted as follows:

- (a) It is considered that in this context “specification” may be read as identification marking and as such the identification of a NO_x influencing component by a manufacturer’s part number or specific marking scheme would be sufficient.

In such instances the identification marking would be tied to a particular drawing or other data defining the features of that component with regard to its influence on NO_x formation in the combustion process. Those drawings or other data shall form part of the conformity of production procedures as required under Chapter 4.

- (b) The “specification” need only address those aspects of the design of the component which directly affect its function as a NO_x critical component. For some components it may be possible to define these components by means of an outline dimensioned drawing within the conformity of production procedures or as a drawing directly included within the Technical File.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 46 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 2.4.2

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.2 reads as follows:

To ensure that engines are in compliance with regulation 13 of Annex VI after installation, each engine with an EIAPP Certificate shall be checked at least once prior to issuance of the IAPP Certificate. Such check can be done using the on-board NO_x verification procedures specified in the engine's technical file or one of the other methods if the owner's representative does not wish to check using the on-board NO_x verification procedures.

Interpretation:

For application of this section it shall be interpreted that, prior to the issuance of an IAPP Certificate, compliance after installation can only be verified by using an on-board NO_x verification procedure approved by the Administration for that particular engine.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 47 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

Chapter 2.4.4.3

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.4.3 reads as follows:

On-board NO_x verification procedures shall be determined by using the direct measurement and monitoring method in accordance with 2.3.4, 2.3.5, 2.3.7, 2.3.8, 2.3.11, and 5.5.

Interpretation:

For application of this section it shall be interpreted that the on-board NO_x verification procedures have been approved by the Administration taking into account MEPC Resolution 103(49) the 'Guidelines for On-board NO_x Verification Procedure – Direct Measurement and Monitoring Method'.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 48 Resolution 2 of the 1997 MARPOL Conference

Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)

Chapter 2.4.5

Chapter 2.4 Technical file and on-board NO_x verification procedures

Chapter 2.4.5 reads as follows:

When a NO_x monitoring and recording device is specified as on-board NO_x verification procedures, such device shall be approved by the Administration based on guidelines to be developed by the Organization. These guidelines shall include, but are not limited to, the following items:

- .1 a definition of continuous NO_x monitoring, taking into account both steady-state and transitional operations of the engine;
- .2 data recording, processing and retention;
- .3 a specification for the equipment to ensure that its reliability is maintained during service;
- .4 a specification for environmental testing of the device;
- .5 a specification for the testing of the equipment to demonstrate that it has a suitable accuracy, repeatability and cross sensitivity compared with the applicable sections of this Code; and
- .6 the form of the approval certificate to be issued by the Administration.

Interpretation:

For application of this section it shall be interpreted that MEPC Resolution 103(49) 'Guidelines for On-board NO_x Verification Procedure – Direct Measurement and Monitoring Method' defines the guidelines as developed by the Organization.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 49 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) **Nitrogen Oxides from Marine Diesel Engines**

Chapter 3.1.1

Chapter 3.1 Maximum allowable NO_x emission limits for marine diesel engines

Chapter 3.1.1 reads as follows:

The graph in figure 1 represents the maximum allowable NO_x emission limit values based on the formulae included in paragraph 3(a) of regulation 13 of Annex VI. The total weighted NO_x emissions, as measured and calculated in accordance with the procedures in this Code, shall be equal to or less than the applicable value from the graph corresponding to the rated speed of the engine.

Interpretation:

For application of this section (in accordance with the Unified Interpretation of Regulation 13 (3) (a)) that precision to one decimal place shall be applied when comparing the determined final weighted NO_x values (g/kWh) with the applicable limit determined in accordance with the formulae given under paragraph 3(a) of regulation 13 of Annex VI.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 50 Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of (July 2004) **Nitrogen Oxides from Marine Diesel Engines**

Chapter 3.1.3

Chapter 3.1 Maximum allowable NO_x emission limits for marine diesel engines

Chapter 3.1.3 reads as follows:

An engine's applicable exhaust emissions limit value from figure 1 and the actual calculated exhaust emissions value for the engine shall be stated on the engine's EIAPP Certificate.

Interpretation:

For application of this section it shall be interpreted (in accordance with the Unified Interpretation of Regulation 13 (3) (a)) that the limit and determined NO_x values in g/kWh stated on the EIAPP Certificate shall be given to the first decimal place.

Furthermore (in accordance with the Unified Interpretation of Chapter 2.2.9) it is the relevant application cycle(s) Parent Engine value(s) which must be stated on the engine's EIAPP Certificate.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 51 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

Chapter 3.2.1

Chapter 3.2 Test cycles and weighting factors to be applied

Chapter 3.2.1 reads as follows:

For every individual engine or parent engine of an engine group or family, one of the test cycles specified in 3.2.2 to 3.2.6 shall be applied for verification of compliance with the NO_x emission limits in accordance with regulation 13 of Annex VI.

Interpretation:

For application of this section it shall be interpreted that:

- (a) One of the test cycles specified in Chapters 3.2.2 to 3.2.6, applicable to the application, shall be applied.
- (b) Where more than one test cycle is to be applied the average cycle weighted NO_x emission value (in g/kWh) for each cycle is to be stated on the EIAPP Certificate 1.15, together with the corresponding limit value, 1.14.
- (c) A Parent Engine test for a particular duty cycle is to follow the appropriate test cycle. A Parent Engine emission value shall not be 'constructed' by, for example, adding data from one test to emission values taken from another test.
- (d) In those instances where a constant speed engine as installed can be used either solely for main propulsion or auxiliary purposes, then that engine should be certified to both the E2 and D2 cycles.
- (e) Where a generator is also permanently fitted or coupled to main engine propulsion shafting then certification of that main engine using only the E2 or E3 cycle, as appropriate, is required.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 52 (July 2004) Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 3.2.3

Chapter 3.2 Test cycles and weighting factors to be applied

Chapter 3.2.3 reads as follows:

For variable-pitch propeller sets, test cycle E2 shall be applied in accordance with table 1.

Table 1 – Test cycle for “Constant-speed main propulsion” application (including diesel-electric drive and variable-pitch propeller installations)

Test cycle type E2	Speed	100%	100%	100%	100%
	Power	100%	75%	50%	25%
	Weighting factor	0.2	0.5	0.15	0.15

Interpretation:

For application of the term “variable-pitch propeller sets” it shall be interpreted that the E2 cycle is applicable to any propulsion engine coupled to a variable pitch propeller, irrespective of whether the system operates at constant speed or variable speeds.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 53 Resolution 2 of the 1997 MARPOL Conference

Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

(July 2004)

Chapter 4.1.1

Chapter 4.1.2

Chapter 4.1.3

Chapter 4.1.4

Chapter 4 Approval for serially manufactured engines: engine family and engine group concepts

Chapter 4.1 General

Chapter 4.1.1 reads as follows:

To avoid certification testing of every engine for compliance with the NO_x emission limits, one of two approval concepts may be adopted, namely the engine family or the engine group concept.

Chapter 4.1.2 reads as follows:

The engine family concept may be applied to any series-produced engines which, through their design, are proven to have similar NO_x emission characteristics, are used as produced, and, during installation on board, require no adjustments or modifications which could adversely affect the NO_x emissions.

Chapter 4.1.3 reads as follows:

The engine group concept may be applied to a smaller series of engines produced for similar engine application and which require minor adjustments and modifications during installation or in service on board. These engines are normally large power engines for main propulsion.

Chapter 4.1.4 reads as follows:

Initially the engine manufacturer may, at its discretion, determine whether engines should be covered by the engine family or engine group concept. In general, the type of application shall be based on whether the engines will be modified, and to what extent, after testing on a test-bed.

Interpretation:

The Engine Family concept shall be interpreted as applicable to mass produced small bore engines (generally high speed) that may, for design purposes, include adjustable features but are generally dispatched with the intent that no 'installation' or 'in service' setting modifications are undertaken.

For marine engine applications the Engine Group concept shall be interpreted as applicable to any engine intended for main propulsion or auxiliary duties, where adjustment and modification following installation (and through the service life of the engine) is considered routine.

For application of the Engine Family or Engine Group concepts it shall be interpreted that engines within an Engine Family may have different cylinder bore and stroke dimensions (within the defined limits - see Chapter 4.3.8.2.3) and that engines within an Engine Group concept effectively have identical bore and stroke dimensions as a result of only one of the parameters defined under Chapter 4.4.5.2 being permitted to vary within the defined engine group.

An Onboard NO_x Verification Procedure shall be included within the Technical Files of all engines irrespective of whether they are included within an Engine Family or Engine Group.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005. ◀ ◀

MPC 54 Resolution 2 of the 1997 MARPOL Conference (July 2004) **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

Chapter 4.3.1

Chapter 4.4.1

Chapter 4.3 Application of the engine family concept

Chapter 4.3.1 reads as follows:

The engine family concept provides the possibility of reducing the number of engines which must be submitted for approval testing, while providing safeguards that all engines within the family comply with the approval requirements. In the engine family concept, engines with similar emission characteristics and design are represented by a parent engine within the family.

Chapter 4.4 Application of the engine group concept

Chapter 4.4.1 reads as follows:

These are engines used primarily for main propulsion. They normally require adjustment or modification to suit the on-board operating conditions but which should not result in NO_x emissions exceeding the limits in 3.1 of this Code.

Interpretation:

For application of these sections it shall be interpreted that where the measured performance of a Member Engine to an Engine Family or Engine Group is fundamental to the verification that that member engine is operating within the parameters defined by the approved engine family or group, then that performance data (emissions, engine performance, ambient conditions) and other necessary data shall have been obtained in accordance with NO_x Technical Code Chapter 5.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 55 (July 2004) Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 4.3.7

Chapter 4.3.10.6

Chapter 4.4.8

Chapter 4.3 Application of the engine family concept

Chapter 4.3.7 reads as follows:

Before granting an engine family approval, the Administration shall take the necessary measures to verify that adequate arrangements have been made to ensure effective control of the conformity of production.

Chapter 4.3.10 Certification of an engine family

Chapter 4.3.10 Certification of an engine family

Chapter 4.3.10.6 reads as follows:

Before granting an engine family approval for new, serially produced engines, the Administration shall take the necessary measures to verify that adequate arrangements have been made to ensure effective control of the conformity of production. This requirement may not be necessary for families established for the purpose of engine modifications on board after an EIAPP Certificate has been issued.

Chapter 4.4 Certification of an engine group

Chapter 4.4.8 Certification of an engine group

Chapter 4.4.8 reads as follows:

The requirements of 4.3.10 apply *mutatis mutandis* to this section.

Interpretation:

For application of these sections it shall be interpreted that the conformity of production scheme would need to demonstrate the following aspects:

- (a) The connection between the NO_x critical component part / ID numbers as proposed for the Engine Family or Engine Group and the drawing numbers (and revision status if applicable) defining those components.
- (b) The means by which the Administration will be able, at the time of a survey, to verify that the drawings used for the production of the NO_x critical components correspond to the drawings established as defining the Engine Family or Engine Group.
- (c) Drawing revision control arrangements. Where it is proposed by a manufacturer that revisions to the NO_x critical component drawings defining an Engine Family or Engine Group may be undertaken through the life of an engine, then the conformity of production scheme would need to demonstrate the procedures to be adopted to cover the cases where revisions (a) will not, or (b) may affect NO_x emissions. These procedures shall cover drawing number allocation, effect on the identification markings on the NO_x critical components and the provision for providing the revised drawings to the Administration responsible for the original Engine Family or Engine Group approval.

Where these revisions may affect the NO_x emissions the means to be adopted to assess / verify performance against the parent engine performance are to be stated together with the subsequent actions to be taken regarding advising the Administration and, where necessary, the declaration of a new Parent Engine prior to the introduction of those modifications into service.

- (d) The implemented procedures that ensure any NO_x critical component spare parts supplied to a certified engine will be identified as given in the approved Technical File and hence will be produced in accordance with the drawings as defining the Engine Family or Engine Group.

It would also be interpreted that all items (a) – (d) are applicable to Engine Family, Engine Group and single engines.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 56 Resolution 2 of the 1997 MARPOL Conference (July 2004) **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

Chapter 4.3.9.1

Chapter 4.4.7

Chapter 4.3 Application of the engine family concept

Chapter 4.3.9 Guidelines for selecting the parent engine of an engine family

Chapter 4.3.9.1 reads as follows:

The method of selection of the parent engine for NO_x measurement shall be agreed to and approved by the Administration. The method shall be based upon selecting an engine which incorporates engine features and characteristics which, from experience, are known to produce the highest NO_x emissions expressed in grams per kilowatt hour (g/kWh). This requires detailed knowledge of the engines within the family. Under certain circumstances, the Administration may conclude that the worst case NO_x emission rate of the family can best be characterised by testing a second engine. Thus, the Administration may select an additional engine for test based upon features which indicate that it may have the highest NO_x emission levels of the engines within that family. If engines within the family incorporate other variable features which could be considered to affect NO_x emissions, these features must also be identified and taken into account in the selection of the parent engine.

Chapter 4.4.7 Guidelines for the selection of the parent engine of an engine group

Chapter 4.4.7 reads as follows:

The selection of the parent engine shall be in accordance with the criteria in 4.3.9, as applicable. It is not always possible to select a parent engine from small-volume production engines in the same way as the mass-produced engines (engine family). The first engine ordered may be registered as the parent engine. The method used to select the parent engine to represent the engine group shall be agreed to and approved by the Administration.

Interpretation:

For application of these sections it shall be interpreted that where a Parent Engine (e.g. large bore 2-stroke engine) cannot be adjusted (e.g. maximum pressure, compression pressure, exhaust back pressure, charge air temperature) to the defined reference or maximum tolerance conditions at the test bed the measured NO_x emission values shall be corrected to the defined reference and maximum tolerance conditions on the basis of sensitivity tests. This correction shall be approved by the Administration. The resulting corrected average weighted NO_x emission value is to be stated under 1.15 of the EIAPP Certificate.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 57 (July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 4.3.9.2

Chapter 4.3 Application of the engine family concept

Chapter 4.3.9 *Guidelines for selecting the parent engine of an engine family*

Chapter 4.3.9.2 reads as follows:

The following criteria for selecting the parent engine for NO_x emission control shall be considered, but the selection process must take into account the combination of basic characteristics in the engine specification:

- .1 main selection criteria
 - higher fuel delivery rate
- .2 supplementary selection criteria
 - higher mean effective pressure
 - higher maximum cylinder peak pressure
 - higher charge air/ignition pressure ratio
 - $dp/d\alpha$, the lower slope of the combustion curve
 - higher charge air pressure
 - higher charge air temperature

Interpretation:

For application of this section the term “main selection criteria” shall be interpreted as a possible selection criterion if no knowledge about the emission behavior of an Engine Family or Engine Group is available. In all cases the final selection criteria for the Parent Engine is the highest resulting average weighted NO_x emission, at the applicable test cycle, according to section 4.3.9.1.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 58 (July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 4.3.10.2
Chapter 4.3.10.3

Chapter 4.3 Application of the engine family concept

Chapter 4.3.10 Certification of an engine family

Chapter 4.3.10.2 reads as follows:

A pre-certificate, or EIAPP Certificate, should be issued for a member engine of an entire family in accordance with this Code which certifies that the parent engine meets the NO_x levels specified in regulation 13 of Annex VI.

Chapter 4.3.10.3 reads as follows:

When the parent engine of an engine family is tested/measured under the most adverse conditions specified within this Code and confirmed as complying with the maximum allowable emission limits (see 3.1), the results of the test and NO_x measurement shall be recorded in the EIAPP Certificate issued for the particular parent engine and for all member engines of the engine family.

Interpretation:

In 4.3.10.2 the word 'entire' shall be read as 'engine'.

For application of these sections it shall be interpreted that the determined Parent Engine NO_x emission value shall be given under 1.15 of the Supplement to EIAPP Certificate for Parent Engine(s) and all subsequent Member Engines within the Engine Family or Engine Group as established from that Parent Engine test.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 59 (July 2004) Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 4.4.5.2

Chapter 4.4.5.3

Chapter 4.4 Application of the engine group concept

Chapter 4.4.5 Guidelines for the selection of an engine group

Chapter 4.4.5.2 reads as follows:

The following parameters and specifications must be common to engines within an engine group:

- .1 bore and stroke dimensions;
- .2 method and design features of pressure charging and exhaust gas system;
 - constant pressure
 - pulsating system
- .3 method of charge air cooling system;
 - with/without charge air cooler
- .4 design features of the combustion chamber that effect NO_x emission;
- .5 design features of the fuel injection system, plunger and injection cam which may profile basic characteristics that effect NO_x emission; and
- .6 maximum rated power per cylinder at maximum rated speed. The permitted range of derating within the engine group shall be declared by the manufacturer and approved by the Administration.

Chapter 4.4.5.3 reads as follows:

Generally, if the parameters required by 4.4.5.2 are not common to all engines within a prospective engine group, then those engines may not be considered as an engine group. However, an engine group may be accepted if only one of those parameters or specifications is not common for all of the engines within a prospective engine group provided the engine manufacturer or the shipowner can, within the technical file, prove to the Administration that such a transgression of that one parameter or specification would still result in all engines within the engine group complying with the NO_x emission limits.

Interpretation:

For application of these sections it shall be interpreted that rated power per cylinder at rated speed is one parameter. Derating and uprating, in terms of power per cylinder and rated speed, outside the approved power or speed ranges shall be interpreted as deviations according to chapter 4.4.5.3.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 60
(July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.2.2.2

Chapter 5.2 Test conditions

Chapter 5.2.2.2 reads as follows:

All engines when equipped as intended for installation on board ships must be capable of operating within the allowable NO_x emission levels of regulation 13 (3) of Annex VI at an ambient seawater temperature of 25°C.*

* 25°C seawater temperature is the reference ambient condition to comply with the NO_x limits. An additional temperature increase due to heat exchangers installed on board, e.g., for the low-temperature cooling water system, shall be taken into consideration.

Interpretation:

For application of this section it shall be interpreted that the 25°C seawater temperature defines an ambient reference value for which compliance with the NO_x emission limits as defined by regulation 13 (3) must be demonstrated (tested or calculated with T_{SC Ref} specified by the manufacturer).

The application of this reference primary coolant value shall be considered in accordance with the charge air cooling arrangement applicable to the individual installation as follows:

- (a) Direct seawater cooling to engine charge air coolers. Compliance with the NO_x limits shall be demonstrated (or otherwise justified) with a charge air / scavenge air cooler coolant inlet temperature of 25°C.
- (b) Intermediate 'freshwater' cooling to engine charge air coolers. Compliance with the NO_x limits shall be demonstrated (or otherwise justified) with the charge air / scavenge air cooling system operating with the highest allowable in service coolant inlet temperature regime comparable with an ambient seawater temperature of 25°C.

Demonstration of compliance at a Parent Engine test for a direct seawater cooled system, as given by (a) above, does not demonstrate compliance in accordance with the higher charge air temperature regime inherent with an intermediate 'freshwater' cooling arrangement as given under (b).

- (c) For those installations incorporating no seawater cooling, either direct or indirect, to the charge air coolers e.g. radiator cooled 'freshwater' systems, air / air charge air coolers, then it shall be interpreted that compliance with the NO_x limits must be demonstrated with the engine and charge air cooling systems operating "as intended for installation on board".

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 61 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.2.5

Chapter 5.2 Test conditions

Chapter 5.2.5 Engine exhaust system

Chapter 5.2.5 reads as follows:

The test engine shall be equipped with an exhaust system which provides an exhaust backpressure as specified by the manufacturer at the engine operating conditions and which results in the maximum declared power in the respective engine application.

Interpretation:

Where test bed installation prevents adjustment to the exhaust backpressure limit the effect upon the NO_x emissions shall be stated and justified by the manufacturer.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 62 Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
(July 2004)
(Rev. 1)
Mar 2006) **Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.4.2

Chapter 5.4 Measurement equipment

Chapter 5.4.2 reads as follows:

Other systems or analysers may, subject to the approval of the Administration, be accepted if they yield equivalent results to that of the equipment referenced in 5.4.1.

Interpretation:

For application of the term “equivalent” it shall be interpreted that alternative systems or analysers would, as quantified by using recognized national or international standards (such as ISO 8178, Part 1:1996, section 7), yield equivalent results when used to measure diesel engine exhaust emission concentrations in terms of the requirements referenced in 5.4.1. (MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 63 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.5.3

Chapter 55. Determination of exhaust gas flow

Chapter 5.5.3 Carbon-balance method

Chapter 5.5.3 reads as follows:

This method involves exhaust gas mass flow calculation from fuel consumption and exhaust gas concentrations using the carbon and oxygen balance method as specified in appendix 6 of this Code.

Interpretation:

For calculation of the exhaust gas mass flow in accordance with “Method 2, universal, carbon/oxygen-balance” detailed under appendix 6 the “CW (soot)” term shall be taken as zero.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 64 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.6 Permissible deviations of instruments for engine-related parameters and other essential parameters

Chapter 5.6 reads as follows:

The calibration of all measuring instruments shall be traceable to recognised international standards and shall comply with the requirements as set out in 1.3.1 of appendix 4 of this Code.

Interpretation:

For application of this section it shall be interpreted that the measuring instruments as detailed under Appendix 4 is not to be considered a definitive listing. Where additional measuring instruments are required in order to define an engine's NO_x emission performance, for example the measurement of peak cylinder or charge air pressures, then those measuring instruments shall also be calibrated. As given by 1.3.1 of Appendix 4 the recognised standards may be national or international.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 65
(July 2004)

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 5.9.1.2

Chapter 5.9 Test Run

Chapter 5.9.1 *General*

Chapter 5.9.1.2 reads as follows:

The settings of inlet restriction and exhaust backpressure shall be adjusted to the upper limits as specified by the manufacturer in accordance with 5.2.4 and 5.2.5, respectively.

Interpretation:

Application of the term “upper limits” shall be interpreted as follows:

- (a) Inlet restriction – an air inlet restriction representative of an unfouled air cleaner.
- (b) Exhaust backpressure – where test bed installation prevents adjustment to the exhaust backpressure limit the effect upon the NO_x emissions shall be stated and justified by the manufacturer.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 66 (July 2004)
(Rev.1
Mar 2006)

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 5.9.2

Chapter 5.9 Test Run

Chapter 5.9.2 *Main exhaust components to be analysed*

Chapter 5.9.2.1 reads as follows:

An analytical system for the determination of the gaseous emissions (CO, CO₂, HC, NO_x, O₂) in the raw exhaust gas shall be based on the use of the following analysers:

- .1 HFID analyser for the measurement of hydrocarbons;
- .2 NDIR analyser for the measurement of carbon monoxide and carbon dioxide;
- .3 HCLD or equivalent analyser for the measurement of nitrogen oxides; and
- .4 PMD, ECS or ZRDO for the measurement of oxygen.

Interpretation:

For application of 5.9.2.1.3 the term “equivalent” shall be interpreted as referring to the use of CLD analysers for the dry basis measurement of nitrogen oxides.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 67 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.9.2.3

Chapter 5.9 Test Run

Chapter 5.9.2.3 reads as follows:

Specifications and calibration of these analysers shall be as set out in appendices 3 and 4 of this Code, respectively.

Interpretation:

For application of this section it shall be interpreted that under Appendix 3 'Chapter 3 Analysers', in accordance with 5.9.2.1, the measurement of hydrocarbons (HC), in terms of ppmC₁, must be undertaken using an analyser of the Heated Flame Ionisation (HFID) type. Gas shall be sampled, and maintained, at a temperature of 463 K (190°C)±10 K. The calibration, span check and other requirements of Appendix 4 shall also apply to the HC analyser for which a suitable hydrocarbon (for example, CH₄ or C₃H₈ in air) calibration and span check gas is to be used.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC Resolution 2 of the 1997 MARPOL Conference

68 Technical Code on Control of Emission of

(July 2004)

Nitrogen Oxides from Marine Diesel Engines

Chapter 5.9.3.1

Chapter 5.9 Test Run

Chapter 5.9.3 Sampling for gaseous emissions

Chapter 5.9.3.1 reads as follows:

The sampling probes for the gaseous emissions shall be fitted at least 0.5m or 3 times the diameter of the exhaust pipe – whichever is the larger – upstream of the exit of the exhaust gas system, as far as practicable, but sufficiently close to the engine so as to ensure an exhaust gas temperature of at least 343K (70°C) at the probe.

Interpretation:

Recognising that successful measurement of gaseous HC requires an exhaust gas temperature of at least 190°C, the 70°C requirement shall be interpreted as a minimum exhaust gas temperature requirement at the NO_x sampling probe where that differs from the HC sampling probe. In the latter case a minimum temperature of 463 K (190°C) at the probe is required.

With regard to the HC sampling system, a heated filter and sampling line shall be provided between the sampling probe and the HC analyser. The filter shall extract any solid particles from the gas sample before the analyser and be changed as necessary. The temperature of the heated filter and the wall temperature of the heated line shall be 463 K (190°C) ± 10 K.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 69 **Resolution 2 of the 1997 MARPOL Conference**
(July 2004) **Technical Code on Control of Emission of**
Nitrogen Oxides from Marine Diesel Engines

Chapter 5.9.3.2

Chapter 5.9 Test Run

Chapter 5.9.3 Sampling for gaseous emissions

Chapter 5.9.3.2 reads as follows:

In the case of a multi-cylinder engine with a branched exhaust manifold, the inlet of the probe shall be located sufficiently far downstream so as to ensure that the sample is representative of the average exhaust emission from all cylinders. In multi-cylinder engines having distinct groups of manifolds, such as in a “Vee” engine configuration, it is permissible to acquire a sample from each group individually and calculate an average exhaust emission. Other methods which have been shown to correlate with the above methods may be used. For exhaust emission calculation, the total exhaust mass flow must be used.

Interpretation:

In the case of multiple turbocharger arrangements it shall be interpreted that where it is not possible to sample the exhaust gas from a position after where the individual turbocharger tailpipes have combined into a single duct then the exhaust gas must be sampled downstream of each turbocharger and analysed. The individual measurement readings shall be averaged as necessary to provide the emission concentrations which are representative of the emissions from all cylinders.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 70 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.9.6.1

Chapter 5.9 Test Run

Chapter 5.9.6 Test sequence

Chapter 5.9.6.1 reads as follows:

After the procedures in 5.9.1 to 5.9.5 have been completed, the test sequence shall be started. The engine shall be operated in each mode in accordance with the appropriate test cycles defined in 3.2.

Interpretation:

For application of the term “test sequence” it shall be interpreted that the test cycle may be run from full power to low power, in accordance with the test cycles defined by 3.2, or from low to full power. In both instances sufficient time shall be given at each mode point for the engine performance (as indicated by the gaseous emission and engine performance readings) to stabilise.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 71 Resolution 2 of the 1997 MARPOL Conference
(July 2004) **Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.9.6.2

Chapter 5.9 Test Run

Chapter 5.9.6 Test sequence

Chapter 5.9.6.2 reads as follows:

During each mode of the test cycle after the initial transition period, the specified speed shall be held within $\pm 1\%$ of rated speed or 3 min^{-1} , whichever is greater, except for low idle, which shall be within the tolerances declared by the manufacturer. The specific torque shall be held so that the average, over the period during which the measurements are to be taken, is within 2% of the maximum torque at the test speed.

Interpretation:

For application of the term “within 2% of the maximum torque” it shall be interpreted that in order to be consistent between the constant (D2 and E2) and the variable speed (C1 and E3) test cycles the specific torque at each load shall be held within 2% of the maximum (rated) torque at the engine’s rated speed.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 72
(July 2004)
(Rev.1
Mar 2006)

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 5.9.7

Chapter 5.9 Test Run

Chapter 5.9.7 Analyser response

Chapter 5.9.7 reads as follows:

The output of the analysers shall be recorded, both during the test and during all response checks (zero and span), on a strip chart recorder or measured with an equivalent data acquisition system with the exhaust gas flowing through the analysers at least during the last ten minutes of each mode.

Interpretation:

For application of this section it shall be interpreted that the response must be of sufficient accuracy and resolution to enable verification of the zero and span response of the analysers in accordance with 5.9.9.

(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 73 (July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.9.9

Chapter 5.9 Test Run

Chapter 5.9.9 Re-checking the analysers

Chapter 5.9.9 reads as follows:

After the emission test, the calibration of the analysers shall be re-checked, using a zero gas and the same span gas as used prior to the measurements. The test shall be considered acceptable if the difference between the two calibration results is less than 2%.

Interpretation:

For application of this section the following interpretations shall be applied:

- (a) The term “the calibration of the analysers shall be re-checked,” shall be interpreted as the ‘the zero and span response of the analysers shall be re-checked’.
- (b) The term “if the difference between the two calibration results is less than 2%” shall be interpreted as ‘if the difference between the two check results is less than 2%’ where the 2% is understood to be 2% of the span gas (and not analyser full scale) value, i.e.:

Maximum permitted difference in span or zero check readings (ppm or % as appropriate):

$$= 0.02 \cdot \text{Initial span check reading}$$

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 5.10.1

Chapter 5.10 Test report

Chapter 5.10.1 reads as follows:

For every engine tested for pre-certification or for initial certification on board without pre-certification, the engine manufacturer shall prepare a test report which shall contain, as a minimum, the data as set out in appendix 5 of this Code. The original of the test report shall be maintained on file with the engine manufacturer and a certified true copy shall be maintained on file by the Administration.

Interpretation:

For application of this section the term “as a minimum” shall be interpreted as incorporating the necessary data to fully define the engine performance and enable calculation of the gaseous emissions, in accordance with 5.12, from the raw data units to the cycle weighed NO_x emission value in g/kWh. The data set given under Appendix 5 should not be considered definitive and any other test data (i.e. engine performance or setting data, description of control devices, etc.) relevant to the approval of a specific engine design and/or on-board NO_x verification procedures must also be given.

With reference to appendix 5 of the Code it shall be further interpreted that:

- (a) The term “Deviation” as given under “Sheet 3/5, Measurement equipment, Calibration” refers to the deviation of the analyser calibration and not the deviation of the span gas concentration.
- (b) The fuel properties as given under “Sheet 3/5, Fuel characteristics, Fuel properties” shall, in those cases where a ‘DM’ grade fuel is used, include sufficient data to justify the ISO 8217 grade (i.e. DMA, DMB or DMC) as given on EIAPP Certificate Supplement 1.12 and hence as a minimum shall give the analysis results for water content (ISO 37733), carbon residue (ISO 10370) - full or 10% sample and, in the case of the DMA / DMB grades, Cetane Number / Index (ISO 4264).

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 75 (July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.11 Data evaluation for gaseous emissions

Chapter 5.11 reads as follows:

For the evaluation of the gaseous emissions, the chart reading of the last 60 seconds of each mode shall be averaged, and the average concentrations (conc) of CO, CO₂, HC, NO_x, and O₂ during each mode shall be determined from the average chart readings and the corresponding calibration data.

Interpretation:

For application of this section it shall be interpreted that the averaged results must be given to 2 decimal places for the CO₂ / O₂ species and whole numbers for the CO, HC and NO_x species.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 76
(July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 5.12.4.1

Chapter 5.12 Calculation of the gaseous emissions

Chapter 5.12.4 Calculation of the emission mass flow rates

Chapter 5.12.4.1 reads as follows:

The emission mass flow rates for each mode shall be calculated as follows (for the raw exhaust gas):

$$\text{Gas mass} = u \quad \bullet \quad \text{conc} \bullet G_{\text{EXHW}} \quad (15)$$

or

$$\text{Gas mass} = v \quad \bullet \quad \text{conc} \bullet V_{\text{EXHD}} \quad (16)$$

or

$$\text{Gas mass} = w \quad \bullet \quad \text{conc} \bullet V_{\text{EXHW}} \quad (17)$$

Interpretation:

For application of this section it shall be interpreted that for equations (15) and (17) the term “conc” applies to the averaged gas concentrations, as determined in accordance with 5.11, measured or corrected in accordance with 5.12.2 (conc, dry / $K_{W,r}$) to a wet basis and (in the case of NO_x) multiplied by the K_{HDIES} correction factor for humidity and temperature in accordance with 5.12.3.

For equation (16) the term “conc” applies to the averaged gas concentrations, as determined in accordance with 5.11, measured or corrected in accordance with 5.12.2 (conc, wet • $K_{W,r}$) to a dry basis and (in the case of NO_x) multiplied by the K_{HDIES} correction factor for humidity and temperature in accordance with 5.12.3.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 77 (July 2004) **Resolution 2 of the 1997 MARPOL Conference
Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 6.2.1.2

Chapter 6.2 Engine parameter check method

Chapter 6.2.1 General

Chapter 6.2.1.2 reads as follows:

An engine parameter check method shall be conducted on engines, subject to 6.2.1.1, whenever there is a change of components and/or adjustable features of the engine that affect NO_x emission levels. This method shall be used to confirm compliance with the NO_x emission limits. Engines installed in ships shall be designed in advance for an easy check of components, adjustable features and engine parameters that affect NO_x emission levels.

Interpretation:

It shall be interpreted that a survey would additionally be required where the component or adjustable feature change was outside that already approved for the Engine Group or Engine Family and as given in the engine's Technical File. In such cases the change would need to be documented in accordance with 6.2.3.2.2.

It shall be further interpreted that, in the case of the Engine Parameter Check Method, that the change is to be such that the Engine Group / Engine Family Parent Engine emission value was not exceeded.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC 78 Resolution 2 of the 1997 MARPOL Conference
(July 2004)
(Rev.1
Mar 2006) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Chapter 6.2.3.4.2

Chapter 6.2 Engine parameter check method

Chapter 6.2.3 Documentation for an engine parameter check method

Chapter 6.2.3.4 List of NO_x –influencing parameters sometimes modified on board

Chapter 6.2.3.4.2 reads as follows:

The actual technical file of an engine may, based on the recommendations of the engine manufacturer and the approval of the Administration, include less components and/or parameters than discussed above depending on the particular engine and the specific design.

Interpretation:

For application of this section it shall be interpreted that the term “engine manufacturer” is the entity which applied for the engine certification.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



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(July 2004)
(Rev.1
Mar 2006)

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Chapter 6.2.3.5

Chapter 6.2 Engine parameter check method

Chapter 6.2.3 Documentation for an engine parameter check method

Chapter 6.2.3.5 Checklist for the engine parameter check method

Chapter 6.2.3.5 reads as follows:

For some parameters, different survey possibilities exist. Approved by the Administration, the ship operator, supported by the engine manufacturer, may choose what method is applicable. Any one of, or a combination of, the methods listed in appendix 7 of this Code may be sufficient to show compliance.

Interpretation:

For application of this section it shall be interpreted that the term “engine manufacturer” is the entity which applied for the engine certification.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005.
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006



MPC 80 Resolution 2 of the 1997 MARPOL Conference
(July 2004)
(Rev.1
Mar 2006) **Technical Code on Control of Emission of
Nitrogen Oxides from Marine Diesel Engines**

Appendix 4 Calibration of the analytical instruments (Refer to chapter 5 of the NO_x Technical Code)

1 Introduction

Chapter 1.1 reads as follows:

Each analyser used for the measurement of an engine's parameters shall be calibrated as often as necessary in accordance with the requirements of this appendix.

Tables 1, 2 3 & 4 right hand column headers read as follows:

Calibration intervals (month).

Interpretation:

For application of this section it shall be interpreted that the calibration intervals as defined by Tables 1, 2, 3, and 4 of Appendix 4 represent the duration of calibration validity applicable to the particular measurement instruments listed.

All instruments used for the measurement of an engine's parameters shall be verified as being within the defined calibration validity period at the time of the measurement.
(MEPC/Circ. 473)

Note:

1. This UI is to be uniformly implemented by IACS Societies from 19 May 2005
2. Revision 1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2006.



MPC 81
(July 2004)

Resolution 2 of the 1997 MARPOL Conference Technical Code on Control of Emission of Nitrogen Oxides from Marine Diesel Engines

Appendix 4 Calibration of the analytical instruments (Refer to chapter 5 of the NO_x Technical Code)

8.1

8 Interference effects with CO, CO₂, NO_x and O₂ analysers

8.1 *CO analyser interference check*

8.1 reads as follows:

Water and CO₂ may interfere with the CO analyser performance. Therefore, a CO₂ span gas having a concentration of 80 to 100% of full scale of the maximum operating range used during testing shall be bubbled through water at room temperature and the analyser response recorded. The analyser shall not be more than 1% of full scale for ranges greater than or equal to 300ppm or more than 3ppm for ranges below 300ppm.

Interpretation:

For application of this section the term “The analyser shall not be more than ...” shall be interpreted as “The analyser response shall not be more than ...” to correctly reflect the intent of this statement and ISO 8178-1 Section 8.9.1.

Note:

This UI is to be uniformly implemented by IACS Societies from 19 May 2005.



MPC Regulation 14, Annex VI of MARPOL 73/78 82

(Sept. 2005) **Regulation 14**
Sulphur Oxides (SO_x)

Regulation 14(1) (entered into force on 19 May 2005) reads:

The sulphur content of any fuel oil used on board ships shall not exceed 4.5 % m/m.

Regulation 14(4)(a) (which enters into force on 19 May 2006) reads:

The sulphur content of fuel oil used on board ships in a SO_x emission control area does not exceed 1.5 % m/m.

Interpretation

The 4.5% limit should be applied to all ships starting from the 19 May 2005 even if the IAPP certificate was not already issued for the ships concerned. The same applies for the 1.5 % limit starting from 19 May 2006. Checking for compliance pursuant to issuance of the IAPPC is limited to checking the bunker delivery notes under regulation VI/18.



MPC Regulation 18, Annex VI of MARPOL 73/78

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(Sept. 2005) **Regulation 18**
Fuel oil quality

Regulation 18(3) (entered into force on 19 May 2005) reads:

For each ship subject to regulations 5 and 6 of this Annex, details of fuel oil for combustion purposes delivered to and used on board shall be recorded by means of a bunker delivery note which shall contain at least the information specified in appendix V to this Annex.

Interpretation

Bunker delivery notes, for fuel oil delivered to and for use onboard on or after the 19 May 2005, should be kept on board even if the IAPP certificate has not been issued yet. However, at the time a survey is conducted for issuance of the IAPP certificate, only such notes relevant to fuel present on board at the time of the survey, are considered as a basis for issuance of the IAPP certificate.



MPC 84 Annex VI of MARPOL 73/78

(Nov 2005)

Regulations 16(9)

Regulation 16(9) (entered into force on 19 May 2005) reads:

Monitoring of combustion flue gas outlet temperature shall be required at all times and waste shall not be fed into a continuous-feed shipboard incinerator when the temperature is below the minimum allowed temperature of 850°C. For batch-loaded shipboard incinerators, the unit shall be designed so that the temperature in the combustion chamber shall reach 600°C within five minutes after start-up.

Interpretation

The minimum combustion chamber flue gas outlet temperature of 850°C is equally applicable to continuous-feed and batch-loaded shipboard incinerators^[1]. Monitoring of the combustion flue gas outlet temperature shall be required at all times for both types of incinerators.

[1] Refer to MEPC/Circ.473 for applicable incinerators.

Note:

This UI is to be uniformly implemented by IACS Members and Associates from 3rd February 2006.



MPC 85 Regulation 22(5), Annex I of MARPOL 73/78 as amended by resolution MEPC.117(52)

(Jan 2006)
(Rev.1
July 2006)
(Rev.2
Apr 2007)
(Rev.3
Jan 2008)
(Rev.4
Sep 2008)

Regulation 22, Pump-room bottom protection

Regulation 22 (entering into force on 1 January 2007) reads:

“ 1. This regulation applies to oil tankers of 5,000 tonnes deadweight and above constructed on or after 1 January 2007.

2. The pump-room shall be provided with a double bottom such that at any cross-section the depth of each double bottom tank or space shall be such that the distance h between the bottom of the pump-room and the ship's base line measured at right angles to the ship's base line is not less than specified below:

$$h = B/15(\text{m}) \text{ or} \\ h = 2 \text{ m, whichever is the lesser.}$$

The minimum value of $h = 1 \text{ m}$.

3. In case of pump rooms whose bottom plate is located above the base line by at least the minimum height required in paragraph 2 above (e.g. gondola stern designs), there will be no need for a double bottom construction in way of the pump-room.

4. Ballast pumps shall be provided with suitable arrangements to ensure efficient suction from double bottom tanks.

5. Notwithstanding the provisions of paragraphs 2 and 3 above, where the flooding of the pump room would not render the ballast or cargo pumping system inoperative, a double bottom need not be fitted.”.

Interpretation

1. The term “*pump-room*” means a cargo pump room. Ballast piping is permitted to be located within the pump-room double bottom provided any damage to that piping does not render the ship's pumps located in the “*pump room*” ineffective.

Note:

1. Rev.1 of this UI is to be uniformly implemented by IACS Members and Associates for ships subject to this regulation.
2. Rev.2 of this UI is to be uniformly implemented by IACS Members and Associates for ships subject to this regulation.
3. Rev.3 of this UI is to be uniformly implemented by IACS Members and Associates for ships subject to this regulation.
4. Rev.4 of this UI is to be uniformly implemented by IACS Members and Associates for ships subject to this regulation.

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2. The double bottom protecting the “*pump-room*” can be a void tank, a ballast tank or, unless prohibited by other regulations, a fuel oil tank.
3. Bilge wells may be accepted within the double bottom provided that such wells are as small as practicable and the distance between the well bottom and the ship's base line measured at right angles to the ship's base line is not less than $0.5h$.
4. Where a portion of the pump-room is located below the minimum height required in regulation 22.2, then only that portion of the pump room is required to be a double bottom.

End of Document

MPC 86 **Annex IV of MARPOL 73/78**
Regulation 10.1 as amended by Resolution
MEPC.115(51)

(June
2006)
(Corr.1
Oct 2007)

Standard Discharge Connection

Regulation 10.1 as amended by Resolution MEPC.115(51) reads as follows:

"To enable pipes of reception facilities to be connected with the ship's discharge pipeline, both lines shall be fitted with a standard discharge connection in accordance with the following table....."

Interpretation:

All ships subject to Annex IV, irrespective of their size and of the presence of a sewage treatment plant or sewage holding tank, shall be provided with a pipeline and the relevant shore connection flange for discharging sewage to port sewage treatment facility.

Note:

1. This UI is to be uniformly implemented by IACS Societies for ships contracted for construction on or after 1 January 2007.
2. The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to IACS Procedural Requirement (PR) No. 29.

End of Document

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(Jan
2007)

Annex I of MARPOL 73/78 Regulation 12A as amended by Resolution MEPC.141(54)

Regulation 12A.9, as amended by Resolution MEPC.141(54), reads:

“Lines of oil fuel piping located at a distance from the ship’s bottom of less than h , as defined in paragraph 6, or from the ship’s side less than w , as defined in paragraphs 7 and 8 shall be fitted with valves or similar closing devices within or immediately adjacent to the oil fuel tank. These valves shall be capable of being brought into operation from a readily accessible enclosed space the location of which is accessible from the navigation bridge or propulsion machinery control position without traversing exposed freeboard or superstructure decks.

The valves shall close in case of remote control system failure (fail in a closed position) and shall be kept closed at sea at any time when the tank contains oil fuel except that they may be opened during oil fuel transfer operations.”

Regulation 12A.10, as amended by Resolution MEPC.141(54), reads:

“Suction wells in oil fuel tanks may protrude into the double bottom below the boundary line defined by the distance h provided that such wells are as small as practicable and the distance between the well bottom and the bottom shell plating is not less than $0.5 h$.”

Interpretation:

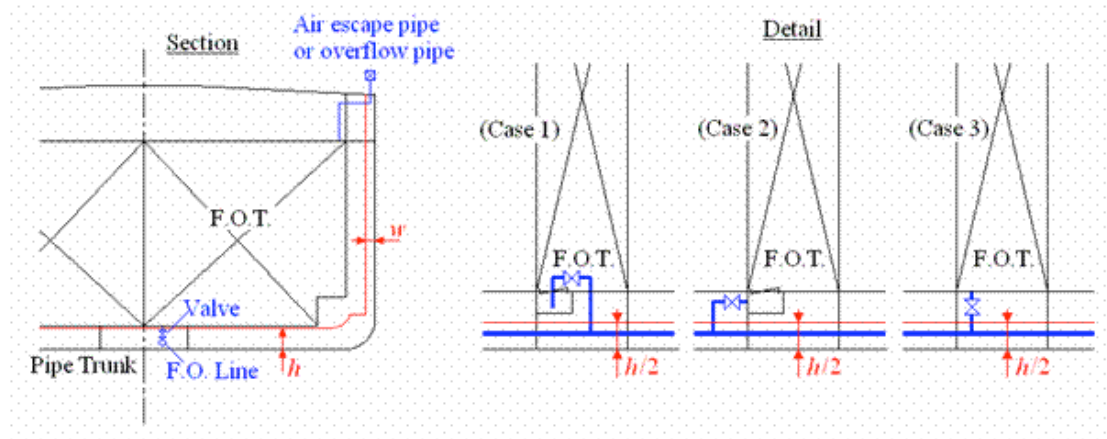
1. Valves for oil fuel tanks located in accordance with the provisions of paragraphs 6, 7 and 8 of MARPOL regulation I/12A may be treated in a manner similar to the treatment of suction wells as per MARPOL regulation I/12A.10 and therefore arranged at a distance from the ship’s bottom of not less than $h/2$ (see the figure below).
2. Valves for tanks which are permitted to be located at a distance from the ship’s bottom or side at a distance less than h or w , respectively, in accordance with the accidental oil fuel outflow performance standard of MARPOL regulation I/12A.11 may be arranged at the distance less than h or w , respectively.
3. Fuel tank air escape pipes and overflow pipes are not considered as part of ‘*lines of fuel oil piping*’ and therefore may be located at a distance from the ship’s side of less than w .

Note:

This Unified Interpretation is to be applied by all Members and Associates on ships delivered on or after 1 August 2010 as defined in MARPOL regulation I/28.9.

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(cont)



End

MPC 88

Annex IV of MARPOL 73/78

Regulation 9.1.1

(Feb
2007)

Regulation 9 Sewage systems

Regulation 9.1.1 reads:

1 Every ship which, in accordance with regulation 2, is required to comply with the provisions of this Annex shall be equipped with one of the following sewage systems:

.1 a sewage treatment plant which shall be of a type approved by the Administration, in compliance with the standards and test methods developed by the Organization”.....*

The footnote to regulation 9.1.1 reads:

**Reference is made to the international specifications for effluent standards, construction and testing of sewage treatment systems adopted by the Organization by resolution MEPC.2(VI) on 3 December 1976. For existing ships, national specifications are acceptable.*

Operative paragraph 2(a) of resolution MEPC.159(55), which supersedes resolution MEPC.2(VI), and paragraph 1.3 in the Annex thereto read:

“2. INVITES Governments to:

(a) implement the Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants and apply them so that all equipment installed on board on or after 1 January 2010 meets the Revised Guidelines in so far as is reasonable and practicable; and....”

“1.3 These Guidelines apply to sewage treatment plants installed on board on or after 1 January 2010.”

Interpretation

For application of resolution MEPC.159(55), the phrase *“installed on board a ship on or after 1 January 2010”* shall be interpreted as follows:

- (a) For new ships, installations on board ships the keels of which are laid or which are at a similar stage of construction on or after 1 January 2010.
- (b) For existing ships, new installations with a contractual delivery date to the ship on or after 1 January 2010 or, in the absence of a contractual delivery date, the actual delivery of the equipment to the ship on or after 1 January 2010.

Note:

This UI is to be uniformly implemented by IACS Societies from 1 July 2007.

End of Document

MPC 90 (Sept 2007)
Annex I of MARPOL 73/78
Regulation 1 as amended by Resolution
MEPC.117(52)

Regulation 1.28.1 to 1.28.8, as amended by Resolution MEPC.117(52), reads:

“ship delivered on or before” dd/mm/yyyy “means a ship:

.....

in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or before dd/mm/yyyy: or

.....”

Regulation 1.30, as amended by Resolution MEPC.117(52), reads:

“Constructed means a ship the keel of which is laid or which is at a similar stage of construction.”

Interpretation

“A similar stage of construction” means the stage at which:

- (a) construction identifiable with a specific ship begins; and
- (b) 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.

Note:

1. This UI is to be uniformly implemented by IACS Societies from 1 October 2007.

End of Document

MPC Annex IV of MARPOL 73/78

91

(Sept
2007)

Regulation 1.1 reads:

“For the purposes of the present Annex:

(1) *New ship means a ship:*

- (a) *for which the building contract is placed, or in the absence of a building contract, the keel of which is laid, or which is at a similar stage of construction, on or after the date of entry into force of this Annex;
.....”*

Interpretation

“A similar stage of construction” means the stage at which:

- (a) construction identifiable with a specific ship begins; and
- (b) 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.

Note:

1. This UI is to be uniformly implemented by IACS Societies from 1 October 2007.

End of Document

MPC 92 Tonnage to be used when applying MARPOL Annex VI

(Oct
2007)

Regulation 5 Surveys and Inspections

- (1) *Every ship of 400 gross tonnage and above and every fixed and floating drilling rig and other platforms shall be subject to the surveys specified below.*
- (2) *In the case of ships of less than 400 gross tonnage, the Administration may establish appropriate measures in order to ensure that the applicable provisions of this Annex are complied with.*

Regulation 6 Issue of International Air Pollution Prevention Certificate

- (1) *An International Air Pollution Prevention Certificate shall be issued, after survey in accordance with the provisions of regulation 5 of this Annex, to:*
 - (a) *any ship of 400 gross tonnage or above engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties; and*

Interpretation

- 1) This UI pertains to the gross tonnage to be used when applying MARPOL Annex VI.
- 2) When applying MARPOL Annex VI the gross tonnage as calculated in accordance with the tonnage measurements regulations contained in Annex I to the International Convention on Tonnage Measurements of Ships, 1969 or any successor Convention is to be used.

Note:

1. This Unified Interpretation is to be applied by all Members and Associates to ships the keels of which are laid after 1 January 2008.

End of Document

MPC 93 (July 2008)

Annex I of MARPOL 73/78 Regulation 23 Accidental oil outflow performance, as amended by Resolution MEPC.117 (52)

Regulation 23.7.3.2, as amended by Resolution MEPC.117(52) reads:

“The cargo level after damage shall be calculated as follows:

$$h_c = \{(d_s + t_c - Z_1)(\rho_s) - (1000p)/g\}/\rho_n$$

where the overpressure p is defined as:

“ p = if an inert gas system is fitted, the normal overpressure, in kilopascals, to be taken as not less than 5 kPa; if an inert gas system is not fitted, the overpressure may be taken as 0.”

Interpretation:

The pressure p is to be taken as the maximum static inert gas pressure that is obtained at the discharge side of the non-return device fitted forward of the deck water seal or 5 kPa, whichever is greater. However, p need not be taken more than the maximum tank pressure corresponding to the P/V valve set-point.

Note:

This Unified Interpretation is to be applied by all Members and Associates on ships subject to MARPOL I, regulation 23, as amended by Resolution MEPC.117(52), for which the building contract is placed on or after 1 April 2009.

End of Document

**MPC
94**
(July
2008)

Annex I of MARPOL 73/78 Regulation 12A.6-8 and 11.8 Oil Fuel Tank Protection, as amended by Resolution MEPC.141(54)

Regulation 12A.6-8 and 11.8 as Amended by Resolution MEPC.141(54) reads:

6 For ships, other than self-elevating drilling units, having an aggregate oil fuel capacity of 600m^3 and above, oil fuel tanks shall be located above the moulded line of the bottom shell plating nowhere less than the distance h as specified below:

$$h = B/20 \text{ m or,}$$

$h = 2.0 \text{ m, whichever is the lesser.}$

The minimum value of $h = 0.76 \text{ m}$

In the turn of the bilge area and at locations without a clearly defined turn of the bilge, the oil fuel tank boundary line shall run parallel to the line of the midship flat bottom as shown in Figure 1.

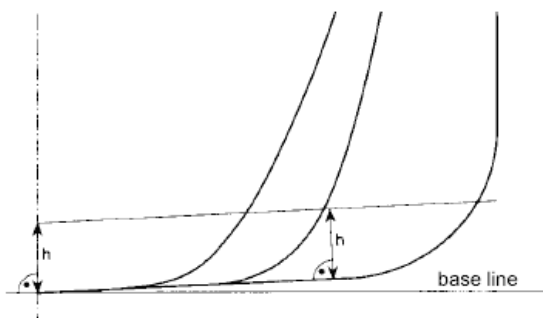


Figure 1 – Oil fuel tank boundary lines for the purpose of paragraph 6

7 For ships having an aggregate oil fuel capacity of 600 m^3 or more but less than $5,000 \text{ m}^3$, oil fuel tanks shall be located inboard of the moulded line of the side shell plating, nowhere less than the distance w which, as shown in Figure 2, is measured at any cross-section at right angles to the side shell, as specified below:

$$w = 0.4 + 2.4 C/20,000 \text{ m or}$$

The minimum value of $w = 1.0 \text{ m}$, however for individual tanks with an oil fuel capacity of less than 500 m^3 the minimum value is 0.76 m .

Note:

This Unified Interpretation is to be applied by all Members and Associates on ships subject to MARPOL I, regulation 12A, as amended by Resolution MEPC.141(54), for which the building contract is placed on or after 1 April 2009.

MPC 94

(cont)

8 For ships having an aggregate oil fuel capacity of 5,000 m³ and over, oil fuel tanks shall be located inboard of the moulded line of the side shell plating, nowhere less than the distance w which, as shown in Figure 2, is measured at any cross-section at right angles to the side shell, as specified below:

$$w = 0.5 + C/20,000 \text{ m or}$$

$w = 2.0 \text{ m}$, whichever is the lesser.

The minimum value of $w = 1.0 \text{ m}$

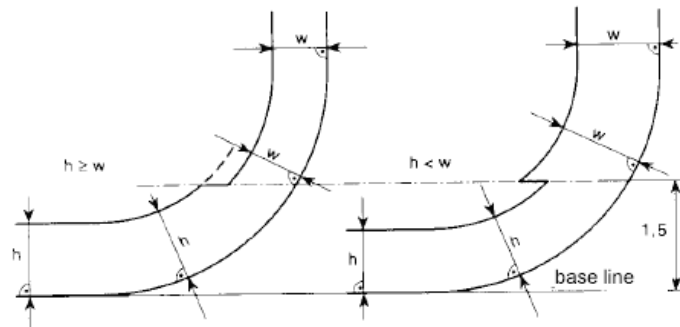


Figure 2 – Oil fuel tank boundary lines for the purpose of paragraphs 7 and 8

....

11 Alternatively to paragraphs 6 and either 7 or 8, ships shall comply with the accidental oil fuel outflow performance standard specified below:

....

.8 For the purpose of maintenance and inspection, any oil fuel tanks that do not border the outer shell plating shall be located no closer to the bottom shell plating than the minimum value of h in paragraph 6 and no closer to the side shell plating than the applicable minimum value of w in paragraph 7 or 8."

Interpretation:

1. The distance " h " should be measured from the moulded line of the bottom shell plating at right angle to it (Reg.12A, Fig.1).

1.1 For vessels designed with a skeg, the skeg should not be considered as offering protection for the FO tanks. For the area within skeg's width the distance " h " should be measured perpendicular to a line parallel to the baseline at the intersection of the skeg and the moulded line of the bottom shell plating as indicated in Figure A.

MPC 94

(cont)

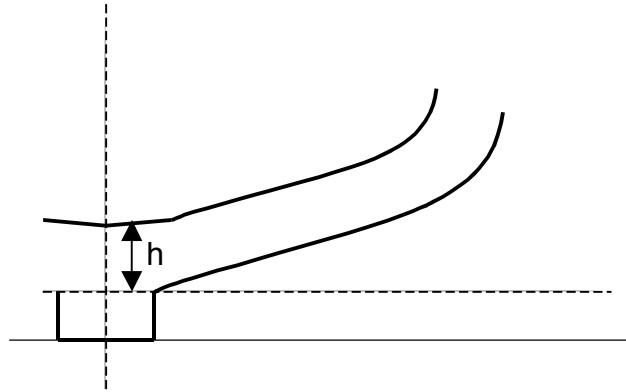


Figure A

1.2 For vessels designed with a permanent trim, the baseline should not be used as a reference point. The distance “h” should be measured perpendicular to the moulded line of the bottom shell plating at the relevant frames where fuel tanks are to be protected.

2. For vessels designed with deadrising bottom, the distance “1.5h” should be measured from the moulded line of the bottom shell plating but at right angle to the baseline, as indicated in Figure B.

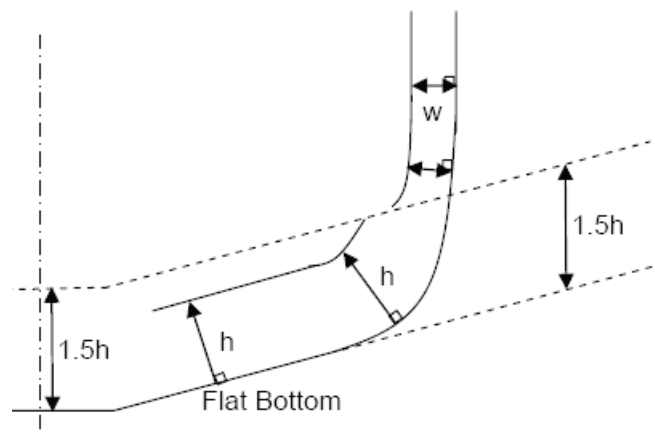


Figure B

3. Paragraphs 1 and 2, above also apply to the reference to the distance “h” in Regulation 12A-11.8.

End of
Document

SC224 Measurement of Distances

(Aug 2008)

LL74

(Aug 2008)

Several IMO instruments (e.g., ICLL, SOLAS and MARPOL Conventions, the IBC Code and the IGC Code, etc.) require distances to be measured such as tank length, height, width, ship (or subdivision or waterline) length, etc..

MPC95

(Aug 2008)

Interpretation

Unless explicitly stipulated otherwise in the text of the regulations in SOLAS, Load Line and MARPOL Conventions and any of their mandatory Codes, distances are to be measured by using moulded dimensions.

Note:

This Unified Interpretation is to be uniformly implemented by IACS Societies from 1 April 2009.

End of Document

SC234 Initial Statutory Surveys at New Construction

(Apr 2009)

1. Scope¹

LL76

(Apr 2009)

The scope of this UI is to define the requirements for the initial statutory surveys at new construction as detailed in IMO Resolution A.997(25), which are not addressed in UR Z23 for the following as applicable:-

MPC96

(Apr 2009)

- (i) International Load Line Certificate (1966)
- (ii) Cargo Ship Safety Equipment Certificate
- (iii) International Oil Pollution Prevention Certificate

This UI only covers the survey activities required and does not cover the technical interpretations of the statutory requirements or approval of plans, designs and manuals required by the Regulations.

2. This UI does not cover the requirements for type approval or certification at vendor's works and for which evidence of acceptance is to be provided as indicated in the survey tables.

3. Definitions used in the survey tables

Survey Item	A description of the survey item considered
Origin of the Requirement	Applicable Statutory Regulation
Approved Drawings /Documentation	Indicates whether approved drawings/documentation is required
Conformity Verification	This verification may consist of an examination of the certificate, a check of the marks or, for products which require type approval, to verify conformity of the product with the approved prototype or certification with Flag Administration requirements
Survey during construction or installation	Indicates whether the witness by surveyor of construction and installation on board is required
Tightness Testing	Indicates whether tightness testing is required to be witnessed by the surveyor for survey item
Survey after construction or installation	Indicates whether the survey item is examined by the Surveyor after completion of its construction and installation on board
Function Test	Indicates whether a survey item or system is to be subjected to a functioning and/or performance test or trial in the presence of a Surveyor after installation on board

¹Note: This UI is to be uniformly implemented by IACS Societies on ships contracted for construction (as defined in IACS PR 29) from 1st July 2010.

SC234

(cont)

Onboard Verification of documentation	Indicates whether the required documentation is to be verified on board by the surveyor
Series of Vessels	As defined by IACS PR 29

LL76

(cont)

MPC96

(cont)

4. Application

This UI applies to all vessels for which the statutory certificates listed in paragraph 1 are to be issued at new construction by IACS Societies.

5. Interpretation of the survey requirements are given in Appendix 1

Table 1 – Load Line

Table 2 – Safety Equipment

Table 3 – MARPOL Annex 1

6. Specific flag administration requirements, if any, supersede the requirements contained in this UI.

7. Qualification and monitoring of personnel

The surveys required by this UI shall be carried out by exclusive surveyors of the classification society, as defined in PR5. The surveyors are to be qualified to be able to carry out the tasks and procedures are to be in place to ensure that their activities are monitored. Details are specified in PR6 and PR7.

8. Inspection and test plan for new building activities

The shipbuilder is to provide inspection and test plans for the items which are required to be surveyed and/or tested prior to the commencement of the surveys and/or test.

9. Product and Type Approval Certificates

The shipbuilder is to provide product and type approval certificates for the applicable items listed in Appendix 1 to be placed on board.

10. Proof of the consistency of surveys

The classification society is to be able to provide evidence, e.g. through records, check lists, inspection and test records, etc. that its surveyors have complied with the requirements of this UI.

Enclosure: Appendix 1

Appendix 1 to Uls SC234, LL76 & MPC96

1. Description

COLUMN 1	A.997(25) Requirements	
COLUMN 2	Survey Item	A description of the survey item considered
COLUMN 3	Origin of the Requirement	Applicable Statutory Regulation
COLUMN 4	Correspondence with Approved Drawings/Documentation	Indicates whether approved drawings/documentation is required
COLUMN 5	Conformity Verification	This verification may consist of an examination of the certificate, a check of the marks or, for type approved products, to verify conformity of the product with the approved prototype or certification with National Requirements
COLUMN 6	Survey during construction or installation	Indicates whether the witness by surveyor of fabrication and installation on board is required
COLUMN 7	Tightness Testing	Indicates whether tightness testing is required to be witnessed by the surveyor for survey item
COLUMN 8	Survey after construction or installation	Indicates whether the survey item is examined by the Surveyor after completion of its installation on board and/or
COLUMN 9	Function Test	Indicates whether a system is to be subjected to a functioning and/or performance test or trial in the presence of a Surveyor after installation on board
COLUMN 10	Onboard Verification of documentation	Indicates whether the required documentation is to be verified on board by the surveyor

Table 1. Safety Equipment

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.1	examining the fire pumps and fire main and the disposition of the hydrants, hoses and nozzles and the international shore connection and checking that each fire pump, including the emergency fire pump, can be operated separately so that two jets of water are produced simultaneously from different hydrants at any part of the ship whilst the required pressure is maintained in the fire main	Fire Pumps	(SOLAS 74/00 reg.II-2/10.2 FSSC chs.2 and 12) (SOLAS 74/88 regs.II-2/4 and 19)	X	X		X		X
		Fire Mains		X				X	
		Hydrants		X	X		X		
		Hoses and Nozzles		X	X		X		
		International Shore Connection		X			X		
(EI) 1.1.3.2	examining the provision and disposition of the fire extinguishers	Fire Extinguishers	(SOLAS 74/00 reg.II-2/10.3 FSSC ch.4) (SOLAS 74/88 reg.II-2/17)	X	X		X		
(EI) 1.1.3.3	examining the fire fighters' outfits and emergency escape breathing devices - EEBDs -	Fire Fighters' Outfits	(SOLAS 74/00 regs.II-2/10.10, 13.3.4 and 13.4.3 FSSC ch.3) (SOLAS 74/88 reg.II-2/17)	X	X		X		
		EEBDs - Emergency Escape Breathing Devices		X	X		X		
(EI) 1.1.3.4	checking the operational readiness and maintenance of fire-fighting systems	Operational Readiness and Maintenance of Fire-fighting System	(SOLAS 74/00 reg.II-2/14) (SOLAS 74/88 reg.II-2/21)					X	
(EI) 1.1.3.5	examining the fixed fire-fighting system for the machinery, cargo, vehicle, special category and ro-ro spaces, as appropriate, and confirming that the installation tests have been satisfactorily completed and that its means of operation are clearly marked	Fixed Fire fighting systems	(SOLAS 74/00 regs.II-2/10.4, 10.5, 10.7 and 20.6.1, FSSC chs.5 to 7) (SOLAS 74/88 regs.II-2/7 and 53)	X	X		X	X	X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.6	examining the fire-extinguishing and special arrangements in the machinery spaces and confirming, as far as practicable and as appropriate, the operation of the remote means of control provided for the opening and closing of the skylights, the release of smoke, the closure of the funnel and ventilation openings, the closure of power operated and other doors, the stopping of ventilation and boiler forced and induced draft fans and the stopping of oil fuel and other pumps that discharge flammable liquids	Remote means of opening and closing of Skylights	(SOLAS 74/00 regs.II-2/5.2, 8.3, 9.5 and 10.5) (SOLAS 74/88 regs.II-2/7 and 11)	X					X
		Fire Dampers and Funnel opening		X	X				X
		Closure of power operated and other doors		X	X				X
		remote stops for ventilation and boiler fans		X					X
		remote stops for FO pumps		X					X
(EI) 1.1.3.7	examining any fire detection and alarm system and any automatic sprinkler, fire detection and fire alarm system and confirming that installation tests have been satisfactorily completed	Fixed Fire Detection System	(SOLAS 74/00 regs.II-2/7.2, 7.3, 7.4, 7.5.1, 7.5.5, 19.3.3 and 20.4; FSSC ch.9) (SOLAS 74/88 regs.II-2/11, 13, 14, 53 and 54)	X	X		X		X
		Fire Alarm System		X	X		X		X
		Automatic Sprinkler		X	X		X		X
(EI) 1.1.3.8	examining the fire-extinguishing system for spaces containing paint and/or flammable liquids and deep-fat cooking equipment in accommodation and service spaces and confirming that installation tests have been satisfactorily completed and that its means of operation are clearly marked	Spaces containing Paint and/or flammable liquids: Fire Extinguishing System	(SOLAS 74/00 regs.II-2/10.6.3 and 10.6.4; FSSC chs.4 to 7) (SOLAS 74/88 reg.II-2/18.7)	X			X		
		Deep-Fat Cooking Equipment in Accommodation: Fire Extinguishing System		X			X		
(EI) 1.1.3.9	examining the arrangements for remote closing of valves for oil fuel, lubricating oil and other flammable oils and confirming, as far as practicable and as appropriate, the operation of the remote means of closing the valves on the tanks that contain oil fuel, lubricating oil and other flammable oils	Remote Closing Valves for: Oil Fuel	(SOLAS 74/00 reg.II-2/4.2.2.3.4) (SOLAS 74/88 reg.II-2/15.2.5)	X					X
		Remote Closing Valves for: Lubricating Oil		X					X
		Remote Closing Valves for: Other Flammable Oils		X					X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.10	examining the fire protection arrangements in cargo, vehicle and ro-ro spaces and confirming, as far as practicable and as appropriate, the operation of the means for closing the various openings	Fire Detection and Alarm system	(SOLAS 74/00 regs.II-2/10.7, 20.2.1, 20.3 and 20.6.2) (SOLAS 74/88 reg.II-2/53)	X	X		X		X
		Fixed Fire Extinguishing System		X				X	
		Structural Fire Protection		X	X		X		
		Precaution against ignition of flammable vapours in closed vehicle spaces, closed ro-ro spaces and special category spaces		X			X		X
(EI) 1.1.3.11	examining, when appropriate, the special arrangements for carrying dangerous goods, including checking the electrical equipment and wiring, the ventilation, the provision of protective clothing and portable appliances and the testing of the water supply, bilge pumping and any water spray system	Water Supply	(SOLAS 74/00 reg.II-2/19 (except 19.3.8, 19.3.10 and 19.4) FSSC chs.9 and 10) (SOLAS 74/88 reg.II-2/54)	X					X
		Sources of Ignition		X	X		X		
		Detection System		X	X				X
		Ventilation		X			X		
		Bilge system		X					X
		Personnel Protection		X	X		X		
		Fire Extinguishers		X	X		X		
		Insulation of Machinery space boundaries		X	X		X		
Water Spray System	X	X	X	X			X		
(EI) 1.1.3.12	checking the provision and disposition of the survival craft, where applicable, marine evacuation systems and rescue boats	Survival Craft Provision and Disposition	(SOLAS 74/88 regs.III/11 to 16 and 31; LSAC section 6.2)	X	X		X		
		Rescue Boat Provision and Disposition		X	X		X		
		Marine Evacuation Systems Provision and Disposition		X	X		X		
(EI) 1.1.3.13	deployment of 50% of the MES after installation	Deployment of Marine Evacuation Systems	(LSAC paragraph 6.2.2.2)						X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.14	examining each survival craft, including its equipment	Survival Craft Design	(SOLAS 74/88 reg.III/31 LSAC sections 2.5, 3.1 to 3.3 and 4.1 to 4.9)		X		X		
		Survival Craft Engine			X			X	
		Survival Craft Equipment			X		X		
(EI) 1.1.3.15	examining the embarkation arrangements for each survival craft and the testing of each launching appliance, including overload tests, tests to establish the lowering speed and the lowering of each survival craft to the water with the ship at its lightest sea-going draught, and, where applicable, launching underway at 5 knots, checking the recovery of each lifeboat	Survival Craft Launching and Recovery appliances	(SOLAS 74/00 regs.III/11, 12, 13, 16, 31 and 33 LSAC section 6.1)		X		X		X
		Survival Craft Embarkation Arrangements			X		X		X
(EI) 1.1.3.16	examining the embarkation arrangements for each marine evacuation device, where applicable, and the launching arrangements, including inspection for lack of side shell opening between the embarkation station and waterline, review of distance to the propeller and other life-saving appliances and ensuring that the stowed position is protected from heavy weather damage, as much as practicable	MES Launching and Recovery appliances	(SOLAS 74/00 reg.III/15; LSAC section 6.2)	X	X		X		X
		MES Embarkation Arrangements		X			X		
(EI) 1.1.3.17	examining each rescue boat, including its equipment	Rescue Boat Design	(SOLAS 74/88 reg.III/31; LSAC sections 2.5, 5.1 and 6.1)		X		X		
		Rescue Boat Engine			X		X		X
		Rescue Boat Equipment			X		X		
(EI) 1.1.3.18	examining the embarkation and recovery arrangements for each rescue boat and testing each launching and recovery appliance, including overload tests, tests to establish the lowering and recovery speeds and ensuring that each rescue boat can be lowered to the water and recovered with the ship at its lightest sea-going draught, launching underway at 5 knots	Rescue Boat Launching and Recovery appliances and Arrangements	(SOLAS 74/88 regs.III/14, 17 and 31; LSAC section 6.1)		X		X		X
(EI) 1.1.3.19	testing that the engine of the rescue boat(s) and of each lifeboat, when so fitted, start satisfactorily and operate both ahead and astern	Test of engines of lifeboat and Rescue Boat	(SOLAS 74/00 reg.III/19)						X
(EI) 1.1.3.20	confirming that there are posters or signs in the vicinity of survival craft and their launching stations and containers, brackets, racks and other similar stowage locations for life-saving equipment	Posters or Signs	(SOLAS 74/88 regs.III/9 and 20)				X		

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.21	examining the provision and stowage and checking the operation of portable on board communications equipment, if provided, and two-way VHF radiotelephone apparatus and radar transponders	Two-way VHF radiotelephone apparatus	(SOLAS 74/88 regs.II-2/12.2 and III/6)		X		X		X
		Radar Transponders			X		X		X
(EI) 1.1.3.22	examining the provision and stowage of the distress flares and the line-throwing appliance, checking the provision and operation of fixed on board communications equipment, if provided, and testing the means of operation of the general alarm system	Distress Flares and Line-Throwing Appliances	(SOLAS 74/00 regs.III/6 and 18; LSAC sections 3.1, 7.1 and 7.2)		X		X		
		On board Communications equipment			X		X		X
		General Alarm System		X			X		X
(EI) 1.1.3.23	examining the provision, disposition and stowage of the lifebuoys, including those fitted with self-igniting lights, self-activating smoke signals and buoyant lines, lifejackets, and immersion suits	Lifebuoys	(SOLAS 74/00 regs.III/7 and 32 to 37; LSAC sections 2.1, 2.5 and 3.3)	X	X		X		
		Lifebuoys fitted with self-igniting lights		X	X		X		
		Lifebuoys fitted with self-activating smoke signals		X	X		X		
		Lifebuoys fitted with buoyant lines		X	X		X		
		Lifejackets		X	X		X		
		Immersion suits		X	X		X		
		Anti-exposure suits		X	X		X		

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.24	checking the lighting of the muster and embarkation stations and the alleyways, stairways and exits giving access to the muster and embarkation stations, including when supplied from the emergency source of power	Muster and Embarkation Station Lighting	(SOLAS 74/88 regs.II-1/43 and III/11)				X		X
		Alleyways and Stairways Lighting					X		X
		Exits giving Access to the Muster and Embarkation Stations Lighting					X		X
		Muster and Embarkation Station Lighting from Emergency Source of Power					X		X
		Alleyways and Stairways Lighting from Emergency Source of Power					X		X
		Exits giving Access to the Muster and Embarkation Stations Lighting from Emergency Source of Power					X		X
(EI) 1.1.3.25	examining the provision and positioning and checking the operation of, as appropriate, the navigation lights, shapes and sound signalling equipment	Navigation Lights	(International Regulations for Preventing Collisions at Sea (COLREG) in force, regs.20 to 24, 27 to 30 and 33)	X	X		X		X
		Shapes and Sounds signalling equipment			X		X		X
(EI) 1.1.3.26	checking that the minimum safe distances from the steering and standard magnetic compasses for all electrical equipment are complied with	Bridge	(SOLAS 74/00 regs.V/17 and 19)				X		
(EI) 1.1.3.27	checking the electromagnetic compatibility of electrical and electronic equipment on or in the vicinity of the bridge	Bridge	(SOLAS 74/00 reg.V/17)		X		X		

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.28	checking, as appropriate, the provision and operation of the following ship borne navigational systems equipment								
(EI) 1.1.3.28 .1	the magnetic compass, including examining the sighting, movement, illumination and a pylorus or compass bearing device	Navigation Equipment: Magnetic Compass	(SOLAS 74/00 reg.V/19)		X		X		
		Navigation Equipment: Pylorus or Compass Bearing Device			X				X
(EI) 1.1.3.28 .2	nautical charts and nautical publications necessary for the intended voyage are available and have been updated, and, where electronic systems are used, the electronic charts have been updated and the required back-up system is provided and updated	Navigation Equipment: ECDIS including back-up arrangements	(SOLAS 74/00 reg.V/19)		X				X
		Nautical Charts and Nautical Publications					X		
(EI) 1.1.3.28 .3	global navigation satellite system receiver or terrestrial radio navigation system	Navigation Equipment: GNSS receiver			X				X
(EI) 1.1.3.28 .4	sound reception system, when bridge is totally enclosed	Navigation Equipment: Sound Reception System			X				X
(EI) 1.1.3.28 .5	means of communication to emergency steering position, where provided	Navigation Equipment: Means of communication with Emergency Steering Position		X	X				X
(EI) 1.1.3.28 .6	spare magnetic compass	Navigation Equipment: Spare Magnetic Compass			X		X		
(EI) 1.1.3.28 .7	daylight signalling lamp	Navigation Equipment: Daylight Signalling Lamp			X				X
(EI) 1.1.3.28 .8	echo sounding device	Navigation Equipment: Echo-sounding Device			X				X
(EI) 1.1.3.28 .9	radar reflector	Navigation Equipment: radar reflector			X		X		

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.28 .10	radar(s), including examining the waveguide and cable runs for routing and protection and the display unit confirming lighting, correct operation of all controls, and functions	Navigation Equipment: Radar Installations			X		X		X
(EI) 1.1.3.28 .11	electronic plotting aid, automatic tracking aid or automatic radar plotting aid as appropriate, using the appropriate test facilities	Navigation Equipment: Electronic Plotting Aid			X				X
		Navigation Equipment: Automatic Tracking aid(s) or Automatic Radar Plotting Aid			X				X
(EI) 1.1.3.28 .12	speed and distance measuring devices "through the water" and "over the ground"	Navigation Equipment: Speed and Distance measuring Device			X				X
(EI) 1.1.3.28 .13	transmitting heading device providing heading information to radar, plotting aids and automatic identification system equipment and voyage data recorder	Navigation Equipment: Transmitting Heading Device			X				X
(EI) 1.1.3.28 .14	automatic identification system	Navigation Equipment: AIS Automatic Identification System			X				X
(EI) 1.1.3.28 .15	gyrocompass, including examining the alignment of the master and all repeaters	Navigation Equipment: Gyro Compass			X				X
		Navigation Equipment: Gyro Compass Repeaters			X				X
(EI) 1.1.3.28 .16	rudder angle indicator	Navigation Equipment: Rudder Angle Indicator			X				X
(EI) 1.1.3.28 .17	propeller rate of revolution indicator	Navigation Equipment: Propeller rate of Revolution Indicator			X				X
(EI) 1.1.3.28 .18	propeller, operational mode, thrust, and pitch indicator	Navigation Equipment: Variable-Pitch propeller pitch and operational mode indicator			X				X
(EI) 1.1.3.28 .19	rate-of-turn indicator	Navigation Equipment: Rate of Turn Indicator			X				X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.3.28 .20	heading or track control system	Navigation Equipment: Heading or Track Control System			X				X
(EI) 1.1.3.29	checking for the provision and operation of the voyage data recorder	VDR - Voyage Data Recorder	(SOLAS 74/00 reg.V/20)		X				X
(EI) 1.1.3.31	checking navigation bridge visibility	Navigation Bridge Visibility	(SOLAS 74/00 reg.V/22)	X					
(EI) 1.1.3.32	checking the provision and, as appropriate, the deployment or operation of the pilot ladders and hoists/pilot transfer arrangements	Pilot ladders and hoists/pilot transfer arrangements	(SOLAS 74/00 reg.V/23)	X	X		X		X
(EI) 1.1.4.1	checking the deck foam system, including the supplies of foam concentrate, and testing that the minimum number of jets of water at the required pressure in the fire main is obtained (see (EI) 1.1.3.1) when the system is in operation	Deck Foam System: Foam Tanks	(SOLAS 74/00 reg.II-2/10.8; FSSC ch.15) (SOLAS 74/88 reg.II-2/61)	X			X		
		Deck Foam System: Monitors			X		X		X
		Deck Foam System: Applicators			X		X		X
		Deck Foam System: Foam Concentrates			X				
(EI) 1.1.4.2	examining the inert gas system and in particular:	Cargo Tank Protection: Venting	(SOLAS 74/00 reg.II-2/4.5.5; FSSC ch.15) (SOLAS 74/88 reg.II-2/62)	X	X				
(EI) 1.1.4.2. 1	examining externally for any sign of gas or effluent leakage	Signs of Gas or effluent Leakage					X		X
(EI) 1.1.4.2. 2	confirming the proper operation of both inert gas blowers	Inert Gas Blowers							X
(EI) 1.1.4.2. 3	observing the operation of the scrubber-room ventilation system	Scrubber Room Ventilation							X
(EI) 1.1.4.2. 4	checking the deck water seal for automatic filling and draining	Deck Water Seal					X		X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.4.2. 5	examining the operation of all remotely operated or automatically controlled valves and, in particular, the flue gas isolating valves	Remote or Automatic Control Valves Flue Gas Isolating Valve					X		X X
(EI) 1.1.4.2. 6	observing a test of the interlocking feature of soot blowers	Interlocking of soot Blowers							X
(EI) 1.1.4.2. 7	observing that the gas pressure-regulating valve automatically closes when the inert gas blowers are secured	Gas Pressure-Regulating Valve							X
(EI) 1.1.4.2. 8	checking, as far as practicable, the following alarms and safety devices of the inert gas system using simulated conditions where necessary:								X
(EI) 1.1.4.2. 8.1	high oxygen content of gas in the inert gas main	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.2	low gas pressure in the inert gas main	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.3	low pressure in the supply to the deck water seal	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.4	high temperature of gas in the inert gas main	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.5	low water pressure or low water-flow rate	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.6	accuracy of portable and fixed oxygen-measuring equipment by means of calibration gas	Simulation Test for Alarms and Safety Devices			X				X
(EI) 1.1.4.2. 8.7	high water level in the scrubber	Simulation Test for Alarms and Safety Devices							X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.4.2. 8.8	failure of the inert gas blowers	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.9	failure of the power supply to the automatic control system for the gas regulating valve and to the instrumentation for continuous indication and permanent recording of pressure and oxygen content in the inert gas main	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 8.10	high pressure of gas in the inert gas main	Simulation Test for Alarms and Safety Devices							X
(EI) 1.1.4.2. 9	checking the proper operation of the inert gas system on completion of the checks listed above	IGS Operating Procedure						X	
(EI) 1.1.4.3	examining the fixed fire-fighting system for the cargo pump room, confirming that the installation tests have been satisfactorily completed and that its means of operation are clearly marked and, when appropriate, checking the operation of the remote means for closing the various openings	Cargo Pump Room Fire Extinguishing	(SOLAS 74/00 reg.II-2/10.9; FSSC chs.5, 6, 7 and 8, as applicable)	X			X		
		Cargo Pump Room Means of Closing Various Opening					X		X
(EI) 1.1.4.4	examining the protection of the cargo pump-rooms and confirming that the installation tests have been satisfactorily completed	temperature sensing devices	(SOLAS 74/00 reg.II-2/4.5.10) (SOLAS 74/88 regs.II-2/55 to 58)	X	X				X
		Interlock between lighting and ventilation							X
		monitoring of hydrocarbon gas			X				X
		Bilge monitoring							X
(EI) 1.1.5.1	confirming that the fire control plans are permanently exhibited or, alternatively, emergency booklets have been provided and that a duplicate of the plans or the emergency booklet are available in a prominently marked enclosure external to the ship's deckhouse	Required Documentations	(SOLAS 74/00 reg.II-2/15.2.4) (SOLAS 74/88 reg.II-2/20)					X	
(EI) 1.1.5.2	confirming that maintenance plans have been provided	Required Documentations	(SOLAS 74/00 regs.II-2/14.2.2 and 14.4)					X	
(EI) 1.1.5.3	confirming that the training manuals and the fire safety operational booklets have been provided	Required Documentations	(SOLAS 74/00 regs.II-2/15.2.3, 16.2 and 16.3)					X	

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	INSPECTIONS DURING INSTALLATION	INSPECTION AFTER INSTALLATION	ONBOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(EI) 1.1.5.4	confirming, where appropriate, that the ship is provided with a document indicating compliance with the special requirement for carrying dangerous goods	Required Documentations	(SOLAS 74/00 reg.II-2/19.4) (SOLAS 74/88 reg.II-2/54(3))					X	
(EI) 1.1.5.5	confirming that emergency instructions are available for each person on board, that the muster list is posted in conspicuous places and they are in a language understood by the persons on board	Required Documentations	(SOLAS 74/00 regs.III/8 and 37)					X	
(EI) 1.1.5.6	confirming that the training manual and training aids for the life-saving appliances have been provided	Required Documentations	(SOLAS 74/00 reg.III/35)					X	
(EI) 1.1.5.7	confirming that the instructions for on board maintenance of the life-saving appliances have been provided	Required Documentations	(SOLAS 74/88 reg.III/36)					X	
(EI) 1.1.5.8	confirming that a table or curve of residual deviations for the magnetic compass has been provided, and that a diagram of the radar installations shadow sectors is displayed	Required Documentations	(SOLAS 74/00 reg.V/19)					X	
(EI) 1.1.5.9	checking that operational and, where appropriate, maintenance manuals for all navigational equipment are provided	Required Documentations	(SOLAS 74/00 reg.V/16)					X	
(EI) 1.1.5.10	checking that the charts and nautical publications necessary for the intended voyage are available and have been updated	Required Documentations	(SOLAS 74/88 reg.V/27)					X	
(EI) 1.1.5.11	checking that the International Code of Signals and a copy of Volume III of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual have been provided	Required Document	(SOLAS 74/00/02, reg.V/21)					X	
(EI) 1.1.5.12	checking that arrangements are provided to maintain records of navigational activities and daily reporting	Required Documents	(SOLAS 74/00/03, reg.V/28)					X	
(EI) 1.1.5.13	checking that the life-saving signals to be used by ships, aircraft or persons in distress are available	Required Documents	(SOLAS 74/00, reg.V/29)					X	
(EI) 1.1.5.14	confirming that continuous synopsis record is provided	Required Documents	(SOLAS 74/02, reg.XI-1/5)					X	
(EI) 1.1.6.1	confirming, when appropriate, that the instruction manuals for the inert gas system have been provided	Required Documents	(FSSC ch.15 paragraph 2.4.4) (SOLAS 74/88, reg.II-2/62.21)					X	

Table 2. Load Line

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	TIGHTNESS TEST	SURVEY AFTER CONSTRUCTION OR INSTALLATION	FUNCTION TEST	ON BOARD VERIFICATION OF DOCUMENTATION
(LI) 1.1.2	For the load line the survey during construction and after installation should consist of:									
(LI) 1.1.2.2	confirming that the deck line and load line mark are properly positioned	Positioning of Deck Line and Load Line Mark	(LLC 66/88 regs.4 to 9)	X				X		
(LI) 1.1.2.3	witnessing the inclining experiment or lightweight survey	Inclining Experiment	(LLC 66/88/03 reg.10)	X				X		
(LI) 1.1.2.4	examining the superstructure end bulkheads and the openings therein	Superstructure End Bulkheads	(LLC 66/88 regs.11 and 12)							
		Superstructure Openings		X	X		X	X		
(LI) 1.1.2.5	examining the means of securing the weather tightness of cargo hatchways, other hatchways and other openings on the freeboard and superstructure decks	Freeboard Deck - Means of Securing the weather tightness of Cargo Hatchways	(LLC 66/88 regs. 13 to 18)	X		X	X		X	
		Freeboard Deck - Means of Securing the weather tightness of Other Hatchways		X			X		X	
		Freeboard Deck - Means of Securing the weather tightness of Other Openings		X			X		X	
		Superstructure Deck - Means of Securing the weather tightness of Cargo Hatchways		X		X	X		X	
		Superstructure Deck - Means of Securing the weather tightness of Other Hatchways		X			X		X	
		Superstructure Deck - Means of Securing the weather tightness of Other Openings		X			X		X	
(LI) 1.1.2.6	examining the ventilators and air pipes, including their coamings and closing appliances	Ventilators and air pipes including their coamings and closing appliances	(LLC 66/88 regs.19 and 20)	X	X			X		

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	TIGHTNESS TEST	SURVEY AFTER CONSTRUCTION OR INSTALLATION	FUNCTION TEST	ON BOARD VERIFICATION OF DOCUMENTATION
(LI) 1.1.2.7	examining the watertight integrity of the closures to any openings in the ship's side below the freeboard deck	Closures to any openings in the ship's side below the freeboard deck	(LLC 66/88 reg.21)	X	X		X	X	X	
(LI) 1.1.2.8	examining the scuppers, inlets and discharges	Scuppers, Inlets and Discharger	(LLC 66/88 reg.22)	X	X			X		
(LI) 1.1.2.9	examining the garbage chutes	Garbage chute	(LLC 66/88/03, reg. 22-1)	X		X	X			
(LI) 1.1.2.10	examining the spurling pipes and cable lockers	Spurling Pipe	(LLC 66/88/03, reg. 22-2)	X		X	X			
		Cable Locker		X		X	X			
(LI) 1.1.2.11	examining the side scuttles and deadlights	Side Scuttles and Deadlights	(LLC 66/88 reg.23)	X	X		X	X		
(LI) 1.1.2.12	examining the bulwarks including the provision of freeing ports, special attention being given to any freeing ports fitted with shutters	Bulwarks	(LLC 66/88/03 reg.24, 25)	X				X		
		Freeing Ports		X				X		
		Freeing Ports fitted with shutters		X				X	X	
(LI) 1.1.2.13	examining the guardrails, gangways, walkways and other means provided for the protection of the crew and means for safe passage of crew	Guardrails	(LLC 66/88/03 reg.25, 25-1)	X					X	
		Gangways								
		Walkways								
		Other means								
(LI) 1.1.2.14	special requirements for ships permitted to sail with type "A" or type "B-minus" freeboards	Machinery Casings	(LLC 66/88/03 reg.26, 27)	X			X	X		
		Gangway and Access								
		Hatchways								
		Freeing arrangements								

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS / DOCUMENTATION	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	TIGHTNESS TEST	SURVEY AFTER CONSTRUCTION OR INSTALLATION	FUNCTION TEST	ON BOARD VERIFICATION OF DOCUMENTATION
(LI) 1.1.2.15	checking, when applicable, of the fittings and appliances for timber deck cargoes	Uprights	(LLC 66/88 regs.42 to 45)	X				X		
		Lashings		X					X	
		Stability		X					X	
		Protection of Crew		X				X		
(LI) 1.1.3.1	checking that the loading and ballasting information has been supplied to the master	Loading and Stability Manual	(LLC 66/88 reg.10)	X					X	

Table 3. MARPOL Annex 1

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS/DOCUMENTATIONS	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	SURVEY AFTER CONSTRUCTION OR INSTALLATION	ON BOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
Requirements for All Ships									
(OI) 1.1.3.1	confirming the satisfactory installation and operation of, as appropriate, oil filtering equipment and when appropriate the operation of the automatic means provided to stop the discharge of effluent and the satisfactory operation of the alarm - or other installation	oil filtering equipment Automatic Stopping Device Alarm	MARPOL 90/04 Annex I regs. 14 and 15	X	X			X	X
(OI) 1.1.3.2	confirming, when applicable, that the oil content meter and its recording device are operable and that there is a sufficient supply of consumables for the recording device on board	Oil Content Meter	MARPOL 90/04 Annex I regs. 14 and 15		X	X			X
		Recording Device			X	X			X
		Consumables						X	
(OI) 1.1.3.3	testing, where fitted, the automatic stopping device required for discharges in Special Areas	Stopping Device	MARPOL 90/04 Annex I reg. 15						X
(OI) 1.1.3.4	confirming the segregation of the oil fuel and water ballast system and the non-carriage of oil in forepeak tanks	Segregation of WB and Oil Carriage of Oil in FP Tank	MARPOL 90/04 Annex I reg. 16	X		X			
(OI) .1.1.3.5	confirming that the oily residue (sludge) tank and its discharge arrangements are satisfactory and, when the size of the sludge tank is approved on the basis of such installations, confirming the satisfactory operation of homogenizers, sludge incinerators or other recognised means for the control of sludge	Oily residue (sludge) tank	MARPOL 90/04 Annex I reg. 12	X			X		
		Discharge Arrangement		X			X		
		Approved Sludge Tank's Size		X			X		
		Incinerators/Homogenisers		X	X		X		X
(OI) 1.1.3.6	confirming the provision of the standard discharge connection	Standard Discharge Connection	MARPOL 90/04 Annex I reg. 13				X		
(OI) 1.1.3.7	confirming oil fuel tank protection arrangements	Tank Arrangements	MARPOL 90/04 Annex I reg. 12A	X		X			

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS/DOCUMENTATIONS	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	SURVEY AFTER CONSTRUCTION OR INSTALLATION	ON BOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
Additional Requirements for Oil Tankers									
(OI) 1.1.4.1	confirming that the arrangements of slop tanks or cargo tanks designated as slop tanks and associated piping systems are satisfactory	Slop Tanks Cargo Tanks designated as slop tanks	MARPOL 90/04 Annex I regs. 29 and 34	X X			X X		
(OI) 1.1.4.2	confirming the satisfactory installation and operation of the oil discharge monitoring and control system, including any audible or visual alarms, the automatic and manual means to stop the discharge of effluent, the starting interlock and the accuracy of the flow meter and the applicable resolution's requirements for installation survey	Discharge Monitoring and Control System Audible and Visual Alarms Automatic and manual means to stop discharge of Effluent Starting Interlock Accuracy Flow Meter	MARPOL 90/04 Annex I regs. 31 and 34	X	X		X X X X		X X X X
(OI) 1.1.4.3	confirming that the oil content meter and its recording device are operable and that there is a sufficient supply of consumables for the recording device on board	Oil Content meter and recording device	MARPOL 90/04 Annex I regs. 31 and 34		X		X		X
(OI) 1.1.4.4	confirming that the approved oil/water interface detectors are on board and are operational	Oil/water interface detectors	MARPOL 90/04 Annex I reg. 32		X		X		
(OI) 1.1.4.5	confirming that the arrangements of pumps, pipes and valves are in accordance with the requirements for segregated ballast systems and that there are no cross-connections between the cargo and segregated ballast systems	Segregated Ballast Tanks: Pumps, Piping and Valves	MARPOL 90/04 Annex I reg. 18	X			X		
(OI) 1.1.4.6	where a portable spool piece is provided for the emergency discharge of segregated ballast by connecting the segregated ballast system to a cargo pump, confirming that non-return valves are fitted on the segregated ballast connections and that the spool piece is mounted in a conspicuous position in the pump room with a permanent notice restricting its use	Segregated Ballast Tanks: Emergency Discharge	MARPOL 90/04 Annex I reg. 18	X			X		

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(OI) 1.1.4.7	testing ballast pipelines that pass through cargo tanks and those cargo pipelines that pass through ballast tanks to ensure there is no cross contamination	Pipelines	MARPOL 90/04 Annex I reg. 18	X			X		
(OI) 1.1.4.8	confirming that the crude oil washing system is installed in accordance with the approved plans and, in particular:		MARPOL 90/04 Annex I regs. 18 & 33	X					
(OI) 1.1.4.8.1	examining crude oil washing piping, pumps, valves and deck mounted washing machines for signs of leakage and to check that all anchoring devices for crude oil washing piping are intact and secure;	Piping, Pumps Valves & Anchoring Devices					X		
(OI) 1.1.4.8.2	carrying out pressure testing of the crude oil washing system to 1.5 times the working pressure;	Pressure Test					X		
(OI) 1.1.4.8.3	confirming in those cases where drive units are not integral with the tank washing machines, that the number of operational drive units specified in the Manual are on board;	Operational Drive Units					X		
(OI) 1.1.4.8.4	checking that, when fitted, steam heaters for water washing can be properly isolated during crude oil washing operations, either by double shut-off valves or by clearly identifiable blanks;	Steam Heaters					X		X
(OI) 1.1.4.8.5	checking that the prescribed means of communications between the deck watch keeper and the cargo control position is operational;	Means of Communication					X		X
(OI) 1.1.4.8.6	confirming that an overpressure relief device (or other approved arrangement) is fitted to the pumps supplying the crude oil washing system;	Overpressure Relief Device					X		X
(OI) 1.1.4.8.7	verifying that flexible hoses for supply of oil to the washing machines on combination carriers are of an approved type, are properly stored and are in good condition;	Flexible Hoses			X		X		

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(OI) 1.1.4.9	verifying the effectiveness of the crude oil washing system and, in particular:	COW-Crude Oil Washing: Effectiveness	MARPOL 90/04 Annex I reg. 33						
(OI) 1.1.4.9.1	checking that the crude oil washing machines are operable and to observe the proper operation of the washing machines by means of the movement indicators and/or sound patterns or other approved methods;						X		X
(OI) 1.1.4.9.2	checking the effectiveness of the stripping system in appropriate cargo tanks by observing the monitoring equipment and by hand-dipping or other approved means;								X
(OI) 1.1.4.9.3	verifying by internal tank inspection after crude oil washing that the installation and operational procedures laid down in the Operations and Equipment Manual are satisfactory;								X
(OI) 1.1.4.10	confirming that, where there is a crude oil washing system, an inert gas system has been installed and tested in accordance with the requirements of SOLAS 74/88/2000 (see (EI) 1.1.4.2 in Annex 1);	COW-Crude Oil Washing: General			X		X		X
(OI) 1.1.4.11	confirming, as appropriate, that the arrangements for the prevention of oil pollution in the event of collision or stranding are in accordance with the approved plans	Pollution due to Collision or Stranding	MARPOL 90/04 Annex I regs. 19 to 22	X			X		
(OI) 1.1.4.12	confirming that the piping systems associated with the discharge of dirty ballast water or oil-contaminated water are satisfactory	Pumping, Piping and Discharge	MARPOL 90/04 Annex I reg. 30	X			X		
(OI) 1.1.4.13	confirming that the observation and discharge control positions for visually observing the discharge of oil-contaminated water, including the testing of the communication system between the two positions are satisfactory	Observation and Discharge Control	MARPOL 90/04 Annex I reg. 30				X		X

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS/DOCUMENTATIONS	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	SURVEY AFTER CONSTRUCTION OR INSTALLATION	ON BOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(OI) 1.1.4.14	confirming that the means of draining cargo pumps and cargo lines, including the provision of a stripping device and the connections for pumping to the slop or cargo tanks or ashore are satisfactory	Means of Draining and Stripping means for pumping ashore / slop / cargo tanks	MARPOL 90/04 Annex I reg. 30	X X			X X		
(OI) 1.1.4.16	confirming that closing devices installed in the cargo transfer system and cargo piping, as appropriate, are satisfactory	Closing arrangements	MARPOL 90/04 Annex I regs. 23 & 26						X
(OI) 1.1.4.17	confirming that the subdivision and stability arrangements, in addition to the provision of (OI) 1.1.4.16, to prevent progressive flooding are satisfactory	Stability Manual Tank Arrangement	MARPOL 90/04 Annex I regs. 23 & 26	X			X	X	
(OI) 1.1.4.18	confirming the arrangements for cargo pump-room bottom protection (double bottom where required)	Tank Arrangements	MARPOL 90/04 Annex I reg. 22	X			X		
Requirements for All Ships									
(OI) 1.1.5.1	confirming that certificates for type approval for the oil filtering equipment and oil content meters are available	Type Approval Certificates	MARPOL 90/04 Annex I reg. 14		X			X	
(OI) 1.1.5.2	confirming that the Oil Record Book (Part I) has been provided	Oil Record Book	MARPOL 90/04 Annex I reg. 17					X	
(OI) 1.1.5.3	confirming that the shipboard oil pollution emergency plan or, in the case of a chemical/product tanker, a shipboard marine pollution emergency plan has been provided	SOPEP/SMPEP	MARPOL 90/04 Annex I reg. 37	X				X	
(OI) 1.1.5.4	confirming, as appropriate, that the Operating and Maintenance manuals for the 15ppm bilge separator and 15ppm bilge alarm are available	Operations Manual						X	
Additional Requirements for Oil Tankers									
(OI) 1.1.6.2	confirming that, if applicable, a Crude Oil Washing Operations and Equipment Manual has been provided	COW-Crude Oil Washing: Operations & Equipment Manual	MARPOL 90/04 Annex I reg. 35	X				X	

	A.997(25) REQUIREMENT	SURVEY ITEM	ORIGIN OF THE REQUIREMENT	CORRESPONDENCE WITH APPROVED DRAWINGS/DOCUMENTATIONS	CONFORMITY VERIFICATION	SURVEY DURING CONSTRUCTION OR INSTALLATION	SURVEY AFTER CONSTRUCTION OR INSTALLATION	ON BOARD VERIFICATION OF DOCUMENTATION	FUNCTION TEST
(OI) 1.1.6.3	confirming that an operations manual for the oil discharge monitoring and control system has been provided together with any other documentation requested by the applicable resolution	ODM Operation Manual	MARPOL 90/04 Annex I reg. 31	X				X	
(OI) 1.1.6.4	confirming that certificates for type approval for the oil content meters, oil discharge monitoring and control system and oil/water interface detectors are available	Type Approval Certificates	MARPOL 90/04 Annex I regs. 31 and 32					X	
(OI) 1.1.6.5	confirming that an Oil Record Book (Part II) has been provided	Oil Record Book	MARPOL 90/04 Annex I reg. 36					X	
(OI) 1.1.6.7	confirming that the information and data concerning the loading and damage stability has been provided	Loading and Damage Stability Data	MARPOL 90/04 Annex I reg. 28	X				X	
(OI) 1.1.6.8	confirming that the shipboard oil pollution emergency plan or in the case of a chemical/product tanker a shipboard marine pollution emergency plan has been provided	SOPEP/SMPEP	MARPOL 90/04 Annex I reg. 37	X				X	
(OI) 1.1.6.9	confirming, for oil tankers of 5,000 deadweight and above delivered on/after 1 February 2002, that the intact stability has been approved	Stability Information	MARPOL 90/04 Annex I reg. 27	X				X	
(OI) 1.1.6.10	confirming, for oil tankers of 5,000 deadweight and above, that arrangements are in place to provide prompt access to shore-based damage stability and residual structural strength computerized calculation programmes	Shore based emergency support arrangements	MARPOL 90/04 Annex I reg. 37.4					X	

End of document

RESOLUTION A.233(VII)

RECOMMENDATION ON INTERNATIONAL PERFORMANCE
SPECIFICATIONS FOR OILY-WATER SEPARATING
EQUIPMENT AND OIL CONTENT METERS

The Assembly,

Noting Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

Noting also Resolution 8 of the International Conference on Prevention of Pollution of the Sea by Oil, 1962, concerning the encouragement of development and installation of efficient oily-water separators for use in ships and the preparation of an international performance specification for such separators,

Noting further Resolution 12 of that Conference concerning in particular, the need for research on oily-water separators for use in ships and the development of a device to detect, measure and record the oil content of discharges from ships,

Having considered the Recommendation adopted by the Maritime Safety Committee at its twenty-third session,

Adopts the Recommendation on International Performance Specifications for Oily-Water Separating Equipment and Oil Content Meters, the text of which is set out in the Annex to this Resolution,

Bearing in mind that there has not yet been sufficient opportunity to obtain practical experience of applying the specifications and tests in their entirety,

Invites governments to adopt the procedures to the maximum possible extent which is found to be reasonable and practicable and to report to the Organization on the results obtained in their application, and

Further invites the Maritime Safety Committee to consider all such reports together with future developments in this field and to review the specifications at the appropriate time.

ANNEX

RECOMMENDATION ON INTERNATIONAL PERFORMANCE
SPECIFICATIONS FOR OILY-WATER SEPARATING
EQUIPMENT AND OIL CONTENT METERS

PREAMBLE

1. In response to Resolutions 8 and 12 of the International Conference on Prevention of Pollution of the Sea by Oil, 1962, which call for formulation of a suitable international performance specification for oily-water separators and the development of a device to detect, measure and record the oil content of discharges from ships, the following specifications have been formulated.

2. The specification in respect of oily-water separators is considered to be applicable especially for use in conjunction with oily bilge water, and oily ballast water from fuel oil tanks, as these are of a low or medium capacity, and are conditioned by the need to avoid discharging oily mixture with an oil content of 100 parts or more in 1,000,000 parts of the mixture.

3. It is recommended that Administrations should implement the specification in so far as it is found reasonable and practicable, with a view to progressing towards its full application. In order to avoid hindrance in the development of improved designs, the specification will be reviewed after a reasonable period of operation taking account of the experience gained from its use.

4. The 100 p.p.m. criterion is considered to be a desirable goal for all separators regardless of capacity. It is recognized, however, that the development and test of high capacity separators designed for dealing with effluent from cargo tanks on tankers may pose a special case. Such development and test should not be hindered and Administrations should be prepared to accept deviations from this specification where they are considered necessary in this context.

5. It should be understood that a gravitational separator cannot be expected to be effective over the complete range of oils which might be carried on board ship, nor can it deal satisfactorily with oil of very high specific gravity or with a mixture presented to it as an emulsion.

6. The specification for oil content meters represents a desirable, achievable goal and should be recommended by Administrations to designers and manufacturers of such equipment. Such equipment will be of greatest value in tankers, for avoiding contravention of the Convention, when discharging dirty ballast and tank washings from cargo oil tanks, although the way has been left open for further developments in the design of separating equipment for this purpose.

GENERAL

1.1 *Contents*

The specifications set out in this Recommendation are in two parts as follows:

Part A - Specification for Oily-Water Separating Equipment:

This specification is intended to include both basic constructional details and the test procedures for oily-water separators and necessary ancillary equipment (hereinafter called "the separator") for shipboard use, so that the vessel so fitted is not likely to infringe that part of the Convention which defines the oil content of any discharged water as the permissible limit. Having regard to the need to deal primarily with effluent from machinery space bilges and from tanks which have been used alternatively as fuel tanks and water ballast tanks, the tests are designed with a view to complying with the requirement that the oil content of the discharge should be less than 100 p.p.m.

Part B - Specification for Oil Content Meters:

During the discharge of effluent which might contain oil the need arises for an instrument to measure continuously the oil content of the effluent in the line, to ensure that the operation does not contravene the provisions of the International Convention for Prevention of Pollution of the Sea by Oil. The aim of this specification is to lay down the most important features of the design and the method of testing such Oil Content Meters (hereinafter called "the meter").

1.2 *General Provisions*

1.2.1 Apparatus which in every particular fulfils the requirements of the present specifications may be approved by the Administration of the manufacturer's country for fitting on board ships. The approval should take the form of a "Certificate of Type Test" specifying the main particulars of the equipment and any limiting conditions on its usage necessary to ensure its proper performance. In the case of each size of separator the Certificate should specify the maximum throughput to which it has been tested. After the issue of such certificate a copy of the appropriate certificate for the equipment should be carried aboard any vessel so fitted at all times.

1.2.2 Approved apparatus may be accepted by other countries for use on their vessels on the basis of the first trials, or after fresh tests carried out under the supervision of their own representatives. Should separating equipment or an oil content meter pass a test in one country and fail a test of a similar nature in another country, then the two countries concerned should consult one another with a view to coming to an agreement which could be mutually acceptable.

PART A

SPECIFICATION FOR OILY-WATER SEPARATING EQUIPMENT

2.1 *Technical Specification*

2.1.1 This specification relates primarily to separators of low to medium capacity. A separator should be capable of giving an effluent containing less than 100 p.p.m. of oil irrespective of the oil content (from 0 to 100 per cent) of the feed supplied to it. For higher capacity separators, especially intended for dealing with effluents from cargo tanks on tankers, the specification should be used as a guide but Administrations may adapt the provisions, where necessary.

2.1.2 The apparatus should be strongly constructed and suitable for shipboard use, bearing in mind its intended location on the ship.

2.1.3 The satisfactory functioning of the apparatus should not be affected by the movements and vibrations experienced on board ship. In particular, electrical and electronic alarm and control arrangements should be tested to show that they are at least capable of continued operation under vertical acceleration forces of 2g and vibration conditions varying from 0-14 cycles per second with an amplitude of 1 mm and, additionally, be capable of reliable operation at angles up to 15° in any plane from the normal operational position.

2.1.4 If any part of the equipment, including any automatic control device is intended for installation in hazardous spaces, it should be suitable for operation therein.

2.1.5 The apparatus should be so designed that it functions automatically.

2.1.6 Separators should require the minimum of attention to bring them into operation. In the case of separators used for engine room bilges, there should be no need for any attention to bring the apparatus into operation and, when fitted in unattended machinery spaces, the apparatus should be capable of operating for at least 24 hours without attention.

2.1.7 All working parts of the separator which are liable to wear or to damage should be easily accessible for maintenance.

2.1.8 Changing the feed to the separator from oil/water to oil, or from oil/water to air should not result in the discharge overboard of any mixture containing 100 p.p.m. or more of oil.

2.2 *Test Specification*

2.2.1 These test standards refer to separators of low or medium capacity. Where possible, these tests should be used to test high capacity separators especially intended for dealing with effluents from cargo tanks on tankers, but where impracticable, e.g. when the use of large installations is needed, national authorities may adopt other procedures in line with the standards given below provided that the methods used are such as to allow adequate verification of the efficient working of the separator.

2.2.2 The oil/water mixture, with which the separator has in practice to deal, depends on:

- (a) the position of the oil/water interface, with respect to the suction point, in the tank being pumped;
- (b) the type of pump used;
- (c) the type and degree of closure of any control valve in the circuit; and
- (d) the general size and configuration of the system.

It is therefore desirable that the test rig be so constructed as to include not only the separator, but also the pump and the most important of the valves, pipes, etc. ... (as indicated in Fig.1).

2.2.3 The tests should be carried out with a supply rate equal to the full throughput for which the separator is designed.

2.2.4 The test oil should be a fuel oil of a specific gravity not less than 0.94 at 15°C and of a viscosity not less than 1,000 seconds Redwood No.1 at 100°F (or its equivalent figure in centistokes).

2.2.5 The mixture passed to the separator should be prepared by supplying the required quantity of oil and water to the inlet of a centrifugal pump operating at not less than 1,000 r.p.m. The pump should have a delivery capacity of not less than 1.5 times the

rated capacity of the separator at the delivery pressure required for the test. The variation in oil/water ratio will be obtained by valves on the oil and water suction pipes adjacent to the pump suction, and the flow rates of oil and water or the oil content of the supply to the separator should be monitored. The excess pump capacity should be dissipated by either a by-pass to the suction side, or by a throttle valve or standard orifice plate on the discharge side. The pipe from the pump discharge to the separator should be not greater in diameter than the separator inlet, and should be as short as possible (but not less than 10 diameters in length), but in any case should so arranged that the time taken between the mixture leaving the pump and entering the separator body should be not greater than 5 seconds or 2 per cent of the "residence time" in the separator. The inlet sampling point and a thermometer pocket should be provided near the separator inlet and an outlet sampling point and observation window should be provided on the discharge pipe. Fig.1 gives a diagrammatic representation of one suitable system, though it should be noted that the water from the separator need not be led back to the supply tank.

In order to approach isokinetic sampling, i.e. the sample enters the sampling pipe at stream velocity, the sampling arrangement should be as shown in Fig.2 and, if a cock is fitted, free flow should be effected for at least 1 minute before any sample is taken.

2.2.6 Tests should be carried out with clean sea-water of a specific gravity between 1.020 and 1.025 at 25°C or a synthetic equivalent consisting of potable water containing dissolved Sodium Chloride (common salt) to raise its specific gravity to between 1.020 and 1.025 at 25°C. (Note - hereinafter the term "sea-water" should be understood to include this synthetic equivalent.)

2.2.7* In the case of separators depending essentially on gravity the feed to the separator should be maintained at a temperature not greater than 25°C, and heating and cooling coils should be provided where necessary. In other forms of separator where the dependence of separation efficiency on temperature is not established, tests should be carried out over a range of temperatures representing the normal shipboard operating range 10°C to 25°C or should be taken at a temperature in this range where the separation efficiency is known to be worst.

2.2.8 In those cases where, for the separating equipment, it is necessary to heat water up to a given temperature and to supply heat to maintain that temperature, the tests should be carried out at the given temperature.

2.2.9 To ensure that the separator commences the test with the oil section full of oil and with all the supply line impregnated with oil, the separator should, after filling with water and while in the operating condition, be fed with pure oil for not less than five minutes.

2.2.10 The separator should be fed with a mixture composed of 5000 p.p.m. of oil in water until steady conditions have been established. The test should then proceed for 30 minutes during which time samples should be taken for analysis at the points of outlet of the water at 7½ minutes and 22½ minutes from the start of this period.

At the end of this test, an air cock should be opened on the suction side of the pump and, if necessary, the oil and water valves should be slowly closed together, and a sample taken at the water discharge as the flow ceases (this point can be checked from the observation window).

2.2.11 A test identical to that described in paragraph 2.2.10 above, including the opening of the air cock, should be carried out with a mixture composed of 25 per cent oil and 75 per cent sea-water.

2.2.12 The separator should be fed with 100 per cent of oil for 5 minutes during which time the observation window should be checked for any oil discharge.

2.2.13 The separator should be fed with sea-water for 15 minutes and two samples should be taken during operation at the water outlet, the to be immediately after the changeover.

2.2.14 A test lasting a minimum of three hours should be carried out to check that the separator will operate continuously and automatically. This trial should use a cycle varying progressively from pure sea-water to 25 per cent oil content and back to pure water every 15 minutes, and should test adequately any automatic device which is fitted.

2.2.15 Sampling should be carried out as shown in Fig.2 so that the sample taken will suitably represent the fluid issuing from the water outlet.

2.2.16 Flasks containing samples should be sealed and labelled in the presence of a representative of the national authority and arrangements should be made for analysis as soon as possible and in any case within seven days, at laboratories selected by the Administration.

2.2.17 The oil content of the samples should be determined by a method acceptable to the Administration.

2.2.18 When accurate and reliable oil content meters are fitted, at inlet and outlet of the separator, one sample at inlet and outlet taken during each test will be considered sufficient if they verify, to within 10 per cent, the meter readings noted at the same instant.

2.2.19 In the presentation of the results, the following data should be reported in the International metric system of units.

(i) Properties of the oil:

- specific gravity at 15^oC
- viscosity (centistokes or seconds Redwood No.1 at 100^oF)
- flashpoint
- ash
- water content (total);

(ii) Properties of the water:

- specific gravity at 25^oC with details of any solid matter present;

- (iii) Temperature at the inlet to the separator;
- (iv) The method used in analysis of all samples taken and the results thereof together with meter readings where appropriate;
- (v) A diagram of the test rig; and
- (vi) a diagram of the sampling arrangement.

2.3 *Installation Requirements*

Means should be taken to ensure that, in practice, the rated capacity of the separator is not exceeded.

PART B

SPECIFICATION FOR OIL CONTENT METERS

3.1 *Technical Specification*

3.1.1 The meter should be a robust and practical instrument suitable for shipboard installation and operation.

3.1.2 It should withstand normal stresses due to the ship's motion (rolling and pitching) and its operation must not be affected by such motion. It should be designed and fitted so that the vibration normally occurring on board will not affect its operation. Unless it can be shown to be unnecessary the meter and any associated equipment, particularly electrical and electronic alarm and control arrangements, should be tested to show that it is capable of continued operation under at least vertical acceleration forces of 2g, and vibration conditions varying from 0-14 cycles per second with an amplitude of 1 mm, and additionally be capable of reliable operation at angles up to 15° in any plane from the normal operational position.

3.1.3 It should resist corrosion in conditions of the marine environment.

3.1.4 It should, if intended to be fitted in hazardous spaces on tankers, comply with the relevant safety regulations for such spaces. Any electrical equipment which is part of the apparatus should be placed in a non-hazardous area, or should be certified intrinsically safe by a competent authority. Any moving parts which are fitted in hazardous areas should be arranged so as to avoid the formation of static electricity.

3.1.5 It should not contain or use any substance of a dangerous nature, unless adequate arrangements, acceptable to the Administration, are provided to eliminate any hazard introduced thereby.

3.1.6 The accuracy of the meter should be such that the reading will represent within ± 10 p.p.m. or $\pm 10\%$ of the actual oil content of the sample being tested, whichever is the greater. The accuracy should be maintained despite the presence of contaminants other than oil, such as entrained air, rust, mud, sand and chemical substances introduced for the purposes of tank cleaning at the concentration recommended for such use on ships.

3.1.7 It should be designed so that its operation is not unduly affected by a 10% variation in the level of power supply from the value for which the meter was designed, i.e. in respect of electricity, compressed air, etc.

3.1.8 It is desirable that the reading should not be affected by the type of oil. If it is, it should not be necessary to calibrate the meter on board ship, but pre-set alterations in the calibration by means of switches, in accordance with instructions drawn up at the time of manufacture, are permitted. In the latter case means should be available to check that the correct calibration has been selected for the oil in question.

3.1.9 The response time of the meter, that is, the time which elapses between an alteration in the sample being supplied to the meter and the meter showing the correct response, should not exceed 20 seconds.

3.1.10 The meter may have several scales to facilitate its use on tankers but one scale must, on all ships, read from 0 to 120 p.p.m.

3.1.11 The meter should be fitted with an alarm device which can be set to operate automatically at any pre-stated value either to alert the crew of the ship or to operate control valves. This alarm should also operate automatically if at any time the meter should fail to function.

3.1.12 It is recommended that a simple means be provided aboard ship to check on instrument drift, and to confirm the accuracy and repeatability of the instrument reading.

3.1.13 The meter may be fitted with a recording device to provide a permanent record of the oil content of the discharge.

3.2 *Test Specification*

3.2.1 The tests should consist of an analysis by the instrument of a number of dynamic samples of known concentration extracted from a flowing stream, the oil content and type of oil involved being such as to cover a representative range of oil content which it is desired to measure, and of oils which are commonly carried aboard ship. The meter reading should be within ± 10 p.p.m. or $\pm 10\%$ whichever is the greater, of the true oil content of the sample entering the meter as determined by laboratory tests using a method approved by the Administration.

3.2.2 The sampling arrangement should be as shown in Fig.2 and should be such that a representative homogeneous sample is obtained under all conditions of operation and under all operational proportions of oil content. Special care should be given to this stage of the process and the validity of the resultant findings.

3.2.3 During the various tests the response time of the apparatus should be checked and it should also be noted whether alarms operate adequately when a pre-stated threshold is exceeded.

3.2.4 Tests should be carried out on a sufficient range of contaminants to show that the instrument fulfils the requirements in paragraph 3.1.6.

3.2.5 Tests should be carried out to ascertain the reliability of the equipment and to assess its potential in terms of operating hours between rounds for maintenance purposes.

3.2.6 A specification of the instrument concerned and a diagrammatic presentation of the test arrangements should be provided and the following data should be reported in the International metric system of units:

- (i) Types and properties of oils used in the tests;
- (ii) Concentration of oil samples tested;
- (iii) Details of contaminants tested; and
- (iv) Results of tests and analysis of samples*.

3.3 *Installation Requirements*

3.3.1 The layout of the shipboard installation should be arranged so that the overall response time between an alteration in the mixture being pumped and the alteration in the meter reading should be as short as possible to allow for remedial action being taken before the oil content of the mixture being discharged exceeds the permissible limit.

3.3.2 The arrangements for the extraction of a sample from the discharge line on a ship should generally be as shown in Fig.2, but the end of the sampling pipe should be fixed at the centre of the discharge pipe.

* For uniformity in the presentation of results, the concentrations of oil used and the analysis of oil samples should, in this instance, be on a volumetric basis.

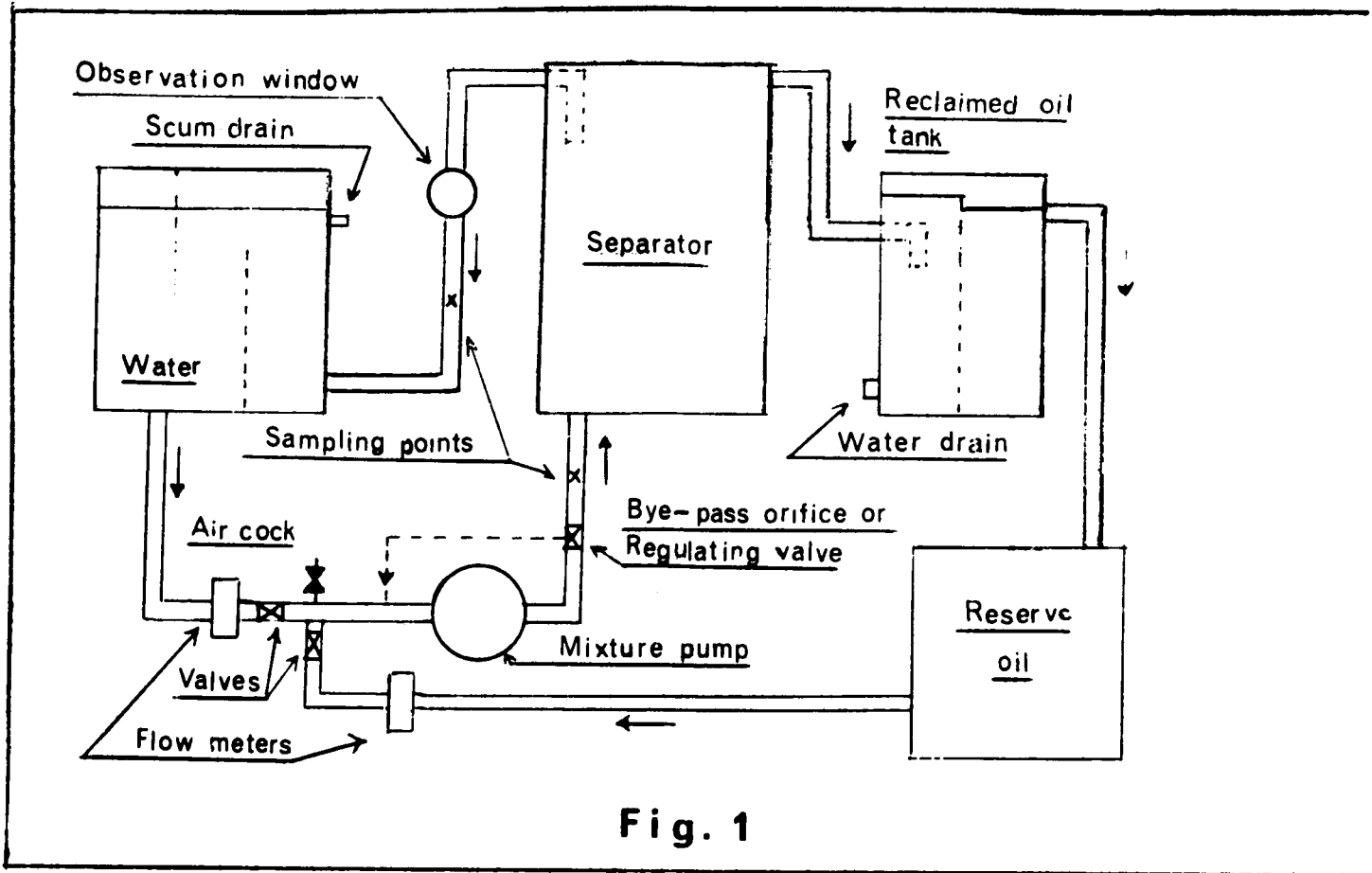


Fig. 1

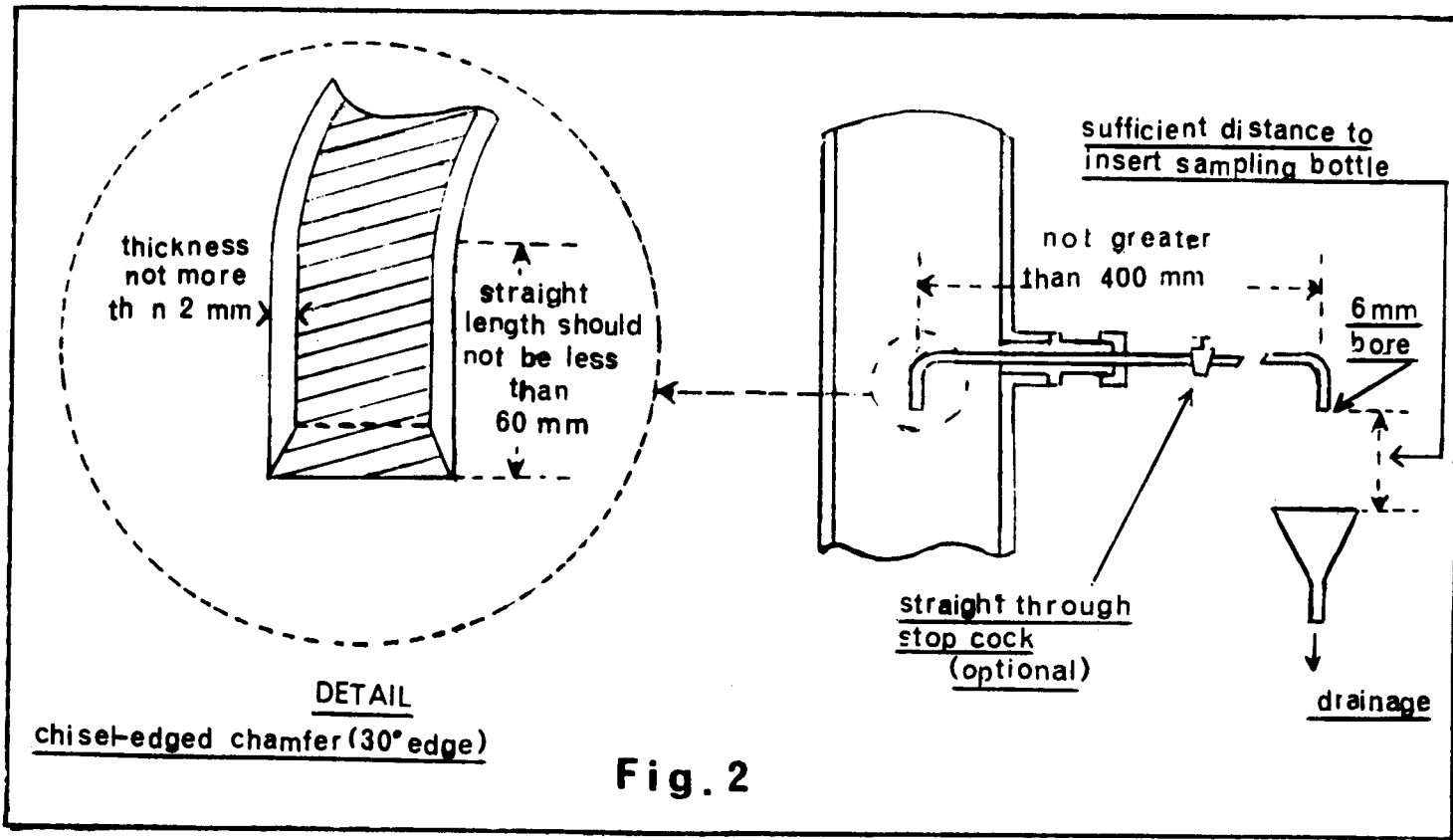


Fig. 2

12 October 1971
 Agenda item 10

RESOLUTION A.393(X)

Adopted on 14 November 1977
Agenda item 9

**RECOMMENDATION ON INTERNATIONAL PERFORMANCE AND
TEST SPECIFICATIONS FOR OILY-WATER SEPARATING EQUIPMENT AND
OIL CONTENT METERS**

THE ASSEMBLY,

NOTING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

RECALLING Resolution A.233(VII) by which the Assembly adopted the Recommendation on International Performance Specifications for Oily-Water Separating Equipment and Oil Content Meters and invited governments to adopt them to the maximum possible extent which they found reasonable and practicable and to report to the Organization the results of such application,

RECALLING FURTHER that by Resolution A.233(VII) the Maritime Safety Committee was invited to review the specifications at the appropriate time,

NOTING that in relation to Regulation 16(3) of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, reference is made to the above-mentioned Specifications,

HAVING CONSIDERED the Recommendation submitted by the Marine Environment Protection Committee including the revised specifications prepared by the Committee in the light of the requirements of Annex I of the 1973 Convention,

ADOPTS the Recommendation on International Performance and Test Specifications for Oily-Water Separating Equipment and Oil Content Meters, the text of which is set out in the Annex to this Resolution, as superseding those contained in Resolution A.233(VII),

INVITES governments :

- (a) to adopt the revised specifications and apply them so that all equipment installed on board one year or later after their adoption by the Assembly meets these revised specifications in so far as is reasonable and practicable ; and
- (b) to provide the Organization with information on experiences gained from their application and, in particular, on successful testing of equipment against the specifications,

REQUESTS the Secretariat, on the basis of information received, to maintain and update a list of approved equipment and to circulate it periodically to governments,

FURTHER INVITES governments to issue an appropriate "Certificate of Type Test" as referred to in paragraph 1.2.1 in the specifications and to recognize such Certificates issued under the authority of other governments as having the same validity as Certificates issued by them.

ANNEX

**RECOMMENDATION ON INTERNATIONAL PERFORMANCE AND
TEST SPECIFICATIONS FOR OILY-WATER SEPARATING EQUIPMENT AND
OIL CONTENT METERS**

PREAMBLE

1. In response to Resolutions 8 and 12 of the International Conference on Prevention of Pollution of the Sea by Oil, 1962 and to Resolution 10 of the International Conference on Marine Pollution, 1973, which call for formulation of a suitable international performance specification for oily-water separators and the development of a device to detect, measure and record the oil content of discharges from ships, the following specifications have been formulated. Where the word "Convention" is used, this is to be understood as reference to the International Convention for the Prevention of Pollution from Ships, 1973. Where the word "Regulations" is used, this is to be understood as reference to the corresponding regulation of Annex I of that Convention.
2. The specification in respect of oily-water separating and filtering equipment is considered to be applicable especially for use in conjunction with oily bilge water and oily ballast water from fuel oil tanks, as these are of a low or medium capacity, and are conditioned by the need to avoid discharging oily mixture with an oil content of more than 100 parts or 15 parts in 1,000,000 parts of the mixture respectively. The term "Separating Equipment" as used in this specification refers to separators and filters, or any combination of these which are designed to produce effluent containing not more than 100 parts per million (ppm) of oil. The term "Filtering Equipment" as used in this specification refers to filters or any combination of separators and filters which are designed to produce effluent containing not more than 15 ppm of oil.
3. It is recommended that Administrations should implement at an early stage the specifications in so far as it is found reasonable and practicable, with a view to progressing towards its full application. In order to avoid hindrance in the development of improved designs, the specifications will be reviewed after a reasonable period of operation taking account of the experience gained from its use.
4. The 100 ppm criterion is considered to be a desirable goal for all separating equipment regardless of capacity. It is recognized, however, that the development and testing of high capacity separating equipment designed for dealing with effluent from cargo tanks on tankers poses special problems and such equipment does not require to be tested under this specification. Such development and test should not be hindered and Administrations should be prepared to accept deviations from this specification where they are considered necessary in this context.
5. It should be understood that a gravitational separator cannot be expected to be effective over the complete range of oils which might be carried on board ship, nor can it deal satisfactorily with oil of very high relative density or with a mixture presented to it as an emulsion. Detergents should not be used in the bilges for cleaning purposes, as the emulsifying effects of such compounds seriously affect the operation of the equipment. Particulate matter can also have a detrimental effect on equipment performance.
6. The specification for oil content meters represents a desirable, achievable goal and should be recommended by Administrations to designers and manufacturers of such meters. Such meters will be of greatest value in tankers, for avoiding contravention of the Convention, when discharging dirty ballast and tank washings from cargo oil tanks, although the way has been left open for further developments in the design of separating and filtering equipment for this purpose.

PART I. GENERAL

1.1 Contents

The specifications set out in this Recommendation are in three parts as follows :

Part II Specification for Oily-Water Separating and Filtering Equipment.

This specification is intended to include both basic constructional details and the test procedures for oily-water separators, filters and necessary ancillary equipment for shipboard use, so that the vessel so fitted is not likely to infringe that part of the Convention which defines the oil content of any discharged water as the permissible limit. Having regard to the need to deal primarily with effluent from machinery space bilges and from tanks which have been used alternately as fuel tanks and water ballast tanks, the tests are designed with a view to complying with the requirement that the oil content of the discharge should be not more than 100 ppm. Filtering equipment should be designed in order to produce effluent containing not more than 15 ppm.

Part III Specification for Oil Content Meters.

During the discharge of effluent which might contain oil, the need arises for an instrument to measure continuously the oil content of the effluent in the line, to ensure that the operation does not contravene the provisions of the Convention. The aim of this specification is to lay down the most important features of the design and the method of testing such oil content meters (hereinafter called "the meter").

Part IV Method for the Determination of Oil Content.

1.2 General Provisions

- 1.2.1 Apparatus which in every particular fulfils the requirements of the present specifications may be approved by the Administration of the manufacturer's country for fitting on board ships. The approval should take the form of a "Certificate of Type Test" specifying the main particulars of the apparatus and any limiting conditions on its usage necessary to ensure its proper performance. In the case of each size of equipment, the certificate should specify the maximum throughput for which it has been approved. Such certificate should be issued in the format shown in the Attachment hereto. After the issue of such a certificate, a copy of the appropriate certificate for the apparatus should be carried aboard any vessel so fitted at all times.
- 1.2.2 Approved apparatus may be accepted by other countries for use on their vessels on the basis of the first trials, or after fresh tests carried out under the supervision of their own representatives. Should separating or filtering equipment or an oil content meter pass a test in one country, and fail a test of a similar nature in another country, then the two countries concerned should consult one another with a view to coming to an agreement which could be mutually acceptable.
- 1.2.3 Where a range of separating or filtering equipments of the same design, but of different capacities, requires certification in accordance with this specification and where the largest capacity in the range does not exceed 50 cubic metres/hour, the Administration may accept tests in two capacities within the range, in lieu of tests on every size, provided that the two tests actually performed are from the lowest quarter and highest quarter of the range.

PART II. SPECIFICATION FOR OILY-WATER SEPARATING AND FILTERING EQUIPMENT

2.1 Technical Specification

2.1.1 This specification relates primarily to separators and filters of low to medium capacity. Separating equipment should be capable of giving an effluent containing not more than 100 ppm of oil irrespective of the oil content (from 0 to 100 per cent) of the feed supplied to it. Filtering equipment should be capable of reducing the oil content in the effluent to not more than 15 ppm.

2.1.2 The equipment should be strongly constructed and suitable for shipboard use, bearing in mind its intended location on the ship.

2.1.3 The satisfactory functioning of the equipment should not be affected by the movements and vibrations experienced on board ship. In particular, electrical and electronic alarm and control arrangements should be tested to show that they are at least capable of continued operation under vibration conditions as follows :

(i) from 2 Hz–13.2 Hz with an amplitude of ± 1 mm, and

(ii) from 13.2 Hz–80 Hz with an acceleration amplitude of ± 0.7 g.

Additionally, the equipment should be capable of reliable operation at angles up to 22.5° in any plane from the normal operational position.

2.1.4 It should, if intended to be fitted in locations where flammable atmospheres may be present, comply with the relevant safety regulations for such spaces. Any electrical equipment which is part of the equipment should be placed in a non-hazardous area, or should be certified by the Administration as safe for use in a hazardous area. Any moving parts which are fitted in hazardous areas should be arranged so as to avoid the formation of static electricity.

2.1.5 The equipment should be so designed that it functions automatically. However, provision should be made for emergency manual control.

2.1.6 Changing the feed to the separating equipment from oily water to oil, or from oil and/or water to air should not result in the discharge overboard of any mixture containing more than 100 ppm of oil. In the case of filtering equipment the oil content in the discharge overboard should not be more than 15 ppm under the same circumstances.

2.1.7 The system should require the minimum of attention to bring it into operation. In the case of equipment used for engine room bilges, there should be no need for any adjustment to valves and other equipment to bring the system into operation and, when fitted in unattended machinery spaces, the system should be capable of operating for at least 24 hours of normal duty without attention.

2.1.8 All working parts of the equipment which are liable to wear or to damage should be easily accessible for maintenance.

2.2 Test Specification

2.2.1 These test standards refer to separating or filtering equipment of low or medium capacity.

2.2.2 The oil/water mixture, with which the system has in practice to deal, depends on :

- (i) the position of the oil/water interface, with respect to the suction point, in the space being pumped ;
- (ii) the type of pump used ;
- (iii) the type and degree of closure of any control valve in the circuit ; and
- (iv) the general size and configuration of the system.

It is therefore desirable that the test rig be so constructed as to include not only the separating and filtering equipment, but also the pump and the most important of the valves, pipes, etc. (for an example see Figure 1). The pipework should be designed for a maximum liquid velocity of 3 m/s.

- 2.2.3 The tests should be carried out with a supply rate equal to the full throughput for which the equipment is designed.
- 2.2.4 Tests should be performed using two grades of oil. All the tests should be carried out using a fuel oil of a relative density of about 0.94 at 15°C and of a viscosity not less than 220 centistokes (about 900 seconds Redwood No.1) at 37.8°C (100°F). In addition, the tests described in 2.2.10 and 2.2.11 should be carried out using a light distillate fuel oil having a relative density of about 0.83 at 15°C.
- 2.2.5 If the equipment includes an integrated feed pump fitted before or after the separator, this equipment should be tested with that pump supplying the required quantity of oil and water to the equipment at its rated capacity. If the equipment is to be fed by the ship's bilge pumps, then the unit will be tested by supplying the required quantity of oil and water mixture to the inlet of a centrifugal pump operating at not less than 1,000 rpm. This pump should have a delivery capacity of not less than 1.5 times the rated capacity of the equipment at the delivery pressure required for the test. The variation in oil/water ratio will be obtained by valves on the oil and water suction pipes adjacent to the pump suction, and the flow rate of oil and water or the oil content of the supply to the equipment should be monitored. If a centrifugal pump is used, the excess pump capacity should be dissipated by either a by-pass to the suction side, or by a throttle valve or standard orifice plate on the discharge side. In all cases, to ensure uniform conditions, the piping arrangements immediately prior to the equipment should be such that the influent to the equipment should have a Reynolds Number of not less than 10,000 as calculated in fresh water, a liquid velocity of not less than 1 m/s and the length of the supply pipe from the point of oil injection to the equipment should have a length not less than 20 times its diameter. A mixture inlet sampling point and a thermometer pocket should be provided near the equipment inlet and an outlet sampling point and observation window should be provided on the discharge pipe. Figure 1 gives diagrammatic representations of two possible test rigs, though it should be noted that the water and oil from the equipment need not be led back to the supply tanks. Where the water and oil are re-circulated during the test, additional sampling points should be fitted in the water and oil lines to the mixture pump in order to check the quality of the water and oil being supplied to the pump.

In order to approach isokinetic sampling, i.e. the sample enters the sampling pipe at stream velocity, the sampling arrangement should be as shown in Figure 2 and, if a cock is fitted, free flow should be effected for at least 1 minute before any sample is taken. The sampling points should be in pipes running vertically.

- 2.2.6 The tests should be carried out with clean water having a relative density at 15°C not more than 0.085 greater than the relative density of the heavier fuel oil detailed in 2.2.4.

- 2.2.7 In the case of equipment depending essentially on gravity, the feed to the system should be maintained at a temperature not greater than 25°C, and heating and cooling coils should be provided where necessary. In other forms of separation where the dependence of separation efficiency on temperature is not established, tests should be carried out over a range of temperatures representing the normal shipboard operating range 10°C to 30°C or should be taken at a temperature in this range where the separation efficiency is known to be worst.
- 2.2.8 In those cases where, for the equipment, it is necessary to heat water up to a given temperature and to supply heat to maintain that temperature, the tests should be carried out at the given temperature.
- 2.2.9 To ensure that the equipment commences the test with the oil section full of oil and with the supply line impregnated with oil, the equipment should, after filling with water and while in the operating condition, be fed with pure oil for not less than five minutes.
- 2.2.10 The equipment should be fed with a mixture composed of between 5,000 and 10,000 ppm of oil in water until steady conditions have been established. Steady conditions are assumed to be the conditions established after pumping through the separating equipment a quantity of oil/water mixture not less than twice the volume of the equipment. The test should then proceed for 30 minutes during which time samples should be taken for analysis at the points of mixture inlet and the water outlet at 10 minutes and 20 minutes from the start of this period. At the end of this test, an air cock should be opened on the suction side of the pump and, if necessary, the oil and water valves should be slowly closed together, and a sample taken at the water discharge as the flow ceases (this point can be checked from the observation window).
- 2.2.11 A test identical to that described in 2.2.10 above, including the opening of the air cock, should be carried out with a mixture composed of approximately 25 per cent oil and 75 per cent water.
- 2.2.12 The equipment should be fed with 100 per cent of oil for at least 5 minutes during which time the observation window should be checked for any oil discharge. Sufficient oil should be fed into the equipment to operate the automatic oil discharge valve. After the operation of the oil discharge valve, the test should be continued for 5 minutes using a 100 per cent oil supply in order to check the sufficiency of the oil discharge system.
- 2.2.13 The equipment should be fed with water for 15 minutes and two samples should be taken during operation at the water outlet, the first one to be immediately after the change-over.
- 2.2.14 A test lasting a minimum of three hours should be carried out to check that the equipment will operate continuously and automatically. This trial should use a cycle varying progressively from water to oily mixture with approximately 25 per cent oil content and back to water every 15 minutes, and should test adequately any automatic device which is fitted. The whole test sequence should be performed as a continuous programme. At the end of the test, while the equipment is being fed with 25 per cent oil, a water effluent sample should be taken for analysis.
- 2.2.15 Sampling should be carried out as shown in Figure 2 so that the sample taken will suitably represent the fluid issuing from the water outlet of the equipment.
- 2.2.16 Flasks containing samples should be sealed and labelled in the presence of a representative of the national authority and arrangements should be made for analysis as soon as possible and in any case within seven days, at laboratories selected by the Administration.

- 2.2.17 The oil content of the samples should be determined by the method in Part IV.
- 2.2.18 When accurate and reliable oil content meters are fitted at inlet and outlet of the separating or filtering equipment, one sample at inlet and outlet taken during each test will be considered sufficient if they verify, to within ± 10 per cent, the meter readings noted at the same instant.
- 2.2.19 In the presentation of the results, the following data should be reported in the International Metric System of Units :
- (i) Properties of the oil :
 - relative density at 15°C
 - viscosity (centistokes at 37.8°C)
 - flashpoint
 - ash
 - water content (total) ;
 - (ii) Properties of the water :
 - relative density at 15°C with details of any solid matter present ;
 - (iii) Temperature at the inlet to the equipment ;
 - (iv) The method used in analysis of all samples taken and the results thereof together with meter readings where appropriate ;
 - (v) A diagram of the test rig ; and
 - (vi) A diagram of the sampling arrangement.

2.3 Installation Requirements

- 2.3.1 For future inspection purposes aboard ship, a sampling point should be provided in a vertical section of the water effluent piping as close as is practicable to the equipment outlet.
- 2.3.2 Means should be taken to ensure that, in practice, the rated capacity of the equipment is not exceeded by :
- (i) connecting only pumps of a capacity equal to, or less than, that of the equipment, or
 - (ii) permanently restricting the discharge to the equipment where larger pumps may be connected.
- 2.3.3 In any case, equipment should not be supplied from a pump which has a capacity more than 1.5 times the rated capacity of the equipment.
- 2.3.4 The equipment should be fitted with a permanently attached plate giving any operational or installation limits considered necessary by the manufacturer or the Administration.

PART III. SPECIFICATION FOR OIL CONTENT METERS

3.1 Technical Specification

3.1.1 This specification relates to oil content meters for a wide range of oil content and oil content alarms for 15 ppm. A meter may, however, be tested for one or several specified applications, i.e. crude oils, "black" products, "white" products, bilge water or "15 ppm alarm"; and the approval should clearly indicate the accepted application(s).

3.1.2 The meter should be a robust and practical instrument suitable for shipboard installation and operation. It should withstand normal stresses due to the ship's motion (rolling and pitching) and its operation must not be affected by such motion. It should be designed and fitted so that the vibration normally occurring on board will not affect its operation. Unless it can be shown to be unnecessary the meter and any associated equipment, particularly electrical and electronic alarm and control arrangements, should be tested to show that it is capable of continued operation under vibration conditions as follows :

(i) from 2 Hz–13.2 Hz with an amplitude of ± 1 mm, and

(ii) from 13.2 Hz–80 Hz with an acceleration amplitude of ± 0.7 g.

Additionally, the equipment should be capable of reliable operation at angles up to 22.5° in any plane from the normal operational position.

3.1.3 It should resist corrosion in conditions of the marine environment.

3.1.4 It should, if intended to be fitted in locations where flammable atmospheres may be present, comply with the relevant safety regulations for such spaces. Any electrical equipment which is part of the meter should be placed in a non-hazardous area, or should be certified by the Administration as safe for use in a hazardous atmosphere. Any moving parts which are fitted in hazardous areas should be arranged so as to avoid the formation of static electricity.

3.1.5 It should not contain or use any substance of a dangerous nature, unless adequate arrangements, acceptable to the Administration, are provided to eliminate any hazard introduced thereby.

3.1.6 The accuracy of meters designed to monitor a wide range of oil content should be such that the reading will represent within ± 10 ppm or ± 20 per cent of the actual oil content of the sample being tested, whichever is the greater. The accuracy should remain within the above limit despite the presence of contaminants other than oil, such as entrained rust, mud and sand. When a vessel is fitted with filtering equipment in accordance with Regulations 16(2)(b) and 16(7) of Annex I of the Convention, an alarm is to be provided which will indicate when the oil content of the effluent exceeds 15 ppm. The accuracy of the alarm should be ± 5 ppm. The alarm arrangement should be tested in accordance with paragraph 3.2.18 of this specification.

3.1.7 It should be designed so that it functions within the above limit when the power supply is varied by 10 per cent from the value for which the meter was designed, i.e. in respect of electricity, compressed air, etc.

3.1.8 It is desirable that the reading should not be affected by the type of oil. If it is, it should not be necessary to calibrate the meter on board ship, but pre-set alterations in the calibration in accordance with instructions drawn up at the time of manufacture are permitted.

In the latter case, means should be available to check that the correct calibration has been selected for the oil in question. The accuracy of the readings should at all times remain within the limit specified in 3.1.6.

- 3.1.9 The response time of the meter, that is, the time which elapses between an alteration in the sample being supplied to the meter and the meter showing the correct response, should not exceed 20 seconds.
- 3.1.10 The meter may have several scales as appropriate for its intended use.
- 3.1.11 The meter should be fitted with an alarm device which can be set to operate automatically at any pre-stated value either to alert the crew of the ship or to operate control valves. This alarm should also operate automatically if at any time the meter should fail to function.
- 3.1.12 It is recommended that a simple means be provided aboard ship to check on instrument drift, and to confirm the accuracy and repeatability of the instrument reading.
- 3.1.13 When a recording device is fitted to a meter which has more than one scale, the recording device should indicate the scale which is in use.

3.2 Test Specification

- 3.2.1 For a meter designed to measure a wide range of oil content, the meter reading should remain within ± 10 ppm or ± 20 per cent whichever is the greater of the true oil content of the sample entering the meter during each test, and testing should be performed in accordance with the procedures detailed in 3.2.4 to 3.2.17. For a meter designed only to give an alarm at 15 ppm, the accuracy should be within ± 5 ppm and testing should be performed in accordance with the procedures in 3.2.18.

- 3.2.2 The sampling arrangement should be such that a representative homogeneous sample is obtained under all conditions of operation and under all operational proportions of oil content.

The sample should be obtained from the full flow through the meter, but when this is impracticable the sampling arrangements shown in Figure 2 should be used. Special care should be given to this stage of the process and the validity of the resultant findings.

- 3.2.3 During the various tests the response time of the meter should be checked and it should also be noted whether alarms operate adequately when a pre-stated threshold is exceeded.
- 3.2.4 A diagrammatic arrangement of a test facility for evaluating the performance of oil content meters is given in Figure 3. The accuracy of the oil content meter will be determined by comparing its readings against a known flow of oil injected into a known flow of water. The grab samples taken will be analysed in a laboratory by the method in Part IV. The results of the laboratory analysis will be used for correlation and to indicate sampling and test equipment variability. The water flow rate will be adjusted so that the entire oil-water flow passes through the oil content meter, except the intermittent grab sample stream. Special care should be given to keep, continuously, a constant oil content in the water that flows into the meter. The oil and contaminant metering pumps should be adjusted to deliver a nearly continuous quantity of oil. If oil injection becomes intermittent at low concentrations, the oil may be premixed with water to provide continuous flow if absolutely necessary. The oil injection point should be immediately up-stream of the oil content meter inlet to minimize time lags caused by the sample system. Wherever Arabian light crude oil is specified in particular tests, a similar crude oil may be substituted, provided that the oil selected is used throughout the tests.

- 3.2.5 The oil content meter will be calibrated and zeroed as per the manufacturer’s instructions. It will then be tested with Arabian light crude oil at the following concentrations in ppm : 0, 15, 50, 100, etc., up to full scale of the meter’s highest range. A complete calibration curve will be constructed. Each concentration test will last for 15 minutes. Following each concentration test, the meter will be run on oil-free water for 15 minutes and the reading noted. If it proves necessary to re-zero or re-calibrate the meter during this test, this fact will be noted.
- 3.2.6 Using the calibration from the previous test, the oil content meter will be tested at 15 ppm, 100 ppm and 90 per cent of the maximum full scale with the following oils :

<i>Type of Oil</i>	<i>Categories Represented</i>
Sahara Blend	Density – Low Viscosity – Low Pour Point – Very Low Producing Country – Algeria General Description – Mixed Base
Arabian Light Crude	Density – Medium Viscosity – Medium Pour Point – Low Producing Country – Saudi Arabia General Description – Mixed Base
Nigerian Medium Crude	Density – High Viscosity – Medium Pour Point – Low Producing Country – Nigeria General Description – Napthenic
Bachaquero 17 Crude	Density – Very High Viscosity – Very High Pour Point – Low Producing Country – Venezuela General Description – Asphaltic
Minas Crude	Density – Medium Viscosity – High Pour Point – Very High Producing Country – Indonesia General Description – Paraffinic
Residual Fuel	Bunker C or No. 6 Fuel Oil

NOTE : Other oils covering the range of properties shown may be substituted if those shown are unobtainable.

Following each test, the meter will be run on oil-free water and the zero recorded. If it is necessary to re-zero, calibrate or clean the meter between tests, this fact and the time required to calibrate or clean up will be noted.

3.2.7 If the meter is considered suitable for products, it will also be tested against the following petroleum products in a manner similar to the tests in 3.2.6 :

Leaded Regular Grade Automotive Gasoline

Unleaded Automotive Gasoline

Kerosene

Light Diesel or No. 2 Fuel Oil.

3.2.8 The oil content meter will be run on oil-free water and zeroed. The oil injection pump, set to 100 ppm of Arabian light crude oil, will be turned on. The following response times will be recorded :

- (i) Time for first detectable reading.
- (ii) Time to read 63 ppm (response time).
- (iii) Time to read 90 ppm.
- (iv) Time to read 100 ppm or for reading to stabilize at maximum.

Record the maximum reading.

Following this upscale test, the oil injection pump will be turned off, and the following response times will be recorded :

- (i) Time for the maximum reading to drop detectably.
- (ii) Time to read 37 ppm (response time).
- (iii) Time to read 10 ppm.
- (iv) Time to read zero or to stabilize at minimum.

Record the minimum reading.

The "Response Time" of the meter will be considered the average of the 63 ppm upscale and the 37 ppm downscale response times.

3.2.9 Two tests will be performed for oil fouling and calibration shift, one with a 10 per cent oil concentration, and the other with pure oil. Both tests will use Arabian light crude oil.

For the 10 per cent oil concentration test, the meter will be running on oil-free water. The high rate oil sample pump, set to give 10 per cent oil in water, will be turned on for one minute and then turned off.

For the pure oil test, the meter will be running on oil-free water. The water will be turned off, and 100 per cent oil will be turned on for one minute. The oil will then be turned off and the oil-free water flow resumed.

Care must be taken in the design of the test equipment to be sure the fouling test results are not degraded by fouling of the sample piping external to the meter.

The following response times will be noted for both tests :

- (i) First detectable response.
- (ii) 100 ppm.
- (iii) Off scale on the highest range.
- (iv) Back on scale on the highest range.
- (v) Return to 100 ppm.
- (vi) Zero reading or lowest stable reading.

The meter should be capable of being cleared with clean water flushing in the shortest practicable time.

If it is necessary to disassemble or flush the meter after the fouling tests for it to return to a zero reading, this fact and the time required to clean and re-calibrate shall be noted.

After successful completion of both fouling tests, a 100 ppm mixture of Arabian light crude oil shall be introduced and any calibration shift noted.

- 3.2.10 The meter will be run on a 500 ppm Arabian light crude oil sample, and the contaminants listed below will be added to the water tank in the concentrations given. Any shift in the meter reading will be noted.

Fresh Water (if sea-water is used for the test programme).

Very Salt Water – 6 per cent common salt with tap water.

Non-soluble suspended solids – about 100 ppm air cleaner test dust to the following specifications :

<i>Particle size in micrometres</i>	<i>Percentage of total weight</i>
0–5	39±2
5–10	18±3
10–20	16±3
20–40	18±3
40–80	9±3

- 3.2.11 The meter will be run on a 100 ppm Arabian light crude oil sample. The high shear pump will be run at various speeds and turned off to provide a range of oil particle size to the meter. Any effect of particle size on the meter reading will be noted.

- 3.2.12 If the meter is only intended for monitoring bilge water, the oils listed in 3.2.6 and 3.2.7 should be substituted by the oils identified in paragraph 2.2.4 under Part II of these specifications. The tests indicated in paragraphs 3.2.5, 3.2.6, 3.2.8, 3.2.9, 3.2.10, 3.2.14, 3.2.15, 3.2.16 and 3.2.17 are to be carried out using the heavy fuel oil. Test 3.2.6 should be repeated using the light distillate fuel oil. The oil content used in paragraph 3.2.10 should be 80 ppm and the contaminants should be as listed except that the non-soluble suspended solids should be 20 ppm. The temperature range for the test should be that given in paragraph 2.2.7.

3.2.13 The meter will be run on a 100 ppm Arabian light crude oil sample. Water temperature will be run at 10°C and 65°C. If the vendor's specification lists a maximum temperature less than 65°C, the meter will be run at that maximum temperature and this fact noted. Any effect of water temperature on meter reading will be noted.

3.2.14 The meter will be run on a 100 ppm Arabian light crude oil sample. Sample pressure or flow will be adjusted from one-half normal, normal and twice normal.

Any effect of these changes on meter reading will be noted.

This test may require modification for meters with flow or pressure regulators or meters designed to discharge into an ambient pressure sump.

The meter will be run on a 100 ppm Arabian light crude oil sample. The water and oil injection pumps will be shut off. No other changes will be made. The meter will be left turned on. After 8 hours, the water and oil will be turned on set at 100 ppm. The before and after readings and any meter damage will be noted. If the meter is fitted with a low flow shut off, this test determines its proper functioning.

3.2.15 The meter will be run on a 100 ppm Arabian light crude oil sample. Supply voltage will be raised to 110 per cent of design for one hour and lowered to 90 per cent of design for one hour. Any effect on meter performance will be noted.

If the meter requires any utilities besides electricity, it shall be tested with these utilities at 110 per cent and 90 per cent of the design figures.

3.2.16 The meter will be calibrated and zeroed. A 100 ppm Arabian light crude oil sample will run through the meter for eight hours and any calibration drift noted. Following this, the meter will be run on oil-free water and any zero drift noted.

3.2.17 The meter shall be shut down and de-energized for one week. It shall be turned on and started per the manufacturer's instructions. After the suggested warm-up and calibration procedures, the meter will be run one hour on a 100 ppm Arabian light crude oil sample and one hour on oil-free water alternately for eight hours. Any zero or span drift will be noted. The total elapsed time to perform the manufacturer's suggested warm-up and calibration procedures will be noted.

3.2.18 For a meter designed only to give an alarm at 15 ppm of oil, the tests detailed in 3.2.5, 3.2.14, 3.2.15, 3.2.16 and 3.2.17 should be performed except that an oil concentration of 15 ppm should be used whenever concentrations up to 100 ppm are specified, and the oil used should be light distillate fuel oil. A calibration curve is not required for such meters, and the response time is to be taken as the time for the meter to give an alarm at 15 ppm oil concentration after the supply to the meter is changed from clean water into oily water having more than 15 ppm of oil.

3.2.19 A specification of the instrument concerned and a diagrammatic presentation of the test arrangements should be provided and the following data should be reported in the International Metric System of Units :

- (i) Types and properties of oils used in the tests.
- (ii) Concentration of oil samples tested.
- (iii) Details of contaminants tested, and
- (iv) Results of tests and analysis of samples.

3.3 Installation Requirements

- 3.3.1 The layout of the shipboard installation should be arranged so that the overall response time between an alteration in the mixture being pumped and the alteration in the meter reading should be as short as possible and in any case not more than 40 seconds, to allow for remedial action being taken before the oil content of the mixture being discharged exceeds the permissible limit.
- 3.3.2 The arrangement on board ship for the extraction of samples from the discharge lines to the meter should give a truly representative sample of the effluent. Sampling points should be arranged in all discharge pipes which have to be monitored for compliance with the Convention.
- 3.3.3 Where the Convention requires records, the oil content meters should be so designed and constructed that any operation carried out on them is automatically registered by the meters.

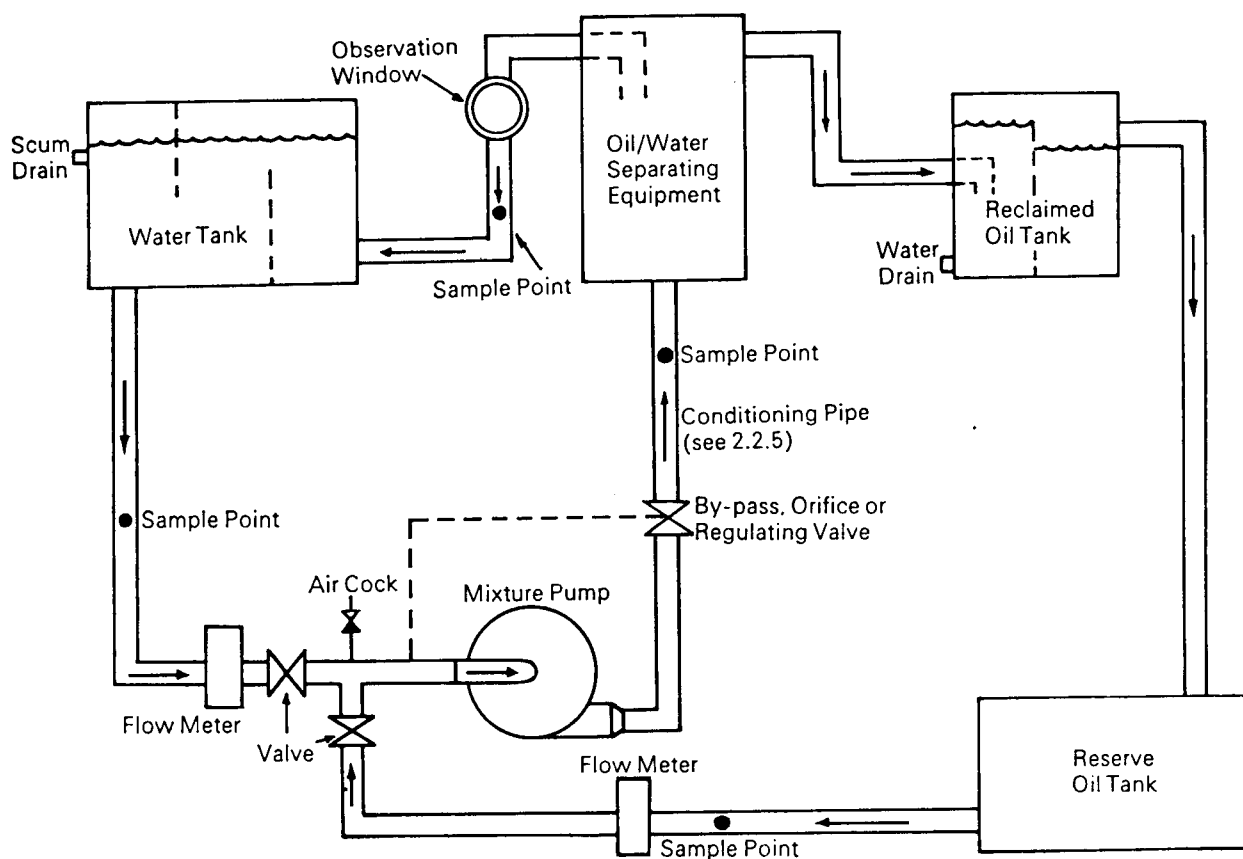


Figure 1a

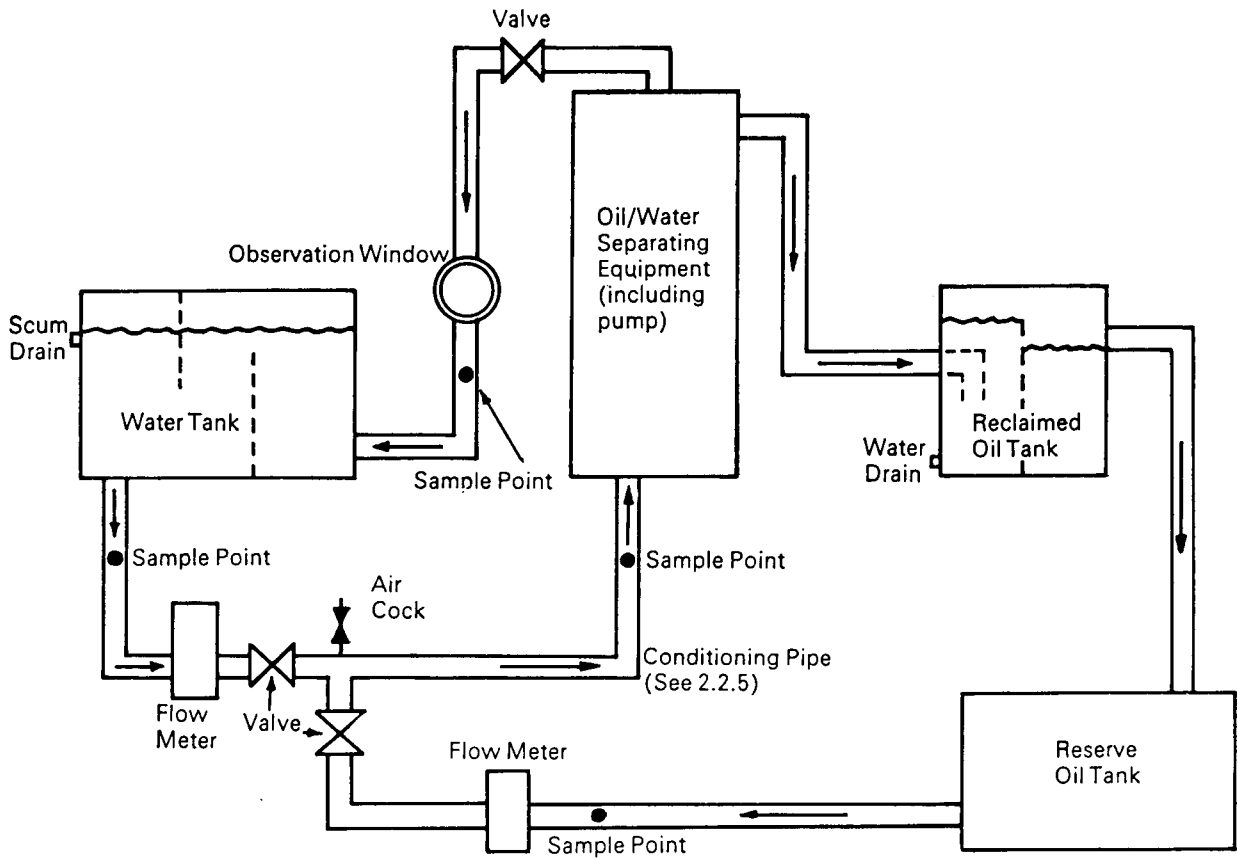
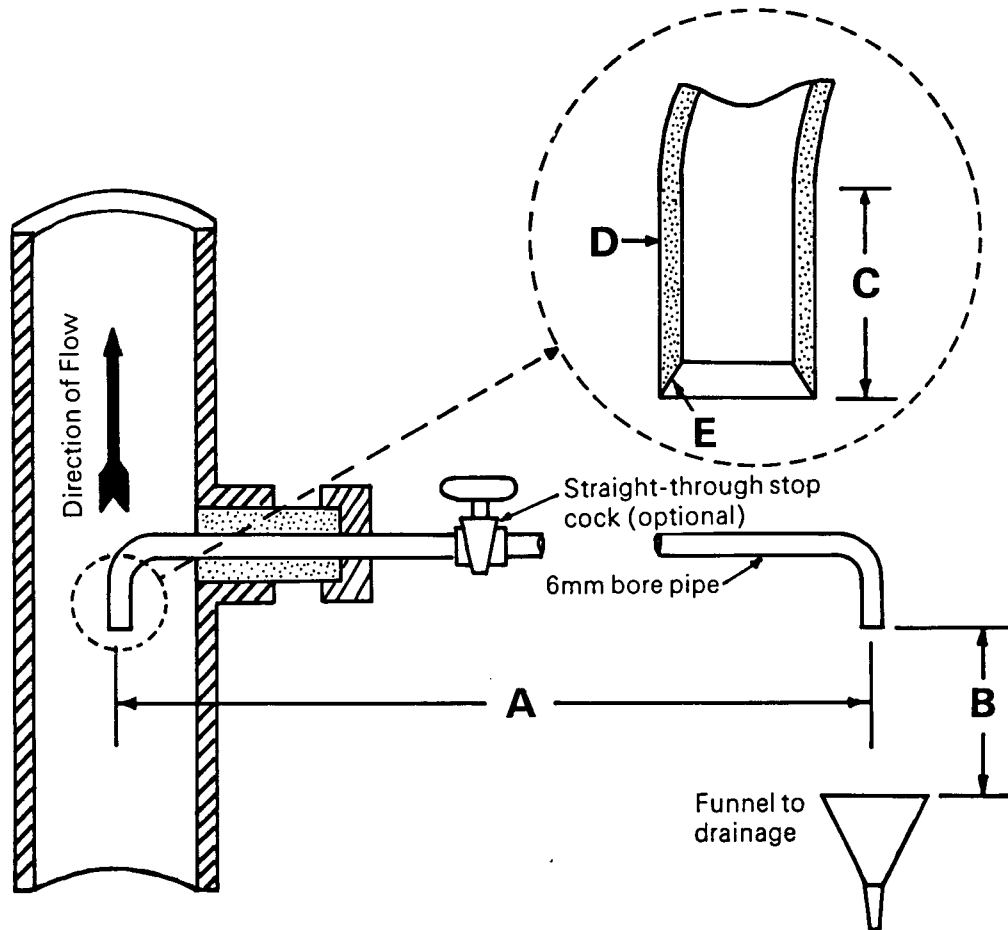


Figure 1b



- A** Distance A, not greater than 400mm.
- B** Distance B, sufficient to insert sampling bottle.
- C** Dimension C, straight length should not be less than 60mm.
- D** Dimension D, pipe thickness should not be greater than 2mm.
- E** Detail E, chisel-edged chamfer (30°).

Figure 2

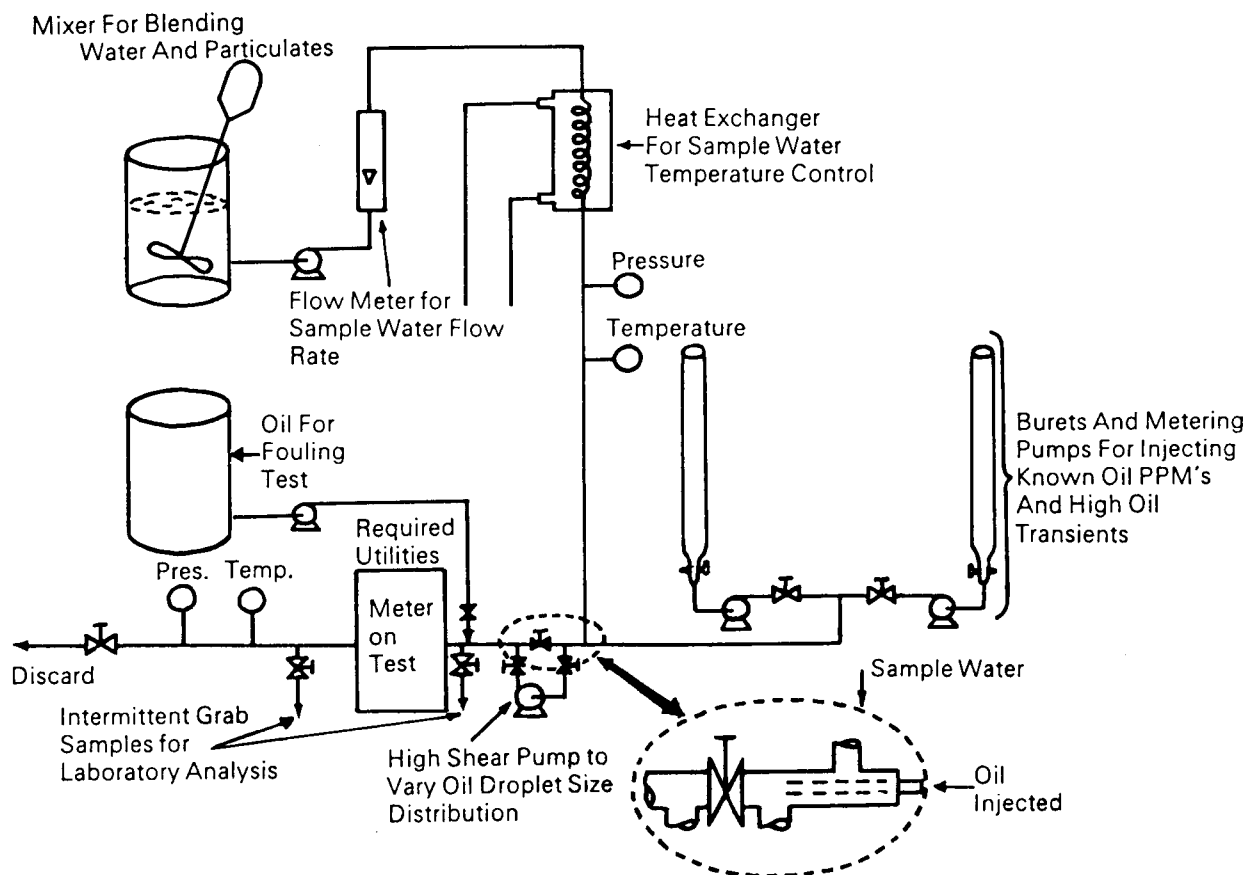


Figure 3

PART IV. METHOD FOR THE DETERMINATION OF OIL CONTENT

4.1 Scope and Application

- 4.1.1 The method includes the measurement of most light oil fractions, although some loss of volatile components will occur during the extractions.
- 4.1.2 The method has a nominal working range from 2 to 80 mg/l. The lower level of detection can be improved to 0.1 mg/l by using longer path-length cells. The upper limit of the method can be extended at least to 1,000 mg/l by preparing dilutions of the sample extract.

4.2 Summary of Method

The sample is acidified to a low pH and extracted with two volumes of carbon tetrachloride. The oil content is determined by comparison of the infra-red absorbances of the sample extract against known concentrations of the appropriate reference oil. Other suitable non-infra-red active solvents may be used if preferred.

4.3 Sampling and Storage

- 4.3.1 A representative sample of 1 litre volume is collected in a narrow-neck glass bottle with a pressure-sealing cap. Unless the sample will be extracted on the day of collection, it is preserved with the addition of 5 ml hydrochloric acid (HCl) (4.5.1).
- 4.3.2 Because losses of oily matter will occur on sampling equipment, the collection of a composite sample is impractical. Individual portions collected at prescribed time intervals must be analysed separately to obtain the average concentration over an extended period.

4.4 Apparatus

- 4.4.1 Separatory funnel, 1,000 ml volume, with Teflon stopcock.
- 4.4.2 Infra-red spectrophotometer.
- 4.4.3 Cells, 5 mm path-length, sodium chloride or infra-red-grade quartz with a minimum of 80% transmittance at 2930 cm^{-1} . The 5 mm path-length is recommended as being convenient for monitoring levels normally encountered. Longer path-lengths may be used.
- 4.4.4 Filter paper, medium grade, 12.5 cm.

4.5 Reagents

- 4.5.1 Hydrochloric acid, HCl 1 : 1. Mix equal amounts of concentrated HCl and distilled water.
- 4.5.2 Sodium chloride, NaCl reagent grade.
- 4.5.3 Carbon tetrachloride, CCl_4 reagent grade.
- 4.5.4 Oil reference : Oil collected from the source at the same time the sample was collected.
- 4.5.5 Stock reference standard (3 mg/ml) : Accurately weigh about 0.30 g of reference oil (4.5.4) into a tared 100 ml volumetric flask and dilute to volume with carbon tetrachloride.
- 4.5.6 Calibration standards : Prepare a series of dilutions by pipetting volumes of stock reference standard into 100 ml volumetric flasks and diluting to volume with carbon tetrachloride. A convenient series of volumes is 5, 10, 15, 20, and 25 ml of stock solution. Calculate the exact concentrations of the dilutions in mg/100 ml solution from the weighing above (4.5.5).

4.6 Extraction

- 4.6.1 If the sample was not acidified at time of collection, add 5 ml hydrochloric acid (4.5.1) to the sample bottle. After mixing the sample, check the pH by touching pH-sensitive paper to the cap to ensure that the pH is 2 or lower. Add more acid if necessary.
- 4.6.2 Pour the sample into a separatory funnel and add 5 g of sodium chloride.

- 4.6.3 Add 50 ml carbon tetrachloride to the sample bottle. Cap tightly and thoroughly shake the bottle to rinse the inside and cap. Transfer the solvent into the separatory funnel and extract by shaking vigorously for 2 minutes. Allow the layers to separate.
- 4.6.4 Drain the solvent layer through a funnel containing solvent-moistened filter paper into a 100 ml volumetric flask.
- 4.6.5 Repeat steps 4.6.3 and 4.6.4 with an additional 50 ml portion of fresh solvent ; combine all solvent in the volumetric flask.
- 4.6.6 Rinse the tip of the separatory funnel, filter paper and funnel with small portions of carbon tetrachloride and collect the rinsings in the volumetric flask. Adjust the extract volume up to 100 ml and stopper the flask. **Mix well.**
- 4.6.7 Drain the water layer into a 1,000 ml graduated cylinder and estimate the sample volume to the nearest 5 ml.

4.7 Infra-red Spectroscopy

- 4.7.1 Prepare the infra-red spectrophotometer according to manufacturer's instructions.
- 4.7.2 Rinse a cell with two volumes of the solution to be measured, then completely fill the cell with solution. Place a matched cell containing carbon tetrachloride in the reference beam.
- 4.7.3 Scan samples and standards from 3,200 cm^{-1} to 2,700 cm^{-1} .

NOTE 1 : Single beam and non-scanning spectrophotometers can be used for this test. Follow manufacturer's instructions and measure the absorbance directly at or near 2930 cm^{-1} .

- 4.7.4 Construct a straight baseline under the hydrocarbon band as illustrated in Figure 4. If the scan is recorded on absorbance paper, read the absorbance of the peak maximum at 2930 cm^{-1} and subtract the absorbance of the baseline at that point. If the scan is recorded on transmittance paper, the net absorbance is :

$$\log_{10} \frac{\%T (\text{baseline})}{\%T (\text{peak maximum})}$$

- 4.7.5 Prepare a calibration plot of net absorbance vs. mg/100 ml oil using the response of the standards.

NOTE 2 : The oil concentration may be plotted as per cent of stock standard. When this procedure is used, the concentration of the stock standard must be used in the calculations (4.8.2).

- 4.7.6 If the net absorbance of a sample exceeds 0.8 or the linear range of the instrument as determined by the calibration plot, prepare a dilution of the sample by pipetting an appropriate volume of the extract into a volumetric flask and diluting to volume. If the absorbance is less than 0.1, more accurate results can be obtained by using a longer path-length cell.

4.8 Calculations

4.8.1 Use the calibration plot to calculate the mg of oil in each 100 ml of sample extract or dilution.

4.8.2 Calculate the oil content in the sample using the formula :

$$\text{mg/l oil} = \frac{R \times D \times 1000}{V}$$

where :

R=mg of oil in 100 ml solution (determined from calibration plot)

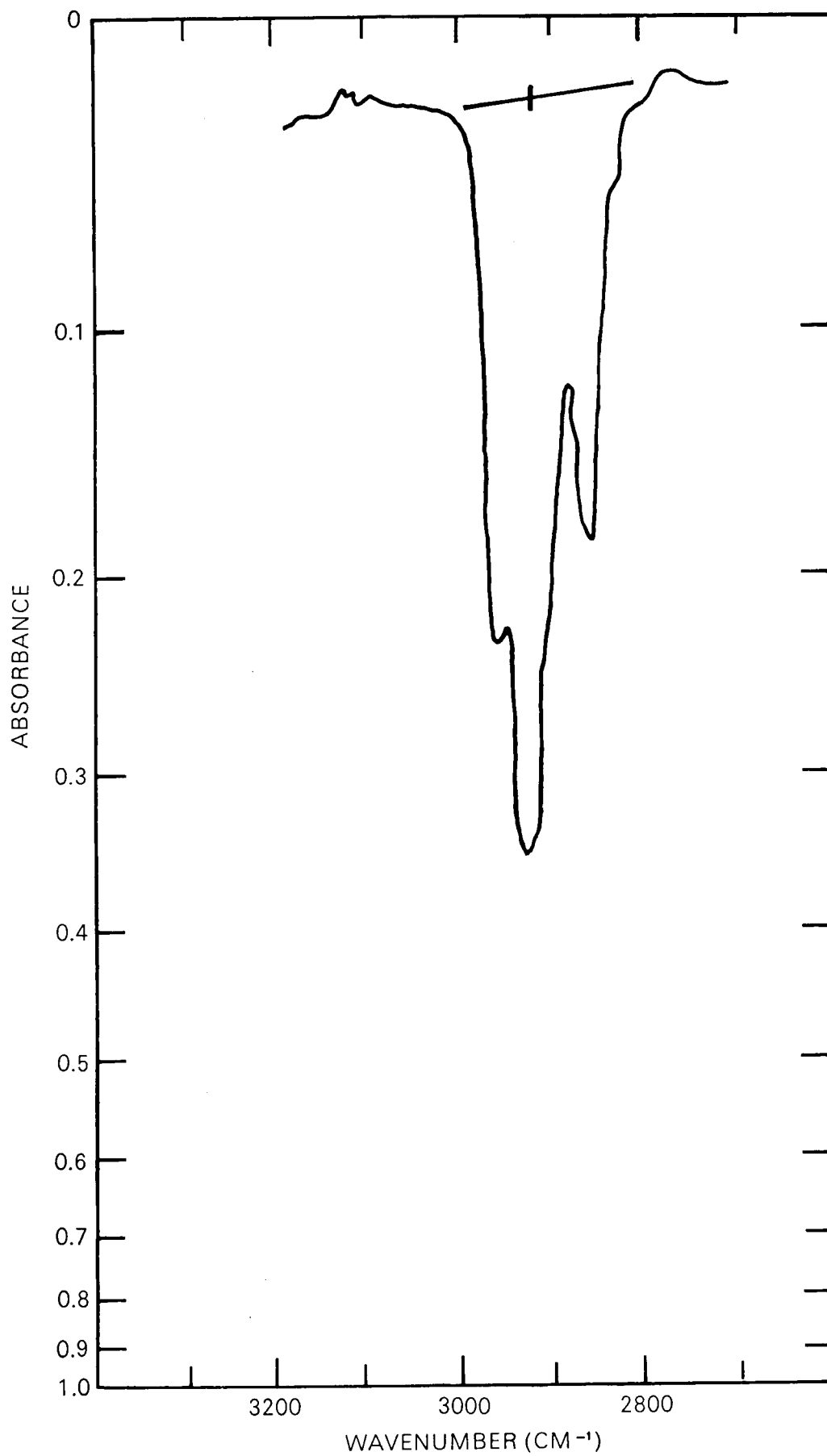
D=extract dilution factor, if used (4.7.6)

V=volume of sample, in millilitres (4.6.7)

4.8.3 Report results to two significant figures for levels below 100 mg/l.

NOTE 3 : For quality control, a reagent blank should be carried through each step of the procedure.

4.8.4 For purposes of comparison to meter records, the results should also be presented in parts per million (volume/volume) with due allowance for the relative density of the oil.

**Figure 4**

Spectrum illustrating baseline construction

FORMS OF CERTIFICATES OF TYPE TEST FOR OILY-WATER SEPARATING EQUIPMENT AND OIL CONTENT METERS



NAME OF ADMINISTRATION

A. CERTIFICATE OF TYPE TEST FOR OILY-WATER SEPARATING AND FILTERING EQUIPMENT

This is to certify that the equipment listed has been examined and tested in accordance with the requirements of the specification contained in Part II of the Annex to the Recommendation contained in IMCO Resolution No. A.393(X). The system tested comprised the following components and this certificate is valid only for such a system.

* System manufactured by including

* Separator manufactured by
to Drawing Nos.

* Coalescer manufactured by
to Drawing Nos.

* Filter manufactured by
to Drawing Nos.

Control equipment manufactured by
to Drawing Nos.

Maximum throughput of system m³/h

Measured oil content of effluent less than 15 ppm * 100 ppm *

If integral feed pump is not fitted state method proposed for ensuring maximum throughput of system is not exceeded.

A copy of this certificate should be carried aboard a vessel fitted with this equipment at all times.

Limiting Conditions imposed

Test data and results attached as Appendix

Signed

Official Stamp

Administration of

Dated this day of 19.....

* Delete as appropriate

APPENDIX

Test data and results of tests conducted on oily-water separating and filtering equipment in accordance with Parts II and IV of the Annex to the Recommendation contained in IMCO Resolution No. A.393(X).

System manufactured byincluding

* Separator manufactured by

* Coalescer manufactured by

* Filter manufactured by

Control equipment manufactured by

Maximum throughput of systemm³/h

Test location

Method of sample analysis

Samples analysed at

Details of test pump (if integral pump is not fitted)

Type

Capacity (m³/h)

Speed rpm

Vibration tests to paragraph 2.1.3 satisfactory

Equipment is capable of reliable operation at angles of up to 22.5° in any plane from normal operational position

* Delete as appropriate

Res. A.393(X)

Test Oil (A)

Relative density	at 15°C
Viscosity	Centistokes at 37.8°C
Flash point	°C
Ash content	%
Water content at start of test	%

Test Oil (B)

Relative density	at 15°C
Viscosity	Centistokes at 37.8°C
Flash point	°C
Ash content	%
Water content at start of test	%

Test Water

Relative density	at 15°C
Solid matter present	

Test temperatures

Ambient	°C
Test oil (A)	°C
Test oil (B)	°C
Test water	°C

Diagram of test rig attached
Diagram of sampling arrangement
attached



B. CERTIFICATE OF TYPE TEST FOR OIL CONTENT METERS

This is to certify that the system comprising the equipment listed has been examined and tested in accordance with the requirements of the specification contained in Part III of the Annex to the Recommendation contained in IMCO Resolution No. A.393(X). This certificate is valid only for such a system.

- * System manufactured by including
Oil content meter manufactured by
to Drawing Nos.
- * Recording device manufactured by
to Drawing Nos.
- * Alarm manufactured by
to Drawing Nos.
- * Meter supply manufactured by
to Drawing Nos.
- * Homogeniser (Mixer) manufactured by
to Drawing Nos.
Control system manufactured by
to Drawing Nos.

The system is acceptable for the following applications

- * Crude oils
- * "Black" products
- * "White" products
- * Bilge or fuel tank ballast water monitor
- * 15 ppm bilge or fuel tank ballast alarm
- * Other products, or applications, listed below

* Delete as appropriate

A copy of this test certificate should be carried aboard a vessel fitted with this equipment at all times.

Test data and results attached as Appendix

Official Stamp

Signed

Administration of

Dated this day of..... 19.....

APPENDIX

Test data and results of tests conducted on oil content meters in accordance with Parts III and IV of the Annex to the Recommendation contained in IMCO Resolution No. A.393(X).

Oil content monitoring system submitted by

Test location

Method of sample analysis

Samples analysed by

Vibration tests to paragraph 3.1.2 satisfactory

Equipment is capable of reliable operation at angles of up to 22.5° in any plane from normal operational position

		READINGS (p.p.m.)			REMARKS	
		Indicated	Measured	Grab Sample		
CALIBRATION	0		
	15	.....	.....	.....
	50	.....	.....	.....
	100	.....	.....	.....
	200	.....	.....	.....
	500	.....	.....	.....
	1000	.....	.....	.....
	2000	.....	.....	.....
		
		
<hr/>						
OIL TYPE						
RESPONSE TESTS						
Sahara Blend						
	15		
	100	.....	.....	.....
	90% M.F.S.V.=	.....	.....	.....
	RECORDED ZERO	.....	.....	.....
			
<hr/>						
Arabian Light Crude						
	15		
	100	.....	.....	.....
	90% M.F.S.V.=	.....	.....	.....
	RECORDED ZERO	.....	.....	.....
			
<hr/>						
M.F.S.V.=MAXIMUM FULL SCALE VALUE						
		RE-ZERO YES/NO*	
		TIME MINS	
		RE-CALIBRATE YES/NO*	
		TIME MINS	
		CLEAN YES/NO*	
		TIME MINS	

* Delete as appropriate

		READINGS (p.p.m.)			REMARKS
		Indicated	Measured	Grab Sample	
Nigerian Medium Crude					
15		
100		
90% M.F.S.V.=		
RECORDED ZERO				
					RE-ZERO YES/NO* TIME MINS RE-CALIBRATE YES/NO* TIME MINS CLEAN YES/NO* TIME MINS
Bachaquero 17 Crude					
15		
100		
90% M.F.S.V.=		
RECORDED ZERO				
					RE-ZERO YES/NO* TIME MINS RE-CALIBRATE YES/NO* TIME MINS CLEAN YES/NO* TIME MINS
Minas Crude					
15		
100		
90% M.F.S.V.=		
RECORDED ZERO				
					RE-ZERO YES/NO* TIME MINS RE-CALIBRATE YES/NO* TIME MINS CLEAN YES/NO* TIME MINS

* Delete as appropriate

			READINGS (p.p.m.)			REMARKS
	Indicated	Measured	Grab Sample			
Residual Fuel	15	.....	.....	.....
	100	.....	.....	.....
	90% M.F.S.V. =	.....	.....	.....
	RECORDED ZERO	.....				RE-ZERO TIME YES/NO* MINS RE-CALIBRATE TIME YES/NO* MINS CLEAN TIME YES/NO* MINS
Leaded Regular Grade Automotive Gasoline	15	.....	.....	.....
	100	.....	.....	.....
	90% M.F.S.V. =	.....	.....	.....
	RECORDED ZERO	.....				RE-ZERO TIME YES/NO* MINS RE-CALIBRATE TIME YES/NO* MINS CLEAN TIME YES/NO* MINS
Unleaded Automotive Gasoline	15	.....	.....	.....
	100	.....	.....	.....
	90% M.F.S.V. =	.....	.....	.....
	RECORDED ZERO	.....				RE-ZERO TIME YES/NO* MINS RE-CALIBRATE TIME YES/NO* MINS CLEAN TIME YES/NO* MINS

* Delete as appropriate

			READINGS (p.p.m.)			REMARKS
		Indicated	Measured	Grab Sample		
Kerosene	15	.....	.....	.....
	100	.....	.....	.....
	90% M.F.S.V.=	.....	.....	.....
	RECORDED ZERO	.....			
					RE-ZERO TIME	YES/NO* MINS
					RE-CALIBRATE TIME	YES/NO* MINS
					CLEAN TIME	YES/NO* MINS
Light Diesel Fuel	15	.....	.....	.....
	100	.....	.....	.....
	90% M.F.S.V.=	.....	.....	.....
	RECORDED ZERO	.....			
					RE-ZERO TIME	YES/NO* MINS
					RE-CALIBRATE TIME	YES/NO* MINS
					CLEAN TIME	YES/NO* MINS

NOTE: If alternative oils, covering the same range of properties of the crude oils listed, are used, these should be substituted where applicable.

* Delete as appropriate

RESPONSE TIMES

		seconds
First detectable reading		.....
	63 ppm	.....
	90 ppm	.....
maximum reading or maximum reading	100 ppm	.....
First detectable drop	ppm	.....
	37 ppm	.....
	10 ppm	.....
minimum reading or minimum reading	zero	.....
	ppm	.....
RESPONSE TIME = $\frac{\textcircled{1} + \textcircled{2}}{2}$	=	.....

OIL FOULING AND CALIBRATION SHIFT

10% oil concentration test

First detectable response		.....
	100 ppm	.....
Off scale on highest range		.....
On scale on highest range		.....
	100 ppm	.....
minimum reading	ppm	.....
Further cleaning required YES/NO * (State extent)		
Time	Mins	

100% oil concentration test

		seconds
First detectable response		.....
	100 ppm	.....
Off scale on highest range		.....
On scale on highest range		.....
	100 ppm	.....
Minimum reading	ppm	.....

* Delete as appropriate

Further cleaning required (State extent) YES/NO*

TimeMins

Calibration shift (%) (ppm)*

CONTAMINANTS TEST

Meter reading shift Fresh Water (%) (ppm)*

Very Salt Water (%) (ppm)*

Non Soluble Suspended Solids (%) (ppm)*

OIL PARTICLE SIZE TEST

Meter reading shift (%) (ppm)*

TEMPERATURE TEST

Calibration test water temperature °C

Meter reading shift at 10°C (%) (ppm)*

Meter reading shift at 65°C (%) (ppm)*

SAMPLE PRESSURE OR FLOW TEST

Meter reading shift at 50% normal (%) (ppm)*

Meter reading shift at 200% normal (%) (ppm)*

Deviations from this test should be stated if necessary

Meter reading before shut off (%) (ppm)*

Meter reading after start up (minimum dry period 8 hours) (%) (ppm)*

Damage to meter as follows

UTILITIES SUPPLY VARIATION TEST

110% voltage effects

90% voltage effects

110% air pressure effects

* Delete as appropriate

90% air pressure effects
110% hydraulic effects
90% hydraulic effects

OTHER COMMENTS

CALIBRATION AND ZERO TEST

Calibration drift (%) (ppm) *
Zero drift (%) (ppm) *

SHUT DOWN AND DE-ENERGISATION TEST

Span drift (%) (ppm) *
Zero drift (%) (ppm) *
Time for warm up and calibration Mins
Specification of instrument attached
Test arrangement diagram attached
Oil type response curves attached

Signed

Date

Official Stamp

* Delete as appropriate

ASSEMBLY
TENTH SESSION
RESOLUTIONS
AND
OTHER DECISIONS
ERRATUM

Resolution A.393(X)

Page 238

In the 13th line, add the word "pump" after "supply".

(Sales No. 78.05.E)

RESOLUTION A.444(XI)

*Adopted on 15 November 1979
Agenda item 11*

**RECOMMENDATION CONCERNING THE INSTALLATION OF
OILY-WATER SEPARATING EQUIPMENT UNDER THE
INTERNATIONAL CONVENTION FOR THE PREVENTION OF
POLLUTION FROM SHIPS, 1973 AS MODIFIED BY THE
PROTOCOL OF 1978 RELATING THERETO**

THE ASSEMBLY,

RECALLING resolution A.297(VIII) by which it established the Marine Environment Protection Committee and specified the functions and responsibilities of that Committee,

RECALLING ALSO Regulation 16 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973 (1973 MARPOL Convention) which *inter alia* requires ships above 400 tons gross tonnage to be fitted with oily-water separating equipment or oil filtering systems,

RECALLING FURTHER that by resolution A.393(X) it adopted the Recommendation on International Performance and Test Specifications for Oily-Water Separating Equipment and Oil Content Meters,

NOTING that many ships are already equipped with oily-water separating equipment under the 1969 amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, or under national legislation which do not necessarily meet the provisions of the Recommendation annexed to resolution A.393(X),

RECOGNIZING the need for uniform requirements for the installation of oily-water separating equipment, oil filtering system and oil discharge monitoring and control system to comply with the provisions of Regulation 16 of Annex I of the 1973 MARPOL Convention, which should be achieved by the installation either of new equipment or of supplementary units attached to the existing equipment,

HAVING CONSIDERED the recommendation made by the Marine Environment Protection Committee at its eleventh session,

1. ADOPTS the Recommendation concerning the Installation of Oily-Water Separating Equipment under the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, the text of which is set out in the Annex to the present resolution;
2. URGES Governments to implement the Recommendation as soon as possible;
3. INVITES Governments to provide IMCO with information on experience gained from their application and, in particular, on successful testing of the process units against the specifications contained in Appendix 1 to the Recommendation.

ANNEX

RECOMMENDATION CONCERNING THE INSTALLATION OF OILY-WATER SEPARATING EQUIPMENT UNDER THE INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS, 1973 AS MODIFIED BY THE PROTOCOL OF 1978 RELATING THERETO

1 INTRODUCTION

1.1 Under Regulation 16 of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973 (1973 MARPOL Convention),* as modified by the Protocol of 1978 relating thereto:

- .1 ships of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage must be fitted with approved oily-water separating equipment or a filtering system (capable of producing effluent with an oil content of less than 100 ppm) (Regulation 16(1) and (6)); and
- .2 ships of 10,000 tons gross tonnage and above, and ships of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage carrying large quantities of fuel oil, must either:
 - .2.1 be fitted with approved oily-water separating equipment or a filtering system (capable of producing effluent with an oil content of less than 100 ppm) and an approved oil discharge monitoring and control system (Regulation 16(2)(a) and (5)); or
 - .2.2 be fitted with approved oily-water separating equipment and effective filtering equipment (capable of producing effluent with an oil content not exceeding 15 ppm) and be provided with alarm arrangements to indicate when this level cannot be maintained (Regulation 16(2)(b), (6) and (7)).

1.2 This Recommendation is intended to provide guidance to Administrations in establishing national programmes for dealing with existing oily-water separating equipment in order to bring such equipment into compliance with the provisions of the 1973 MARPOL Convention as modified by the 1978 Protocol. It applies to all ships of 400 tons gross tonnage and above covered by Regulation 16 of Annex I of the 1973 MARPOL Convention as modified by the 1978 Protocol.

1.3 For the purpose of this Recommendation, existing equipment means equipment which was installed on board a ship on or before 20 January 1979.

1.4 This Recommendation assumes that all oily-water separating equipment installed on board ship after 20 January 1979 is of the type approved under the terms of resolution A.393(X). In cases where equipment installed after 20 January 1979 is not of the type approved under the terms of resolution A.393(X) or does not comply with the provisions of Regulation 16 of Annex I of the 1973 MARPOL Convention, Administrations should take necessary measures in order to ensure that such installations are brought at least to the standards laid down in this Recommendation.

1.5 This Recommendation also assumes that all ships of 500 tons gross tonnage and above have complied with the provisions of the Recommendation concerning Oily-Water Separating Equipment under the 1969 amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as contained in document MEPC VIII/17, Annex V and circulated

* Regulations referred to in this Recommendation are those of Annex I of the 1973 MARPOL Convention.

under cover of MEPC/Circ.56 of 30 December 1977. The text of that Recommendation is reproduced in Appendix 2 to the present Recommendation. Ships which have not yet complied with that Recommendation should, without delay, be brought to the standards laid down in that Recommendation.

1.6 For the purposes of the present Recommendation:

- .1 "oily-water separating equipment" means a separator or filter, or any combination thereof, which is designed to produce effluent containing less than 100 ppm of oil, in compliance with Regulation 16(6);
- .2 "oil filtering equipment" means any combination of a separator and a filter or coalescer which is designed to produce effluent containing not more than 15 ppm of oil, in compliance with Regulation 16(6) and (7);
- .3 "oil content meter" means an oil discharge monitoring system referred to in Regulation 16(5);
- .4 "recording device" means a device to provide a continuous record of the oil content in parts per million, as required by Regulation 16(5);
- .5 "15 ppm alarm" means an alarm arrangement to indicate when the oil content of the effluent exceeds 15 ppm. An oil content meter approved for "15 ppm bilge or fuel tank ballast alarm" under the terms of resolution A.393(X) satisfies the requirements for 15 ppm alarm.

2 EXISTING EQUIPMENT ON BOARD SHIPS OF 10,000 TONS GROSS TONNAGE AND ABOVE AND SHIPS OF 400 TONS GROSS TONNAGE AND ABOVE BUT LESS THAN 10,000 TONS GROSS TONNAGE CARRYING LARGE QUANTITIES OF FUEL OIL

2.1 Ships with no installed equipment

Such ships should either:

- .1 be fitted with oily-water separating equipment for 100 ppm and an oil content meter of a type approved under the terms of resolution A.393(X) and be provided with a recording device; or
- .2 be fitted with oil filtering equipment for 15 ppm of a type approved under the terms of resolution A.393(X) and be provided with a 15 ppm alarm.

2.2 Existing non-approved equipment

Such equipment should be replaced with equipment specified in either 2.1.1 or 2.1.2 above.

2.3 Existing equipment approved under national standards or under resolution A.233(VII)

Such equipment may continue to be used until it must be replaced with new equipment due to age or failure, provided that either of the following conditions is complied with:

- .1 it is fitted with an oil content meter of a type approved under the terms of resolution A.393(X) and is provided with a recording device; or
- .2 it is fitted with ancillary coalescers or filters for 15 ppm of a type approved by the Administration under the terms of the specifications for process units intended for attachment to existing oily-water separating equipment as shown in Appendix 1 hereto, and is provided with a 15 ppm alarm.

2.4 Existing equipment approved under the terms of resolution A.393(X)

Such equipment:

- .1 if it is oil filtering equipment for 15 ppm and is provided with a 15 ppm alarm, may continue to be used, provided that it remains in good working order; or
- .2 if it is oily-water separating equipment for 100 ppm, should either:
 - .2.1 be fitted with an oil content meter of a type approved under the terms of resolution A.393(X) and be provided with a recording device; or
 - .2.2 be fitted with ancillary coalescers or filters for 15 ppm of a type approved by the Administration under the terms of the specifications for process units intended for attachment to existing oily-water separating equipment, as shown in Appendix 1 hereto, and be provided with a 15 ppm alarm.

3 EXISTING EQUIPMENT ON BOARD SHIPS OF 400 TONS GROSS TONNAGE AND ABOVE BUT LESS THAN 10,000 TONS GROSS TONNAGE

3.1 Ships with no installed equipment

Such ships should be fitted with oily-water separating equipment of a type approved under the terms of resolution A.393(X).

3.2 Existing non-approved equipment

Such equipment should:

- .1 be replaced with oily-water separating equipment of a type approved under the terms of resolution A.393(X); or
- .2 be fitted with an oil content meter of a type approved under the terms of resolution A.393(X).

3.3 Existing equipment approved under national standards not based on resolution A.233(VII)

Such equipment may continue to be used until it must be replaced with new equipment due to age or failure, provided that either:

- .1 it is fitted with an oil content meter of a type approved under the terms of resolution A.393(X); or
- .2 it complies with all of the following conditions:
 - .2.1 the system is fitted with ancillary coalescers or filters of a type approved by the Administration under the terms of the specifications for process units intended for attachment to existing oily-water separating equipment as shown in Appendix 1 hereto;
 - .2.2 the residence time* of the system is not less than 10 minutes; and
 - .2.3 the system is modified for automatic operation if the mode of operation makes this necessary.

3.4 Existing equipment approved under the terms of resolution A.233(VII) or equivalent national standards

Such equipment may continue to be used until it must be replaced with new equipment due to age or failure, provided that any one of the following conditions is complied with:

- .1 it has received type approval by a retest under the terms of resolution A.393(X); or

* Residence time is defined as
$$\frac{\text{Volume of equipment (m}^3\text{)}}{\text{Throughput of equipment (}\frac{\text{m}^3}{\text{min}}\text{)}}$$

- .2 it is fitted with an oil content meter of a type approved under the terms of resolution A.393(X); or
- .3 it is fitted with an ancillary coalescer or filter of a type approved by the Administration under the terms of the specifications for process units intended for attachment to existing oily-water separating equipment as shown in Appendix 1 hereto; or
- .4 it complies with all of the following conditions:
 - .4.1 the physical condition and the arrangement of the equipment continue to be to the satisfaction of the Administration;
 - .4.2 the equipment is so arranged that the input is restricted in a permanent manner to the maximum rated figure and that the residence time within the separator is not less than 20 minutes;
 - .4.3 the emulsifying characteristics of the supply pump are no worse than those of the pump used for the test for type approval; and
 - .4.4 the arrangements on each ship for minimizing the entry of oil in the bilges are to the satisfaction of the Administration.

3.5 Existing equipment approved under the terms of resolution A.393(X)

Such equipment may continue to be used, provided that it remains in good working order.

4 GENERAL PROVISIONS

4.1 The provisions of sections 2 and 3 of this Recommendation are intended to cover primarily existing ships as defined in Regulation 1(7) of Annex I of the 1973 MARPOL Convention. Existing equipment on board new ships as defined in Regulation 1(6) may be treated in the same manner as for existing ships under sections 2 and 3 of this Recommendation, provided that new ships of 10,000 tons gross tonnage and above, complying with Regulation 16(2)(a), or of 400 tons gross tonnage and above but less than 10,000 tons gross tonnage carrying large quantities of fuel oil and complying with Regulation 16(2)(a), are fitted with an automatic stopping device required by Regulation 16(5).

4.2 In cases where an oil content meter is to be installed supplementary to existing equipment, Administrations should satisfy themselves that such existing equipment is still capable of producing effluent with an oil content of less than 100 ppm under the original conditions of test. If not, process units should be installed.

4.3 Nothing in this Recommendation should be construed as preventing ships from installing equipment having standards higher than those set out in sections 2 and 3, e.g. the installation of new equipment approved under the terms of resolution A.393(X) in lieu of continuing use of existing equipment in association with supplementary equipment, or oil filtering equipment for 15 ppm in lieu of oily-water separating equipment for 100 ppm. In this connexion, the attention of the Administration is drawn to the possible need for ships of less than 10,000 tons gross tonnage to install equipment capable of producing effluent with an oil content not exceeding 15 ppm, if such ships are intended to be engaged in trades in special areas under the 1973 MARPOL Convention or in coastal trades where discharge from machinery space bilges within 12 nautical miles from the nearest land is envisaged.

4.4 In all cases where existing equipment not approved under the terms of resolution A.393(X) is allowed under sections 2 and 3 of this Recommendation to continue to be used until it must be replaced with new equipment due to age or failure, such continuing use should be allowed only if all of the following conditions are complied with:

- .1 the equipment is in good working order;
- .2 no unauthorized modifications have been made to the system; and

.3 the system is complete and any internal corrosion is within acceptable limits.

4.5 Whenever existing equipment is to be replaced with new equipment due to age, failure or otherwise, the new equipment should be of a type approved under the terms of resolution A.393(X).

APPENDIX 1

SPECIFICATIONS FOR PROCESS UNITS INTENDED FOR ATTACHMENT TO EXISTING OILY-WATER SEPARATING EQUIPMENT

1 **General provisions**

1.1 The equipment tested under these specifications should have such capacity that when attached to existing oily-water separating equipment, having either approval under a national standard or approval under resolution A.233(VII) of the IMCO Assembly, and its supply pump, neither the separator nor the attached equipment can be subjected to a flow rate higher than that stated in the relevant certificate.

1.2 Where a range of process units, intended for attachment to existing oily-water separating equipment, of the same design but of different capacities, requires certification in accordance with these specifications and where the largest capacity in the range does not exceed 50 cubic metres/hour, the Administration may accept tests on two capacities within the range, in lieu of tests on every size, provided that the two tests actually performed are for the lowest quarter and highest quarter of the range.

2 **Technical specifications**

2.1 These specifications relate to equipment (i.e. coalescers or filters) of low to medium capacity intended for attachment to oily-water separating plants to enable the oil content in the effluent, when the oil content of the influent to the equipment is not less than 3,000 ppm, to be reduced to less than 100 ppm, or not exceeding 15 ppm when the equipment is to be approved for the coalescers or filters for 15 ppm. The approval should clearly indicate the accepted application.

2.2 The equipment should be strongly constructed and suitable for shipboard use, bearing in mind its location in the ship.

2.3 The satisfactory functioning of the equipment should not be affected by the movements and vibrations experienced on board ship. Any electrical and electronic alarm and control arrangements should be tested to show that they are capable of continued operation under vibration conditions as follows:

- .1 from 2 Hz to 13.2 Hz with an amplitude of ± 1 mm, and
- .2 from 13.2 Hz to 80 Hz with an acceleration amplitude of $\pm 0.7 g$.

Additionally, the equipment should be capable of reliable operation at angles of up to 22.5° in any plane from the normal operational position.

2.4 The equipment should meet the same electrical safety standards as are applicable to the oily-water separating equipment to which it is to be attached.

2.5 When fitted in unattended machinery spaces the equipment should be capable of operating for at least 24 hours of normal duty without attention.

2.6 All working parts of the equipment which are liable to wear or to damage should be easily accessible for maintenance.

2.7 The equipment should be fitted with a permanently attached plate giving any operational or installation limits considered necessary by the manufacturer or the Administration, including information on the maximum throughput and maximum pressure for which the unit has been tested.

2.8 If the equipment uses regenerated or replaceable elements, the regeneration or replacement cycle should be positively indicated by a means giving satisfactory protection against element saturation. The means selected should be suitable and reliable for the type of element used.

3 Test specifications

3.1 These test standards refer to equipment of low or medium capacity (up to about 50 cubic metres/hour).

3.2 The test rig should be as laid out in figure 1(a) in the Annex to resolution A.393(X).

3.3 As the influent to the equipment will contain only low concentrations of oil it will be necessary to provide an accurate oil metering pump or system.

3.4 To simulate the worst conditions which would apply at the mixture discharge of a separator, a centrifugal pump having the capacity of the maximum throughput of the equipment and operating at not less than 1,000 revolutions per minute should be used as the supply pump.

3.5 It is preferable that the pipe between the outlet of the pump and the inlet to the equipment should be of the same diameter as the equipment inlet; any difference in diameter between the pump outlet and the inlet to the equipment should be taken up by a tapered section at the pump end of the pipe and the length of the parallel section of the supply pipe should be not less than 20 times its diameter.

3.6 The sampling arrangements should be as shown in figure 2 in the Annex to resolution A.393(X).

3.7 Sampling points should be in pipes running vertically and free flow should be effected for at least one minute before any sample is taken.

3.8 Tests should be carried out within the range 10°C to 30°C.

3.9 The tests should be performed using two grades of oil. One should be a fuel oil having a relative density of about 0.94 at 15°C and a viscosity of not less than 220 centistokes (about 900 seconds Redwood No.1) at 37.8°C (100°F). The other oil should be a light distillate fuel having a relative density of about 0.83 at 15°C.

3.10 The tests should be carried out with clean water having a relative density at 15°C not more than 0.085 greater than the relative density of the heavier fuel oil detailed in 3.9.

3.11 The equipment should be presented with an influent mixture containing not less than 3,000 ppm for a period equal to two times the residence time prior to any performance measurements being taken.

3.12 The equipment should be fed with a mixture containing not less than 3,000 ppm of the heavier oil for a minimum period of three hours; at least three samples should be taken at intervals not exceeding one hour, but the test should be of such duration that the operation of the devices mentioned in 3.16 is proved to be satisfactory.

3.13 The test detailed in 3.12 should be repeated with the lighter oil and samples should be taken at the intervals specified in 3.12.

3.14 The tests should be carried out consecutively and work (e.g. changing filter elements or pads) should not be permitted during the test period.

3.15 The oil content of the samples should be determined by the method described in Part IV of the Annex to resolution A.393(X).

3.16 If devices such as oil floats or oil level indicators are fitted these should be in operation during the tests and their satisfactory operation reported.

4 Certification

4.1 After satisfactory completion of tests the Administration should issue a certificate of type test as attached to these specifications.

5 Installation

5.1 The installation should be carried out in accordance with the manufacturer's drawings and instructions.

5.2 The equipment should be permanently attached to the oily-water separator by means of steel pipes, or equivalent, and any changes in cross-sectional area in the pipework should be gradual.

5.3 Bends and fittings in the connecting pipework should be kept to a minimum and so arranged as to keep the flow characteristics constant so far as is practicable.

5.4 The equipment should be positioned, so far as is practicable, in the same horizontal plane as the separator to which it is attached.

5.5 Positive means should be provided to minimize oil spillage when it is necessary to renew elements or clean internal sections.

5.6 For future inspection purposes aboard ship a sampling point should be provided in a vertical section of the water effluent piping as close as practicable to the equipment outlet.



ATTACHMENT TO THE SPECIFICATIONS FOR PROCESS UNITS
INTENDED FOR ATTACHMENT TO EXISTING
OILY-WATER SEPARATING EQUIPMENT

Name of Administration

**CERTIFICATE OF TYPE TEST FOR PROCESS UNITS FOR
ATTACHMENT TO EXISTING OILY-WATER SEPARATING EQUIPMENT**

This is to certify that the equipment listed has been examined and tested in accordance with the requirements of the specifications for process units intended for attachment to existing oily-water separators contained in Appendix I to the Annex to IMCO Assembly resolution A.444(XI). The system tested comprised the following components and this certificate is valid only for such a system.

Type or model

System manufactured by including

* Coalescer manufactured by

to Drawing Nos *[Type or model]*

* Filter manufactured by

to Drawing Nos *[Type or model]*

* Control equipment manufactured by

to Drawing Nos *[Type or model]*

Maximum throughput of system m³/h

Measured oil content of effluent less than 15 ppm* 100 ppm*

A copy of this certificate should be carried at all times aboard a vessel fitted with this equipment.

Limiting conditions imposed

Test data and results attached
as appendix to this certificate

Official stamp

Signed

Administration of

Dated this day of 19....

* *Delete as appropriate.*

APPENDIX TO CERTIFICATE OF TYPE TEST

Data and results of the tests conducted on the equipment listed in accordance with the requirements of the specifications for process units intended for attachment to existing oily-water separating equipment contained in Appendix 1 to the Annex to IMCO Assembly resolution A.444(XI) and Part IV of the Annex to the Recommendation contained in IMCO Assembly Resolution A.393(X).

System manufactured by including

* Coalescer manufactured by

to Drawing Nos

* Filter manufactured by

to Drawing Nos

* Control equipment manufactured by

to Drawing Nos

Maximum throughput of the system m³/h

Test location

Method of sample analysis

Samples analysed at

Diagram of test rig attached

Diagram of sampling arrangement attached

Details of test pump

Type

Capacity m³/h

Speed r.p.m.

Oil float or oil level indicator operation

The results of the vibration tests mentioned in paragraph 2.3 of the specifications are satisfactory.

The equipment is capable of reliable operation at angles of up to 22.5° in any plane from the normal operational position.

* *Delete as appropriate*

Test oil (A)
 Relative density at 15°C
 Viscosity Centistokes at 37.8°C
 Flash point °C
 Ash content %
 Water content at start of test %

Test oil (B)
 Relative density at 15°C
 Viscosity Centistokes at 37.8°C
 Flash point °C
 Ash content %
 Water content at start of test %

Test water
 Relative density at 15°C
 Solid matter present

Test temperatures
 Ambient °C
 Test oil (A) °C
 Test oil (B) °C
 Test water °C

TEST RESULTS (ppm)

Test oil (A)		Test oil (B)		Vm – maximum throughput of equipment	Ve – volume of equipment $2 \frac{Ve}{Vm}$	not less than	Conditioning
Influent	Effluent	Influent	Effluent					more than 3000 ppm
.....	①	1	1	Efficiency test
.....	②	1	1	
.....	③	1	1	

TIME (hours) ↓

Signed Date Official Stamp

APPENDIX 2

RECOMMENDATION CONCERNING OILY-WATER SEPARATING EQUIPMENT
UNDER THE 1969 AMENDMENTS TO THE
INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION
OF THE SEA BY OIL, 1954

(Adopted by the Marine Environment Protection Committee
at its eighth session and circulated under cover of
MEPC/Circ.56 of 30 December 1977)

This Recommendation is for use by Administrations in establishing national programmes for dealing with oily-water separating equipment under the terms of the 1969 amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, 1954. It is intended to be applied to ships covered by the 1969 amendments, that is, ships other than oil tankers of 500 tons gross tonnage and above and oil tankers of 150 tons gross tonnage and above.

I. Existing non-approved oily-water separating equipment

It is recommended that as soon as possible and in any case not later than 20 January 1979, such equipment either:

- (a) be replaced with a separator having type approval under the terms of resolution A.393(X);* or
- (b) be fitted with an oil content meter of a type approved under resolution A.393(X).

II. Existing nationally approved oily-water separating equipment

It is recommended that existing oily-water separating equipment that has been approved to an existing national standard for an effluent of less than 100 parts per million be accepted, provided that:

- (a) the physical condition and the arrangement of the system continue to be to the satisfaction of the Administration;
- (b) the throughput of the system must not exceed the approved throughput of the separator and the supply pump must have emulsifying characteristics no worse than those of the pump used for approval;
- (c) the arrangements on each ship for minimizing the entry of oil to the bilges are to the satisfaction of the Administration; and
- (d) each ship fitted with a system accepted by the Administration carries at all times a certificate issued by, or on behalf of, the Administration, stating that points (a), (b) and (c) are satisfactory.

III. Existing oily-water separating equipment approved under resolution A.233(VII)

It is recommended that such equipment be accepted provided that the physical condition and the arrangement of the system is to the satisfaction of the Administration.

IV. Ships with no installed oily-water separating equipment

It is recommended that such ships be required to install an approved oily-water separator as soon as possible, and in any case not later than 20 January 1979. Such equipment should be of a type approved under resolution A.393(X). In special cases, equivalent existing arrangements approved by an Administration under national regulations as complying with the discharge requirements of the 1969 amendments should be accepted. A certificate to this effect issued by, or on behalf of, the Administration should be aboard the ship at all times.

* Existing oily-water separators may remain on board if their prototype was tested and approved under resolution A.393(X) not later than 20 January 1979.

RESOLUTION A.446(XI)

*Adopted on 15 November 1979
Agenda item 11*

**REVISED SPECIFICATIONS FOR THE DESIGN, OPERATION
AND CONTROL OF CRUDE OIL WASHING SYSTEMS**

THE ASSEMBLY,

RECALLING resolution A.297(VIII) by which it established the Marine Environment Protection Committee and specified the functions and responsibilities of that Committee,

RECALLING ALSO Regulation 13B(2) of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, concerning requirements for crude oil washing and resolution 15 of the International Conference on Tanker Safety and Pollution Prevention, 1978, which contains the Specifications for the Design, Operation and Control of Crude Oil Washing Systems,

RECALLING FURTHER that by the same resolution the Conference requested the Organization to review and revise, as necessary, the Specifications to reflect the latest technology and practices as may be developed by the time of entry into force of the Protocol,

HAVING CONSIDERED the recommendation made by the Marine Environment Protection Committee at its eleventh session,

1. ADOPTS:

- (a) The revised Specifications for the Design, Operation and Control of Crude Oil Washing Systems, the text of which is set out in the Annex to the present resolution, to supersede the Specifications for the Design, Operation and Control of Crude Oil Washing Systems contained in resolution 15 of the International Conference on Tanker Safety and Pollution Prevention, 1978;
- (b) Agreed interpretations of certain of the provisions of the revised Specifications as shown in Appendix III of the revised Specifications;

2. URGES Governments to establish, in time for the entry into force of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, requirements for the crude oil washing installation and associated equipment and arrangements based on the revised Specifications;

3. URGES FURTHER that the requirements to be established by Administrations should not impose requirements over and above those as laid down in the revised Specifications.

ANNEX**REVISED SPECIFICATIONS FOR THE DESIGN, OPERATION
AND CONTROL OF CRUDE OIL WASHING SYSTEMS****INDEX OF SECTIONS**

1. **Purpose**
 2. **Application**
 3. **General provisions**
 - 3.1 Definition
 - 3.2 Initial survey
 4. **Design criteria**
 - 4.1 Piping
 - 4.2 Tank washing machines
 - 4.3 Pumps
 - 4.4 Stripping system
 - 4.5 Ballast lines
 5. **Qualification of personnel**
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 - 6.1 Tankage to be crude oil washed
 - 6.2 Drainage and discharge ashore of cargo lines
 - 6.3 Filling of departure ballast tanks
 - 6.4 Crude oil washing at sea
 - 6.5 Discharge of oily water effluents on ballast voyage
 - 6.6 Use and control of inert gas
 - 6.7 Precautions against electrostatic generation
 - 6.8 Vapour emission
 7. **Operations and Equipment Manual**
- APPENDIX I** — List of changes when applying the Specifications to new crude oil tankers of 20,000 tons deadweight and above
- APPENDIX II** — Training for persons intended to assume overall charge of crude oil washing
- APPENDIX III** — Agreed interpretations of certain of the provisions of the revised Specifications

1. PURPOSE

The purpose of these Specifications is to provide specific design criteria, operational requirements and control and enforcement procedures for the crude oil washing of cargo tanks of crude oil carriers as specified in section 2.

2. APPLICATION

2.1 These Specifications apply to:

- (a) Existing crude oil tankers of 40,000 tons deadweight and above in accordance with Regulation 13(8) of Annex I of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL Protocol); and
- (b) New crude oil tankers of 20,000 tons deadweight and above in accordance with Regulation 13(6) of Annex I of the MARPOL Protocol, with the changes listed in Appendix I.

Compliance of these ships with these Specifications shall be shown on the International Oil Pollution Prevention Certificate as modified by the MARPOL Protocol.

2.2 If a crude oil that is not suitable for crude oil washing is intended to be carried as cargo in a ship that is provided with only a crude oil washing system, then that ship must comply with segregated ballast tank requirements in accordance with Regulation 13(7) or dedicated clean ballast tank requirements in accordance with Regulation 13(9) of Annex I of the MARPOL Protocol.

3. GENERAL PROVISIONS

3.1 *Definition*

For the purpose of these Specifications:

3.1.1 "Arrival ballast" means clean ballast as defined in Regulation 1(16) of Annex I of the MARPOL Protocol.

3.1.2 "Departure ballast" means ballast other than arrival ballast.

3.2 *Initial survey*

The initial survey referred to in Regulation 4 of Annex I of the MARPOL Protocol shall include a complete inspection of the crude oil washing equipment and arrangements and shall include, except for the cases specified in 4.2.11, an examination of the tanks after they have been crude oil washed and the additional controls as specified in 4.2.10 to ensure that the washing system efficiency is in accordance with these Specifications.

4. DESIGN CRITERIA

4.1 *Piping*

4.1.1 The crude oil washing pipes and all valves incorporated in the supply piping system shall be of steel or other equivalent material and shall be of adequate strength having regard to the pressure to which they may be subjected, and shall be properly jointed and supported.

4.1.2 The crude oil washing system shall consist of permanent pipework and shall be independent of the fire mains and of any system other than for tank washing except that sections of the ship's cargo system may be incorporated into the crude oil washing system provided that they

meet the requirements applicable to crude oil pipework. Notwithstanding the above requirements, in combination carriers the arrangement may allow:

- (a) The removal of the equipment, if necessary, when carrying cargoes other than crude oil, provided that, when reinstated, the system is as originally fitted and tested for oil tightness;
- (b) The use of flexible hose pipes to connect the crude oil washing system to tank washing machines if it is necessary to locate these machines in a cargo tank hatch cover. Such flexible hose pipes must be provided with flanged connexions and be manufactured and tested in accordance with standards acceptable to the Administration and be consistent with the duties the hoses are required to perform. The length of these hoses shall be no greater than necessary to connect the tank washing machines to an adjacent point just outside the hatch coaming. These hoses shall be removed to suitably prepared and protected stowage when not in use and be pressure tested by an authority acceptable to the Administration at intervals of not more than two and a half years.

4.1.3 Provision shall be made to prevent overpressure in the tank washing supply piping. Any relief device fitted to prevent overpressure shall discharge into the suction side of the supply pump. Alternative methods to the satisfaction of the Administration may be accepted provided an equivalent degree of safety and environmental protection is provided.

4.1.4 Where hydrant valves are fitted for water washing purposes on tank washing lines, all such valves shall be of adequate strength and provision shall be made for such connexions to be blanked off by blank flanges when washing lines may contain crude oil. Alternatively, hydrant valves shall be isolated from the crude oil washing system by spade blanks.

4.1.5 All connexions for pressure gauges or other instrumentation shall be provided with isolating valves adjacent to the lines unless the fitting is of the sealed type.

4.1.6 No part of the crude oil washing system shall enter the machinery spaces. Where the tank washing system is fitted with a steam heater for use when water washing, the heater must be effectively isolated during crude oil washing by double shut-off valves or by clearly identifiable blanks.

4.1.7 Where a combined crude oil-water washing supply piping is provided the piping shall be so designed that it can be drained so far as is practicable of crude oil, before water washing is commenced, into spaces designated in the Operations and Equipment Manual. These spaces may be the slop tank or other cargo spaces.

4.1.8 The piping system shall be of such diameter that the greatest number of tank cleaning machines required, as specified in the Operations and Equipment Manual, can be operated simultaneously at the designed pressure and throughput. The arrangement of the piping shall be such that the required number of tank cleaning machines to each cargo compartment as specified in the Operations and Equipment Manual referred to in these Specifications can be operated simultaneously.

4.1.9 The piping system shall be tested to one and one half times the working pressure after it has been installed on the ship.

4.1.10 The crude oil washing supply piping shall be anchored (firmly attached) to the ship's structure at appropriate locations, and means shall be provided to permit freedom of movement elsewhere to accommodate thermal expansion and flexing of the ship. The anchoring shall be such that any hydraulic shock can be absorbed without undue movement of the supply piping. The anchors should normally be situated at the ends furthest from the entry of the crude oil supply to the supply piping. If tank washing machines are used to anchor the ends of branch pipes then special arrangements are necessary to anchor these sections when the machines are removed for any reason.

4.2 *Tank washing machines*

4.2.1 The tank washing machines for crude oil washing shall be permanently mounted and shall be of a design acceptable to the Administration.

4.2.2 The performance characteristic of a tank washing machine is governed by nozzle diameter, working pressure and the movement pattern and timing. Each tank cleaning machine fitted shall have a characteristic such that the sections of the cargo tank covered by that machine will be effectively cleaned within the time specified in the Operations and Equipment Manual.

4.2.3 Tank washing machines shall be mounted in each cargo tank and the method of support shall be to the satisfaction of the Administration. Where the tank washing machines are positioned well below the deck level to cater for protuberances in the tank, consideration may need to be given to additional support for the machine and its supply piping.

4.2.4 Each machine shall be capable of being isolated by means of stop valves in the supply line. If a deck mounted tank washing machine is removed for any reason, provision shall be made to blank off the oil supply line to the machine for the period the machine is removed. Similarly, provision shall be made to close the tank opening with a plate or equivalent means.

4.2.5 Where the drive units for the tank cleaning machines are not integral with the tank cleaning machine, sufficient drive units shall be provided to ensure that no drive unit need be moved more than twice from its original position during cargo discharge to accomplish the washing programme as specified in the Operations and Equipment Manual.

4.2.6 The number and location of the tank washing machines shall be to the satisfaction of the Administration.

4.2.7 The location of the machines is dependent upon the characteristics detailed in 4.2.2 and upon the configuration of the internal structure of the tank.

4.2.8 The number and location of the machines in each cargo tank shall be such that all horizontal and vertical areas are washed by direct impingement or effectively by deflection or splashing of the impinging jet. In assessing an acceptable degree of jet deflection and splashing, particular attention shall be paid to the washing of upward facing horizontal areas and the following parameters shall be used:

- (a) For horizontal areas of a tank bottom and the upper surfaces of a tank's stringers and other large primary structural members, the total area shielded from direct impingement by deck or bottom transverses, main girders, stringers or similar large primary structural members shall not exceed 10 per cent of the total horizontal area of tank bottom, the upper surface of stringers, and other large primary structural members.
- (b) For vertical areas of the sides of a tank, the total area of the tank's sides shielded from direct impingement by deck or bottom transverses, main girders, stringers or similar large primary structural members shall not exceed 15 per cent of the total area of the tank's sides.
- (c) For existing crude oil tankers, the Administration may permit the percentages required in (a) and (b) above to be exceeded for tanks having complicated internal structural members provided that the percentages calculated over all the cargo tanks do not exceed 10 per cent for horizontal areas and 15 per cent for vertical areas.

In some installations it may be necessary to consider the fitting of more than one type of tank washing machine in order to effect adequate coverage.

4.2.9 At the design stage the following minimum procedures shall be used to determine the area of the tank surface covered by direct impingement:

- (a) Using suitable structural plans, lines are set out from the tips of each machine to those parts of the tank within the range of the jets.
- (b) Where the configuration of the tanks is considered by the Administration to be complicated, a pinpoint of light simulating the tip of the tank washing machine in a scale model of the tank shall be used.

4.2.10 (a) To confirm the cleanliness of the tank and to verify the design in respect of the number and location of the tank washing machines, a visual inspection shall be made by entry to the tanks after a crude oil wash but prior to any water rinse which may be specified in the Operations and Equipment Manual. The bottom of the tank to be inspected may, however, be flushed with water and stripped in order to remove any heel of crude oil before gas freeing for entry. This inspection shall ensure that the tank is essentially free of oil clingage and deposits. If the flushing procedure is adopted, a similar but unflushed tank must be used for the test specified in (b) below.

(b) To verify the effectiveness of the stripping and drainage arrangements, a measurement shall be made of the amount of oil floating on top of the departure ballast. The ratio of the volume of oil on top of the total departure ballast water to the volume of tanks that contain this water shall not exceed 0.00085. This test shall be carried out after crude oil washing and stripping in a tank similar in all relevant respects to the tank examined in accordance with (a) above, which has not been subjected to a water rinse or to the intervening water flushing permissible in (a) above.

(c) To verify the design, installation and operation of the system, the arrival ballast, after a typical ballast voyage before which the arrival ballast tanks have been crude oil washed and during which the tanks have been water rinsed in accordance with the programme set out in the Operations and Equipment Manual, shall be totally discharged to the loading port harbour through an oil monitoring system approved by the Administration, and the oil content of the effluent in this test shall not exceed 15 ppm.

4.2.11 Where an Administration is satisfied that ships are similar in all relevant respects, the requirements of 4.2.10 need only be applied to one such ship. Furthermore, where a ship has a series of tanks that are similar in all relevant respects then, for that series of tanks, the requirements of 4.2.10(a) need only be applied to one tank of that series.

4.2.12 The design of the deck mounted tank washing machines shall be such that means are provided external to the cargo tanks which, when crude oil washing is in progress, would indicate the rotation and arc of the movement of the machine. Where the deck mounted machine is of the non-programmable, dual nozzle type, alternative methods to the satisfaction of the Administration may be accepted provided an equivalent degree of verification is attained.

4.2.13 Where submerged machines are required, they should be non-programmable and, in order to comply with the requirements of 4.2.8, it must be possible to verify their rotation by one of the following methods:

- (a) By indicators external to the tank;
- (b) By checking the characteristic sound pattern of the machine, in which case the operation of the machine shall be verified towards the end of each wash cycle. Where two or more submerged machines are installed on the same supply line, valves shall be provided and arranged so that operation of each machine can be verified independently of the other machines on the same supply line;

- (c) By gas freeing the tank and checking the operation of the machine with water during ballast voyages. In this case the check shall take place after a maximum of six usages of the machine but the interval between checks shall not exceed 12 months. Each verification shall be recorded in Supplement 2 to the Oil Record Book.

The method of verification shall be stated in the Operations and Equipment Manual.

4.3 *Pumps*

4.3.1 The pumps supplying crude oil to the tank cleaning machines shall be either the cargo pumps or pumps specifically provided for the purpose.

4.3.2 The capacity of the pumps shall be sufficient to provide the necessary throughput at the required pressure for the maximum number of tank cleaning machines required to be operated simultaneously as specified in the Operations and Equipment Manual. In addition to the above requirement, the pumps shall, if an eductor system is fitted for tank stripping, be capable of supplying the eductor driving fluid to meet the requirements of 4.4.2.

4.3.3 The capacity of the pumps shall be such that the requirements of 4.3.2 can be met with any one pump inoperative. The pumping and piping arrangements shall be such that the crude oil washing system can be effectively operated with any one pump out of use.

4.3.4 The carriage of more than one grade of cargo shall not prevent crude oil washing of tanks.

4.3.5 To permit crude oil washing to be effectively carried out where the back pressure presented by the shore terminal is below the pressure required for crude oil washing, provision shall be made such that an adequate pressure to the washing machines can be maintained in accordance with 4.3.2. This requirement shall be met with any one cargo pump out of action. The minimum supply pressure required for crude oil washing shall be specified in the Operations and Equipment Manual. Should this minimum supply pressure not be obtainable, crude oil washing operations shall not be carried out.

4.4 *Stripping system*

4.4.1 The design of the system for stripping crude oil from the bottom of every cargo tank shall be to the satisfaction of the Administration.

4.4.2 The design and capacity of the tank stripping system shall be such that the bottom of the tank being cleaned is kept free of accumulations of oil and sediment towards completion of the tank washing process.

4.4.3 The stripping system shall be capable of removing oil at a rate of 1.25 times the total throughput of all the tank cleaning machines to be operated simultaneously when washing the bottom of the cargo tanks as described in the ship's Operations and Equipment Manual.

4.4.4 Means such as level gauges, hand dipping and stripping system performance gauges as referred to in 4.4.8 shall be provided for checking that the bottom of every cargo tank is dry after crude oil washing. Suitable arrangements for hand dipping must be provided at the aftermost portion of a cargo tank and in three other suitable locations unless other approved means are fitted for efficiently ascertaining that the bottom of every cargo tank is dry. For the purpose of this paragraph, the cargo tank bottom shall be considered "dry" if there is no more than a small quantity of oil near the stripping suction with no accumulation of oil elsewhere in the tank.

4.4.5 Means shall be provided to drain all cargo pumps and lines at the completion of cargo discharge, where necessary, by connexion to a stripping device. The line and pump draining shall be capable of being discharged both to a cargo tank and ashore. For discharge ashore a special small diameter line shall be provided for that purpose and connected outboard of the ship's manifold valve. For new oil tankers or existing oil tankers not already fitted with such a line

the cross-sectional area of this line shall not exceed 10 per cent of that of a main cargo discharge line. Where such a line is already fitted on an existing tanker, a cross-sectional area of not more than 25 per cent of that of a main cargo discharge line may be accepted.

4.4.6 The means for stripping oil from the cargo tanks shall be by positive displacement pump, self-priming centrifugal pump or eductor or other methods to the satisfaction of the Administration. Where a stripping line is connected to a number of tanks, means shall be provided for isolating each tank not being stripped at that particular time.

4.4.7 The carriage of more than one grade of cargo shall not prevent crude oil washing of tanks.

4.4.8 Equipment shall be provided for monitoring the efficiency of the stripping system. All such equipment shall have remote read out facilities in the cargo control room or in some other safe and convenient place easily accessible to the officer in charge of cargo and operations. Where a stripping pump is provided, the monitoring equipment shall include either a flow indicator, or a stroke counter or revolution counter as appropriate, and pressure gauges at the inlet and discharge connexions of the pump or equivalent. Where eductors are provided the monitoring equipment shall include pressure gauges at the driving fluid intake and at the discharge and a pressure/vacuum gauge at the suction intake.

4.4.9 The internal structure of the tank shall be such that drainage of oil to the tank suction of the stripping system is adequate to meet the requirements of 4.4.2 and 4.4.4. Care shall be taken that both longitudinal and transverse drainage are satisfactory and shall be verified during the inspection required by 3.2 and 4.2.10.

4.4.10 The trim conditions for crude oil washing given in the Operations and Equipment Manual shall be adhered to. In general, trim by the stern is only important during the final stages of tank discharge and shall be the maximum possible compatible with operational constraints but in no case less than that recorded during the crude oil washing prior to the inspection required by 3.2 and 4.2.10.

4.5 *Ballast lines*

4.5.1 Where a separate ballast water system for ballasting cargo tanks is not provided, the arrangement shall be such that the cargo pump, manifolds and pipes used for ballasting can be safely and effectively drained of oil before ballasting.

5. QUALIFICATION OF PERSONNEL

5.1 The training requirements of ships' personnel engaged in the crude oil washing of tankers shall be to the satisfaction of the Administration.

5.2 Where a person such as the master, the chief officer or the cargo control officer assumes overall charge of a crude oil wash he shall:

- (a) Have at least one year's experience on oil tankers where his duties have included the discharge of cargo and associated crude washing. Where his duties have not included crude oil washing operations, he shall have completed a training programme in crude oil washing in accordance with Appendix II to these Specifications and satisfactory to the Administration;
- (b) Have participated at least twice in crude oil wash programmes one of which shall be in the particular ship for which he is required to undertake the responsibility of cargo discharge. Alternatively, this latter participation may be acceptable if undertaken on a ship that is similar in all relevant respects; and
- (c) Be fully knowledgeable of the contents of the Operations and Equipment Manual.

5.3 Where other nominated persons are intended to have particular responsibilities as defined in the Operations and Equipment Manual they shall have at least 6 months' experience on oil tankers where, in the course of their duties, they should have been involved in the cargo discharge operation. In addition, they should have been instructed in the crude oil washing operation in the particular ship for which they are required to undertake this responsibility and be fully knowledgeable of the contents of the Operations and Equipment Manual. Appendix II to these Specifications should be used as guidance in establishing the content of such instruction.

6. OPERATION

6.1 *Tankage to be crude oil washed*

Before departure on a ballast voyage, after the complete discharge of cargo, sufficient tanks shall have been crude oil washed in accordance with the procedures specified in the Operations and Equipment Manual to ensure that:

- (a) As a minimum, sufficient tanks have been washed to permit compliance with the draught and trim requirements of Regulation 13(2)(a), (b) and (c) of Annex I of the MARPOL Protocol during all phases of the ballast voyage; and
- (b) Account is taken of the ship's trading pattern and the expected weather conditions so that additional ballast water is not put into tanks which have not been crude oil washed.

In addition to the tanks referred to in (a) above, approximately one quarter of all remaining tanks shall be crude oil washed for sludge control on a rotational basis, but these additional tanks may include the tanks referred to in (b) above. However, for sludge control purposes, no tank need be crude oil washed more than once in every four months. Crude oil washing shall not be conducted between the final discharge and loading ports; that is to say, no crude oil washing shall be undertaken during the ballast voyage. Ballast water shall not be put into tanks that have not been crude oil washed. Water that is put into a tank which has been crude oil washed but not water rinsed shall be regarded as dirty ballast.

6.2 *Drainage and discharge ashore of cargo lines*

At the end of cargo discharge all cargo mains and stripping lines shall be drained and stripped and the drainings and strippings discharged ashore via the special diameter line required by 4.4.5. In addition all cargo tanks are to be stripped before the ship leaves its final port of discharge.

6.3 *Filling of departure ballast tanks*

Care shall be taken at the completion of crude oil washing of any departure ballast tank to strip the tank as completely as possible. Where departure ballast is filled through cargo lines and pumps, these must be drained and stripped of oil using the means required by 4.4.5 before ballast is loaded.

6.4 *Crude oil washing at sea*

All crude oil washing must be completed before the ship leaves its final port of discharge. Where any tank is crude oil washed while the ship is at sea between multiple discharge ports, the tank shall be left empty and available for inspection at the next discharge port before commencing the next ballast voyage. This inspection may consist of multiple sounding/dipping of the bottom of the tank when the tank is empty. Departure ballast tanks shall be ballasted prior to departure from port so that examination of the surface of the ballast water can be made. In the latter case the guidance given in 4.2.10(b) is relevant to the inspection.

6.5 *Discharge of oily water effluents on ballast voyage*

The discharge of departure ballast and any other water effluent discharged during the ballast voyage shall comply with the requirements of Regulation 9 of Annex I of the MARPOL Protocol.

6.6 *Use and control of inert gas*

On ships to which these Specifications apply, no tank shall be crude oil washed unless the inert gas system required by Regulation 13B(3) of Annex I of the MARPOL Protocol is in proper operation. Before each tank is crude oil washed, the oxygen level shall be determined at a point 1 metre from the deck and at the middle region of the ullage space and neither of these determinations shall exceed 8 per cent by volume. Where tanks have complete or partial wash bulkheads, the determinations should be taken from similar levels in each section of the tank. The oxygen level of the inert gas being delivered during the washing process shall be continuously monitored. If during crude oil washing:

- (a) The oxygen level of the inert gas being delivered exceeds 8 per cent by volume; or
- (b) The pressure of the atmosphere at the tanks is no longer positive;

then the washing must be stopped until satisfactory conditions are restored.

6.7 *Precautions against electrostatic generation*

To avoid excessive electrostatic generation in the washing process due to the presence of water in the crude oil washing fluid, the contents of any tank to be used as a source of crude oil washing fluid must first be discharged by at least 1 metre before being so used. Any tank used as a slop tank on the previous ballast voyage shall be completely discharged and refilled with dry crude oil if that tank is to be used as a source of washing fluid.

6.8 *Vapour emission*

On ships to which these Specifications apply there shall be means to avoid vapour emission during the filling of departure ballast wherever local conditions require it. The method of preventing the emission of hydrocarbon vapour into the atmosphere shall be:

- (a) By the use of permanent ballast tanks wherever these are sufficient to provide the minimum departure draught; or
- (b) By containment of vapour in empty cargo tanks by simultaneous ballasting and cargo discharge.

Alternative methods to the satisfaction of the Administrations may be accepted provided an equivalent degree of environmental protection is provided.

7. OPERATIONS AND EQUIPMENT MANUAL

The Operations and Equipment Manual must be to the satisfaction of the Administration and shall contain the following information and operational instructions:

- (a) The complete text of the revised Specifications for the Design, Operation and Control of Crude Oil Washing Systems.
- (b) A line drawing of the crude oil washing system showing the respective position of pumps, lines and washing machines which relate to the crude oil washing system.
- (c) A description of the system and a listing of procedures for checking that equipment is working properly during crude oil washing operations. This shall include a listing of the system and equipment parameters to be monitored, such as line pressure, oxygen

level, machine revolutions, duration of cycles, etc. The established values for these parameters shall be included. The results of the tests carried out in accordance with 4.2.10 and the values of all parameters monitored during such tests shall also be included.

- (d) Details of the requirements of section 6 of these Specifications together with advice and instructions, where appropriate, in meeting these requirements such as:
 - (i) Recommended methods and programmes of crude oil washing in order to accord with all foreseeable circumstances of cargo discharge restraints and to obtain maximum trim during the completion of washing and draining of each tank.
 - (ii) The procedure on ships to avoid vapour emission in accordance with 6.8.
 - (iii) The method of draining tanks which shall include information on optimum trim conditions as required by 4.4.10.
 - (iv) The method of draining cargo pumps, cargo lines, crude oil washing lines and stripping lines, and spaces into which they may be drained, together with the final discharge ashore via the small discharge line on completion of discharge.
 - (v) Typical washing programmes under various conditions of loading specifying:
 - (1) The tanks to be washed in accordance with 6.1;
 - (2) The method for washing each tank, that is single or multi-stage;
 - (3) The number of tank washing machines to be used simultaneously;
 - (4) The duration of the crude oil wash and water rinse where the latter is appropriate;
 - (5) The volume of water used for water rinse, which shall be at least equal to that used in the water rinse prior to the inspection required by 3.2 and 4.2.10; and
 - (6) The preferred order in which the tanks are to be washed.
 - (vi) The procedure for draining and stripping, where appropriate, cargo lines and pumps before being used for the loading of departure ballast.
 - (vii) The procedure for water washing lines before discharge of departure ballast and the loading and final discharge of arrival ballast.
 - (viii) The procedure for verifying by sound patterns that bottom mounted machines are operating shall be carried out towards the end of the wash cycle for each tank. When carrying out such verification all other machines shall be shut down if necessary.
 - (ix) Precise details of procedure to ensure compliance with Regulation 9 of Annex 1 of the MARPOL Protocol in the discharge of departure ballast, the water flushing of lines and the decanting of the slop tanks at sea.
- (e) The dangers of leakage from the crude oil washing system and the precautions necessary to prevent leakage and the action to be taken in the event of a leakage. Guidance shall be given on how the crude oil washing system is to be operationally tested for leakage before each discharge.
- (f) The method of preventing the entry of oil to the engine room through steam heaters as required by 4.1.6.

- (g) The personnel required at all times to conduct the dual operation of discharging cargo and crude oil washing. The numbers of such personnel shall include:
- (i) The person meeting the requirements of 5.2 who will have overall control of the crude oil washing process;
 - (ii) Those persons meeting the requirements of 5.3 who will be expected to undertake the actual operation; and
 - (iii) At least one person on deck at all times during washing to keep watch for leaks and malfunctioning of equipment, to test the oxygen content of tanks before washing, to check tank atmosphere pressure, to sound tank bottoms if required, to lift ullage floats if necessary and to change drive units when this is necessary.

The duties of such persons are not necessarily mutually exclusive.

- (h) An effective means of communication between the watchkeeper on deck and the cargo control position so that in the event of a leak in or malfunctioning of the crude oil washing system the washing may be stopped as soon as possible.
- (i) The typical procedures for ballasting.
- (j) A pre-crude oil wash operational checklist for the use of the crew at each discharge which shall include the checking and calibration of all instruments.
- (k) The recommended intervals for on board inspection and maintenance of crude oil washing equipment in addition to statutory surveys. Reference should be made to technical manuals supplied by the manufacturers of the equipment.
- (l) A list of crude oils unsuitable for the crude oil washing process and their origin.

Appendix I

LIST OF CHANGES WHEN APPLYING THE SPECIFICATIONS TO NEW CRUDE OIL TANKERS OF 20,000 TONS DEADWEIGHT AND ABOVE

Paragraph number	List of changes
4.2.5	This paragraph is not applicable.
4.2.10	Subparagraph (c) is not applicable.
6.1	Replace by the following:
6.1	<i>Tankage to be crude oil washed</i>
6.1.1	Before departure on a ballast voyage:
	(a) Approximately one quarter of the cargo tanks shall be crude oil washed for sludge control purposes on a rotational basis and in accordance with the procedures specified in the Operations and Equipment Manual. However, for these purposes, no tank need be crude oil washed more than once in every four months; and

- (b) If it is considered that additional ballast in a cargo tank or tanks may be required during the ballast voyage under the conditions and provisions specified in Regulation 13(3) of Annex I of the MARPOL Protocol, the tank or tanks which may be used for this ballast shall be crude oil washed in accordance with the procedures specified in the Operations and Equipment Manual.

6.1.2 Ballast water shall not be put into cargo tanks that have not been crude oil washed. Water that is put into a tank which has been crude oil washed but not water rinsed shall be regarded as dirty ballast.

6.1.3 Crude oil washing shall not be conducted between the final discharge and loading ports; that is to say, no crude oil washing shall be undertaken during the ballast voyage.

6.3 Replace by the following:

6.3 *Filling of additional ballasting cargo tanks*

Care shall be taken at the completion of crude oil washing of any cargo tank that might contain ballast to strip the tank as completely as possible. Where this ballast is filled through cargo lines and pumps, these must be drained and stripped of oil using the means required by 4.4.5.

6.4 The last two sentences are not applicable.

6.5 Replace by the following:

6.5 *Discharge of oily water effluents on ballast voyage*

The discharge of additional ballast from cargo tanks and any other water effluent discharged during the ballast voyage shall comply with the requirements of Regulation 9 of Annex I of the MARPOL Protocol.

6.8 This paragraph is not applicable.

7.4 This paragraph is not applicable.

Appendix II

TRAINING FOR PERSONS INTENDED TO ASSUME OVERALL CHARGE OF CRUDE OIL WASHING

INTRODUCTION

Any required training shall be supervised instruction, conducted in a shore-based facility or aboard a suitably equipped ship having training facilities and instructors for this purpose, dealing with the principles involved and the application of these principles to ship operation.

In drawing up an Administration-approved syllabus of training, the revised Specifications for the Design, Operation and Control of Crude Oil Washing Systems of tankers shall be taken into account.

Such training shall include but not necessarily be limited to:

- (a) An introduction to the principles of crude oil washing which shall include:
 - the characteristics of crude oil as a washing fluid and its contrast with water washing;
 - top washing;
 - bottom washing;
 - trim requirements;
 - methods of bleeding off from the cargo discharge;
 - maintenance of required washing fluid pressure;
 - washing at sea between discharge ports;
 - recirculatory washing;
 - relative priorities and requirements for the departure ballast tanks, arrival ballast tanks and cargo only tanks.
- (b) Equipment and design
 - (i) location of washing machines;
 - (ii) washing machines, deck mounted and submerged:
 - types;
 - characteristics;
 - features of construction;
 - operating parameters;
 - (iii) drive units;
 - (iv) washing fluid supply and distribution systems;
 - (v) stripping systems;
 - (vi) means of sounding tanks;
 - (vii) inert gas requirements.
- (c) Generalized crude oil washing procedures
 - (i) traditional pipeline ship/free flow ship/partial free flow ship;
 - (ii) single/multi parcel cargoes;
 - (iii) optimization of washing procedure in order to minimize extra berth time;
 - (iv) ballasting for departure with various ship and pipeline configurations;
 - (v) procedure for washing at sea between discharge ports.
- (d) Associated procedure
 - (i) means for minimizing residues on board
 - stripping of cargo tanks;
 - draining and stripping of cargo lines;
 - final discharge of cargo ashore;
 - (ii) water rinsing of arrival ballast tanks;
 - (iii) filling and ultimate discharge of arrival ballast;

- (iv) discharge of departure ballast;
 - (v) build-up and decanting of residues in slop tank;
 - (vi) requirements of Regulation 9 of Annex I of the MARPOL Protocol;
 - (vii) avoidance of venting in port during ballasting operations.
- (e) Safety
- (i) inert gas procedure;
 - (ii) maintenance and monitoring of inert gas quality and pressure;
 - (iii) stopping of washing/discharge under abnormal inert gas conditions;
 - (iv) electrostatic generation and the precautions required to avoid it;
 - (v) pipework integrity;
 - (vi) avoidance of surge pressures;
 - (vii) spillage.
- (f) Checklists
- (i) before entering port;
 - (ii) before commencing crude oil washing;
 - (iii) after crude oil washing;
 - (iv) after sailing.
- (g) Regulatory enforcement procedures
- (i) Operations and Equipment Manual;
 - (ii) Oil Record Book;
 - (iii) sounding of tanks;
 - (iv) measurement of oil on surface of departure ballast.
- (h) Maintenance of plant and equipment
- (i) maintenance of equipment in accordance with manufacturers' instructions;
 - (ii) additional maintenance items.

Administrations shall ensure that the training facility issues an appropriate document to those qualified in accordance with this Appendix to serve as officers primarily responsible for crude oil washing.

Appendix III

AGREED INTERPRETATIONS OF CERTAIN OF THE PROVISIONS OF THE REVISED SPECIFICATIONS

- 4.1.1 This paragraph requires pipes and valves to be of steel or other equivalent material. As classification societies permit grey cast iron for cargo piping with a maximum permissible working oil pressure of 16 kp/cm², grey cast iron may be permitted in the supply system for crude oil washing systems when complying with nationally approved standards.
- 4.1.3 The requirements of this paragraph allow alternative arrangements. One such alternative is that where the system is served only by centrifugal pumps so designed that the pressure derived cannot exceed that for which the piping is designed, a temperature sensing device located in the pump casing is required to stop the pump in the case of overheating.

4.1.6 On new oil tankers the steam heater referred to shall be located outside the machinery spaces. However, on an existing oil tanker with an existing steam heater located in the machinery spaces, no more additional isolation will be required other than that which isolates the crude oil washing system from the machinery spaces.

4.2.8 With regard to the application of this paragraph a slop tank is considered as a cargo tank.

4.2.9 ***Guidelines for the assessment of shadow diagrams***

(a) Shadow diagrams (to be prepared in accordance with 4.2.9) must be on drawings the scale of which must be at least:

- (i) 1:100 for tankers of less than 100,000 tons deadweight
- (ii) 1:200 for tankers of 100,000 tons deadweight and above.

(b) The drawings must provide at least a plan view, a profile view and an end elevation for each tank, or for tanks considered to be similar.

(c) Sufficient detailed drawings of the vessel must be provided to check that all large primary structural members have been included.

(d) The term "large primary structural members" is to be construed as those components of a tank structure which contribute significant strength to the ship such as web frames and girders. It is intended that smaller components such as those that contribute to plate stiffening be excluded. In general the following lists, in conjunction with the diagram showing structural components of cargo tanks, may be used to amplify this interpretation.

<i>Include</i>	<i>Disregard</i>
(i) web frames	(i) longitudinals
(ii) girders	(ii) brackets
(iii) stringers	(iii) stiffeners
(iv) webs	(iv) ladders
(v) main bracket	(v) pipe work
(vi) transverses	
(vii) crossties in transverse web frames unless it can be verified by tank inspection that their presence does not affect the cleanliness of the tank. However, for the purpose of making an initial assessment where there are no more than two crossties and each is less than 1/15 of the total depth of the tank they may be ignored.	

(e) Shadows cast upon the underside of decks, web frames, centre and side girders can be ignored.

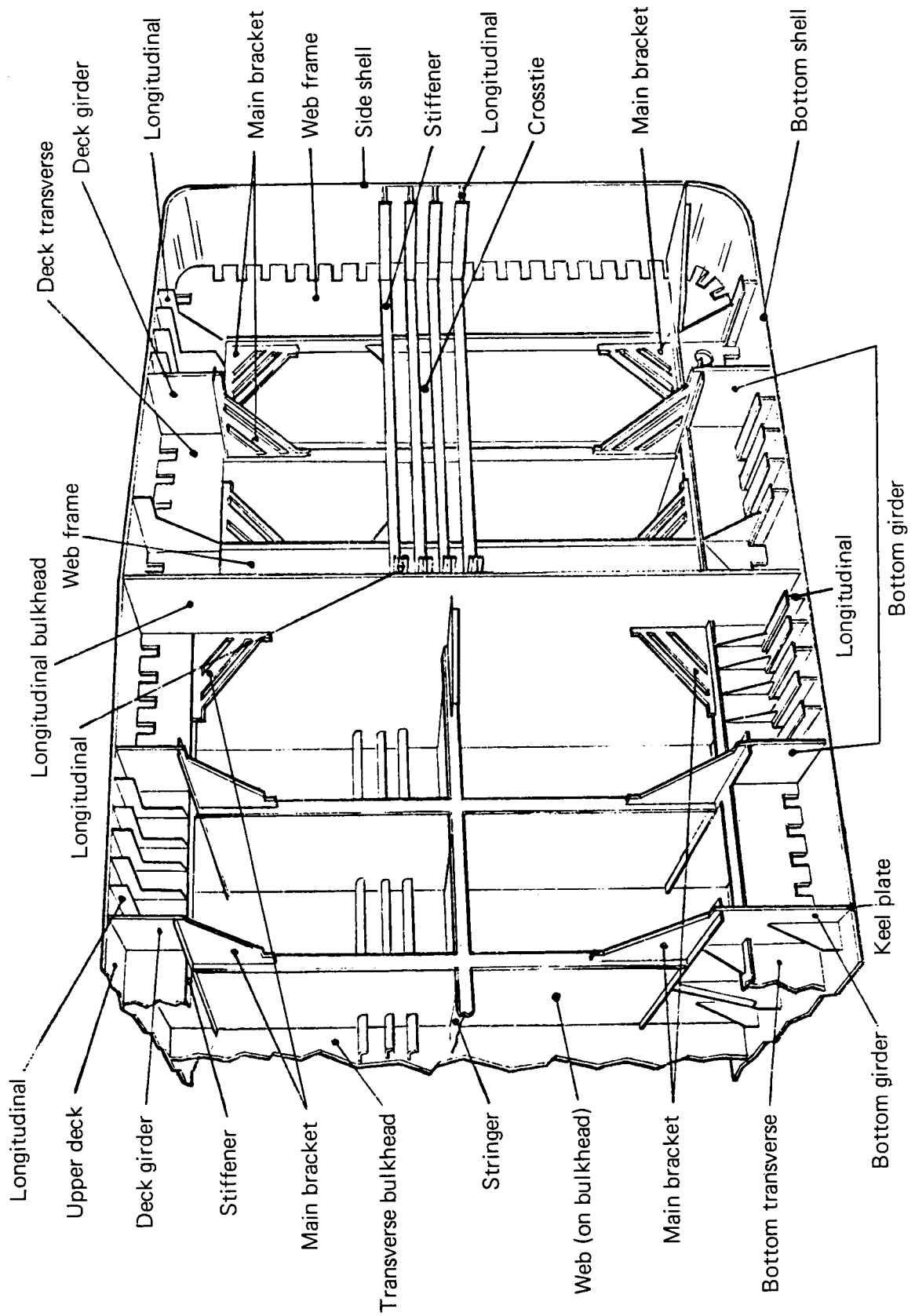
(f) Calculations must be provided either on the drawing or separately to show how the percentages required by 4.2.8 have been arrived at. The calculations should be itemized so that it is possible to relate each item with a particular shadow area.

(g) Where a curved surface is presented to jets it is not necessary to provide exact geometric projections to determine the resultant shadow. A reasonable estimate is acceptable.

(h) For the purpose of determining the bottom area of wing tanks the breadth of the tank is to be taken as the horizontal distance measured across the top of the bottom longitudinal frames to the inside of the shell plating, midway between the tank bulkheads.

(i) A swash bulkhead may be taken as a tank boundary. However, in this event the bulkhead must be assumed to have no openings in it.

DIAGRAM SHOWING STRUCTURAL COMPONENTS OF CARGO TANKS



4.2.10 "Water rinse" means the water washing process carried out in connexion with tank cleaning after crude oil washing and is not intended to be construed as limiting the amount of water needed in the process.

4.2.10(c) The "oil monitoring system" referred to in this paragraph means any approved system, including laboratory tests, which verifies that the oil content of the effluent does not exceed the stated level. If laboratory tests are to be conducted, standards contained in resolution A.393(X) should be used as guidance. Oil tankers engaging in a trade where discharge of cargo takes place in one port State and cargo loading in another port State create a special problem with respect to verification. Two alternatives available to confirm the tanker's capability are:

- (i) The tanker could be required to conduct the entire COW operations at the discharge port, taking inspectors to sea if necessary to observe water washing, handling of discharge ballast and departure of arrival ballast;
- (ii) Co-ordination between the flag State Administrations and port States to obtain the required documentation.

However the test is performed, it should be decided on a case-by-case basis taking into account the service of the tanker and the availability of surveyors.

RESOLUTION A.495(XII)

*Adopted on 19 November 1981
Agenda item 10(b)*

**REVISED SPECIFICATIONS FOR OIL TANKERS
WITH DEDICATED CLEAN BALLAST TANKS**

THE ASSEMBLY,

RECALLING resolution A.297(VIII) by which it established the Marine Environment Protection Committee and specified the functions and responsibilities of that Committee,

NOTING Regulation 13A of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), concerning requirements for dedicated clean ballast tanks and resolution 14 of the International Conference on Tanker Safety and Pollution Prevention, 1978, which contains the Specifications for Oil Tankers with Dedicated Clean Ballast Tanks,

NOTING ALSO that by the same resolution the Conference requested IMCO to review and revise, as necessary, the Specifications,

NOTING FURTHER that Regulation 13A(4) of Annex I of MARPOL 73/78 provides that every tanker operating with dedicated clean ballast tanks shall be provided with a Dedicated Clean Ballast Tank Operation Manual detailing the system and specifying operational procedures,

RECOGNIZING that the said Manual is not only to provide guidance to the crew of the ship for proper operation of the system, but also to provide information on the system and its operational procedures for the inspectors going on board for inspection in ports,

HAVING CONSIDERED the recommendation made by the Marine Environment Protection Committee at its fourteenth session,

1. ADOPTS:

- (a) The revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks, the text of which is set out in Annex 1 to the present resolution, to supersede the Specifications for Oil Tankers with Dedicated Clean Ballast Tanks contained in resolution 14 of the International Conference on Tanker Safety and Pollution Prevention, 1978;
- (b) Agreed interpretations of certain of the provisions of the revised Specifications as shown in Appendix 2 to the revised Specifications;
- (c) The standard format for the Dedicated Clean Ballast Tank Operation Manual appearing in Annex 2 to the present resolution;

2. URGES Governments to establish, in time for the entry into force of MARPOL 73/78, requirements for the dedicated clean ballast tank arrangements based on the revised Specifications;
3. URGES FURTHER that the requirements to be established by Administrations should not impose requirements over and above those as laid down in the revised Specifications;
4. INVITES Governments:
 - (a) To use the standard format for the Dedicated Clean Ballast Tank Operation Manual as called for by Regulation 13A of MARPOL 73/78;
 - (b) To ensure that if the language of the Manual is neither English nor French, the Manual shall include a translation into one of these languages.

ANNEX 1

REVISED SPECIFICATIONS FOR OIL TANKERS WITH DEDICATED CLEAN BALLAST TANKS

1 PURPOSE

1.1 The purpose of these Specifications is to provide specific criteria, operational requirements and control and enforcement procedures for those oil tankers operating with dedicated clean ballast tanks (CBT tankers) as specified in section 2 of these Specifications.

2 APPLICATION

2.1 Under the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), these Specifications apply to:

- .1 existing crude oil tankers of 70,000 tons deadweight and above until two years after the date of entry into force of MARPOL 73/78 in accordance with Regulation 13(9)(a) of Annex I of MARPOL 73/78;
- .2 existing crude oil tankers of 40,000 tons deadweight and above but below 70,000 tons deadweight, until four years after the date of entry into force of MARPOL 73/78 in accordance with Regulation 13(9)(b) of Annex I of MARPOL 73/78; and
- .3 existing product carriers of 40,000 tons deadweight and above in accordance with Regulation 13(10) and Annex I of MARPOL 73/78.

2.2 Compliance by these ships with these Specifications shall be shown on the International Oil Pollution Prevention Certificate.

3 INITIAL SURVEY

3.1 The initial survey referred to in Regulation 4 of Annex I of MARPOL 73/78 shall include the verifications of the appropriateness of:

- .1 the selection of ballast tanks and pumping and piping arrangements; and
- .2 the CBT Operation Manual, i.e. detailed operational procedures including checklist.

3.2 The International Oil Pollution Prevention Certificate shall indicate which tanks are designated as dedicated clean ballast tanks. It shall also state that the master has been supplied with information concerning approved operational procedures (CBT Operation Manual).

4 ON BOARD ARRANGEMENTS

4.1 Dedicated clean ballast tanks

4.1.1 The dedicated clean ballast tanks shall have sufficient capacity to enable the tanker to meet the requirements of Regulation 13(2) of Annex I of MARPOL 73/78.

4.1.2 The selection of the dedicated clean ballast tanks must be such that the hull stresses in the ballast and loaded conditions are to the satisfaction of the Administration.

4.1.3 The ballast carried in dedicated clean ballast tanks (CBT ballast) shall, from the accidental pollution prevention point of view, be carried in wing tanks. However, the Administration may permit the use of centre tanks where it can be shown that significant advantage can be obtained in respect of hull stresses, tank volume or piping arrangements.

4.1.4 Tanks shall be selected so as to require a minimum of involvement of the cargo piping and pumping system.

4.2 Pumping and piping arrangements

4.2.1 The piping system for conveying the CBT ballast shall be such that it can be flushed to a slop tank with water, and shall be so arranged that oily water does not enter any dedicated clean ballast tank when the piping system is flushed.

4.2.2 The piping system(s) of each dedicated clean ballast tank must, not later than 1 July 1983, have at least two valves that isolate that tank from the piping system(s) serving the cargo tank.

4.2.3 The dedicated clean ballast tanks must be connected to the least practicable number of cargo pumps.

4.2.4 The discharge of CBT ballast to the sea is to be monitored by an oil content meter approved by the Administration and sufficient sample points are to be provided in the discharge piping of pumps serving dedicated clean ballast tanks to enable supervision of the oil content in the ballast water being discharged.

5 OPERATIONAL PROCEDURES

5.1 The pumps and piping system conveying CBT ballast shall be flushed with water before clean ballast is loaded, discharged or transferred.

5.2 The water for flushing shall be pumped from a sea chest or dedicated clean ballast tank through the pump and piping system of the dedicated clean ballast tank and then to a slop tank.

5.3 If sections of the piping system for CBT ballast are so arranged that they must be flushed with water from the dedicated clean ballast tanks then the minimum quantity of flushing water to be provided in such tanks at all times shall be the greater of either 10 times the volume of the piping to be flushed or sufficient to provide that level in the tank which would allow the piping to run full of water during the flushing before vortexing starts to admit air into the piping. Alternative methods for the retention of clean ballast required by this paragraph shall be to the satisfaction of the Administration.

5.4 After the loading, discharging or transferring of clean ballast the valves specified in paragraph 4.2.2 shall be shut and the piping system drained.

5.5 The overboard discharge of all CBT ballast shall be monitored by an oil content meter.

5.6 The simultaneous discharge of clean ballast while loading cargo or the simultaneous loading of clean ballast while discharging cargo shall not be undertaken except where there is an effective two-valve separation between the ballast and the cargo systems or when cargo tanks are served by individual pumps.

5.7 Ballast water must not be allowed to free fall into ballast tanks into which hydrocarbon gases have leaked. The Dedicated Clean Ballast Tank Operation Manual shall provide either for such tanks to be gas freed before ballasting or for alternative tanks to be used to obviate the danger posed by splashing and free fall of water in tanks containing hydrocarbon gases within the explosive range.

6 DEDICATED CLEAN BALLAST TANK OPERATION MANUAL

6.1 The Dedicated Clean Ballast Tank Operation Manual specified in Regulation 13A(4)(a) of Annex I of MARPOL 73/78 shall contain the following:

- .1 the complete text of the revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks;
- .2 the drawings of the dedicated clean ballast tank systems;
- .3 the description of the systems connected to the dedicated clean ballast tanks including the identity of the dedicated clean ballast tanks and of the slop tank which may be any designated cargo tank;
- .4 the dedicated clean ballast tank operation procedures containing specific operational procedures for valve operations, line cleaning and for loading and discharging clean ballast when conducted as follows:
 - .4.1 prior to arrival and at the loading port;
 - .4.2 after departure from the loading port;
 - .4.3 prior to arrival at the final discharge port;
 - .4.4 in the final discharge port; and
 - .4.5 after departure from the final discharge port.

In Appendix 1 to these Specifications dedicated clean ballast tank operation procedures are included which apply generally to all tankers operating under the CBT concept;

- .5 the checklists for ballasting and de-ballasting dedicated clean ballast tanks;
- .6 requirements for the carriage of additional ballast;
- .7 compliance procedures for Regulation 9 of Annex I of MARPOL 73/78; and
- .8 additional precautions against oil pollution.

7 DOCUMENTS

7.1 The International Oil Pollution Prevention Certificate and the CBT Operation Manual shall at all times be available on board the tanker.

APPENDIX 1

DEDICATED CLEAN BALLAST TANK OPERATION PROCEDURES

1 Prior to arrival at the loading port

- 1.1 The pumping and piping designated for clean ballast operation shall be properly cleaned to permit the discharge of clean ballast in the loading port.
- 1.2 The valves to the slop tanks and the cargo tanks which are connected to the clean ballast system shall be closed.
- 1.3 An inspection of all CBT ballast is to be made to ensure that there is no contamination with oil.
- 1.4 Clean ballast shall be discharged until sufficient quantity remains for safe berthing and for flushing lines if necessary.
- 1.5 If no further ballast discharge is anticipated in the loading port all valves to the dedicated clean ballast tanks shall be shut and the clean ballast piping drained.

2 In the loading port

- 2.1 After the tanker has been safely berthed ballast may be discharged:
 - .1 before the cargo is loaded; and
 - .2 during the loading of cargo either simultaneously or by interrupting the loading provided there is an effective two-valve separation between the cargo and clean ballast system, or when cargo tanks are served by individual pumps.
- 2.2 Until sufficient clean ballast has been discharged the piping and pumping arrangement servicing the dedicated clean ballast tanks must be kept clean.
- 2.3 Upon completion of ballast discharge all valves to the dedicated clean ballast tanks are to be shut, the clean ballast piping drained and utilized for the loading of cargo.
- 2.4 The tanker should be loaded taking into account the requirements of a discharge sequence compatible with the operational procedures for dedicated clean ballast tanks with particular reference to trim and stress levels if the cargo is to be unloaded at two or more discharge ports.
- 2.5 Slop tanks must be loaded with cargo that will be discharged well before any ballasting operation has to be carried out. If pipe flushing is required during the loaded passage sufficient ullage must be left in the slop tanks to accommodate the necessary flushing water.
- 2.6 At the completion of loading all valves to the cargo tanks shall be closed.

3 After departure from the loading port

- 3.1 If any clean ballast is to be discharged overboard the pumps and piping serving the dedicated clean ballast tanks are to be flushed into the slop tanks.
- 3.2 The valves to the slop tanks are to be closed before pumping clean ballast overboard.
- 3.3 The valves to the dedicated clean ballast tanks are to be closed after discharging ballast.
- 3.4 During the loaded passage the dedicated clean ballast tanks must be periodically checked for any hydrocarbon gas content and if any gas is detected the tank shall be ventilated until safe for entry and inspected for leakage in bulkheads and piping.

4 Prior to arrival at the final discharge port

4.1 The dedicated clean ballast tanks may be ballasted through clean pumps and piping with sufficient ballast to clear port draught requirements.

4.2 The required amount of water for flushing of the piping may be taken into the dedicated clean ballast tanks overdeck or through clean cargo piping.

5 In the final discharge port

5.1 The cargo discharge and ballasting sequence must be compatible with the operational requirements of dedicated clean ballast tanks.

5.2 Clean ballast may be taken on board:

- .1 before the cargo is discharged;
- .2 during the discharge of cargo either simultaneously or by interrupting the discharge provided that there is an effective two-valve separation between cargo and clean ballast system or when cargo tanks are served by individual pumps; and
- .3 after cargo has been discharged completely.

5.3 When clean ballast is to be taken on board the pumps and piping serving the dedicated clean ballast tanks are to be flushed.

5.4 Upon completion of ballasting all the valves to the dedicated clean ballast tanks shall be closed.

6 After departure from the final discharge port

6.1 Dedicated clean ballast tanks may be topped up using clean pumps and piping.

6.2 The slop tank contents are to be processed in accordance with load-on-top procedures.

6.3 The surface of the CBT ballast is to be periodically inspected for the presence of oil, and the causes of any contaminations carefully investigated.

6.4 After cargo tank cleaning operations the pumps and pipelines to be used for clean ballast shall be flushed.

7 Pump and pipe flushing

7.1 The pipe flushing water must never be passed into dedicated clean ballast tanks.

7.2 Water for flushing pipelines may be drawn from the sea and from the dedicated clean ballast tanks and this will be determined by the configuration of the tanker's piping system.

7.3 When flushing from dedicated clean ballast tanks it is essential that the line has first been thoroughly drained of oil. Flushing should normally start from the tank farthest from the pump. After the line has been primed and suction established, the pumping should be stopped and the valves closed for a period to allow the oil to separate from the pipe walls. Pumping is then resumed at a moderate speed with throttling of the output at the pump's delivery side.

7.4 Water shall first be drawn from individual dedicated clean ballast tanks to clear branch pipes.

APPENDIX 2

AGREED INTERPRETATIONS OF CERTAIN PROVISIONS
OF THE REVISED SPECIFICATIONS

Paragraph 4.1.4 of the revised Specifications

A stripping system may be utilized for clean ballast tank operations provided that the system is flushed before such an operation.

Paragraph 5.1 of the revised Specifications

Where ballast lines independent of the cargo system are used these lines need not be flushed. Whenever, during the loaded voyage, pumps and piping are not to be used for clean ballast handling such lines need not be flushed.

Paragraph 5.3 of the revised Specifications

If a seawater pump and deckline are both entirely separate from the cargo system then this pump and line may be used for filling the dedicated clean ballast tanks with clean ballast or with water for pipe flushing, as appropriate. Such a pump and line may be from a cargo tank water washing system in those ships not provided with a fixed tank washing system.

ANNEX 2

STANDARD FORMAT FOR THE DEDICATED CLEAN BALLAST TANK OPERATION MANUAL

1. The standard format consists of the standard text of the introduction to the Manual, an index and either eight or nine sections, depending on the type of tanker.
2. Appendix 1 of the standard format contains the general guidelines for operation procedures and checklists for the purpose of sections 4 to 8 of the Manual, which should be taken into account by shipowners in preparing and Administrations in approving a Manual for a particular tanker.
3. Appendix 2 of the standard format contains a specimen Manual for a tanker operating with dedicated clean ballast tanks.

Standard text of the introduction

INTRODUCTION

1. This Manual is written in accordance with the requirements of Regulation 13A of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto.
2. The purpose of the Manual is to meet the requirements for tankers operating with dedicated clean ballast tanks (CBT tankers) in accordance with the revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks (IMCO Assembly resolution A.495(XII)). It provides standard operational guidance for CBT tankers.
3. Part 1 of the Manual contains all information and operational instructions required by the Specifications. Part 2 of the Manual contains additional information and operational instructions required by the Administration.
4. This Manual has been approved by the Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration.

Note: If the Administration requires information and operational instructions in addition to those provided for by the Specifications, they should be included in part 2 of the Manual. If no such additional information or operating instructions are required by the Administration, the Manual will consist of one part only, and paragraph 3 should read: "The Manual contains all the information and operational instructions required by the Specifications".

DEDICATED CLEAN BALLAST TANK OPERATION MANUAL

INDEX OF SECTIONS

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Part 1

1. TEXT OF THE SPECIFICATIONS
2. DRAWINGS OF THE DEDICATED CLEAN BALLAST TANK SYSTEMS
3. DESCRIPTION OF THE SYSTEMS CONNECTED TO THE DEDICATED CLEAN BALLAST TANKS
4. DEDICATED CLEAN BALLAST TANK OPERATION PROCEDURES
5. CHECKLISTS FOR BALLASTING AND DEBALLASTING DEDICATED CLEAN BALLAST TANKS
6. CARRIAGE OF ADDITIONAL BALLAST
7. COMPLIANCE PROCEDURES FOR REGULATION 9 OF ANNEX I OF MARPOL 1973
8. ADDITIONAL PRECAUTIONS AGAINST OIL POLLUTION ..
9. PROCEDURES FOR CHANGING FROM PRODUCT TRADE TO CRUDE OIL TRADE*

Part 2

(Additional information and operational instructions required by the Administration, if any.)

* Section 9 is included in the Manual for a particular tanker only if applicable.

SECTION 1. TEXT OF THE SPECIFICATIONS

This section contains the complete text of the revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks.

SECTION 2. DRAWINGS OF THE DEDICATED CLEAN BALLAST TANKS SYSTEMS

This section contains line drawing(s) of systems connected to the dedicated clean ballast tanks showing:

- (1) tank arrangements;
- (2) cargo pump(s), lines and valves;
- (3) ballast systems (where fitted);
- (4) stripping systems;
- (5) deck service lines used for supplying flush water (where applicable);
- (6) sampling points for oil content meter.

SECTION 3. DESCRIPTION OF THE SYSTEMS CONNECTED TO THE DEDICATED CLEAN BALLAST TANKS

This section contains a description of the pumping and piping systems, including valve locations for the cargo, ballast, stripping and slop tank arrangements, associated with the operational requirements of the dedicated clean ballast tanks.

SECTION 4. DEDICATED CLEAN BALLAST TANK OPERATION PROCEDURES

This section contains specific operational procedures for valve operations, line cleaning and for loading and discharging clean ballast when conducted:

- (1) prior to arrival and at the loading port;
- (2) prior to departure from the loading port;
- (3) prior to arrival at the final discharge port;
- (4) in the final discharge port;
- (5) after departure from the final discharge port.

Any additional procedure used for the operation of the dedicated clean ballast tanks shall be specified.

This section also contains relevant data on safe trim and stress levels for the tanker.

SECTION 5. CHECKLISTS FOR BALLASTING AND DEBALLASTING DEDICATED CLEAN BALLAST TANKS

This section contains operational checklists for the use of the crew in ballasting and deballasting operations which shall include the checking and calibration of oil content meters.

SECTION 6. CARRIAGE OF ADDITIONAL BALLAST

This section contains information and procedures for the carriage of additional ballast, permitted by provisions of Regulation 13(3) of Annex I of MARPOL 73/78.

SECTION 7. COMPLIANCE PROCEDURES FOR REGULATION 9 OF ANNEX I OF MARPOL 73/78

This section contains information and procedures for the discharge of dirty ballast and the decanting of slops at sea to ensure compliance with Regulation 9 of Annex I of MARPOL 73/78.

SECTION 8. ADDITIONAL PRECAUTIONS AGAINST OIL POLLUTION

This section contains information and procedures for dealing with oil contamination of the dedicated clean ballast tanks.

SECTION 9. PROCEDURES FOR CHANGING FROM PRODUCT TRADE TO CRUDE OIL TRADE *

This section contains operational procedures for changing from product trade to crude oil trade for a tanker which is fitted with separate independent pumping and piping arrangements for ballasting dedicated clean ballast tanks, and with a crude oil washing system and which has been issued with two IOPP Certificates running concurrently with one Certificate certifying the tanker to be a crude oil tanker and the other certifying it to be a product carrier.

APPENDIX 1

GENERAL GUIDELINES FOR OPERATION PROCEDURES AND CHECKLISTS FOR THE PURPOSE OF SECTIONS 4 TO 8 OF THE DEDICATED CLEAN BALLAST TANK OPERATION MANUAL

1 General guidelines for CBT operation procedures (section 4 of Manual)

1.1 CBT operation requires full appreciation of the procedures and thorough understanding of what is going on at all times. Frequent checks are essential to ensure that contamination or pollution does not occur. These checks include visual observation of the ballast tanks, the piping and valve system, etc. and a general awareness of the possibilities of leakages that may permit oil to enter the ballast system. The items in the procedure which emphasize safety must therefore be followed in full.

1.2 The cargo discharging and ballast handling sequence should be clearly illustrated in a programme worked out by the key personnel involved. The programme should clearly identify the responsibility of all persons involved and should specify in a time-related manner essential facts, such as:

* Section 9 is included in the Manual for a particular tanker only if applicable.

- the procedure and the timing for taking the necessary quantity of piping flush water into the ballast tanks;
- the cargo discharging sequence, specifying pumps and lines to be used at each point in the sequence and the projected timetable;
- the procedure and the timing for flushing the ballast piping and taking on ballast: if this is done before the cargo is fully discharged great attention must be paid to the details of the programme so that safe segregation is maintained;
- the procedure for stripping and draining of the cargo tanks, and particularly the cargo pipes, after completion of the discharge.

1.3 The above cargo discharge and ballast handling programme together with the checklist (see section 5 of Manual) and other relevant information should be displayed in the cargo control room or other appropriate place easily accessible to all persons involved.

1.4 During any part of the CBT operation, when quick and reliable communication is required between activities taking place some distance apart, adequate and approved portable radio equipment should be available.

1.5 The tanker should be loaded bearing in mind the requirements of a cargo discharge sequence compatible with the CBT operation.

1.6 When loading cargo that will be unloaded at two or more discharge ports it is important to ensure that this can be done following the CBT procedures and while maintaining safe trim and stress levels.

1.7 Prior to arrival at loading port, the clean ballast may be reduced to berthing condition, using a pump and pipe that have been cleaned or kept clean during the ballast voyage.

1.8 The ballast may be discharged prior to loading or after some cargo has been loaded, depending on the ship and terminal limiting requirements. If cargo has to be loaded prior to deballasting, this must only be done through piping that can be kept separated from the dedicated clean ballast tanks and associated piping.

1.9 Ballast water carried in dedicated clean ballast tanks should be visually checked prior to and during discharge for presence of any oil. If any doubt about the cleanliness of the water during discharge exists, the discharge should be stopped and the remainder retained in the ballast tank or transferred to the slop tank for later discharge to the reception facility or at sea in compliance with Regulation 9 of Annex I of MARPOL 73/78.

1.10 Normal line flushing must be carried out by drawing water from the dedicated clean ballast tanks and discharging to a slop tank. Flush water must never be discharged into a dedicated clean ballast tank. The related method for making flush water available to the ballast tanks for line flushing depends on the piping system and influences the entire CBT procedure for the tanker.

1.11 If the tanker has a separate pump and deck line for water washing of cargo tanks, isolated from the cargo system, this may be used for transferring the necessary amount of flush water to the ballast tanks at any time. Tank washing hoses are used as required between the deck line and the individual tanks. This method can be adopted by most tankers (which have not been built to use fixed, high capacity washing machines) and it offers the most flexible and convenient arrangement. Alternatively, the fire pump and the fire main and hoses or other deck service lines may be used for this purpose, subject to approval by the Administration of the use of the fire-fighting system. The operation can normally be carried out completely independently of the cargo tank activities. The amount of water transferred to the ballast tanks prior to line flushing should always be at least ten times the volume of the pipes to be flushed. There is, however, no disadvantage in taking in more: what is not used for line flushing simply remains in the ballast tanks, becoming part of the departure ballast.

1.12 In vessels which do not have a water supply system suitable for transfer of flush water over deck, flush water must be transferred to the ballast tanks through the cargo piping during the operational stages when the piping is clean. This means that a quantity of flush water has to be left in the ballast tanks at deballasting and subsequently is used for line flushing after the loading of cargo. Similarly a quantity of flush water has to be taken in through the clean piping towards the end of the loaded voyage in order to be used for line flushing after the cargo discharge. A part of the cargo piping thus has to remain flushed and clean during the loaded passage. This procedure requires more control and more careful planning than that described in paragraph 1.11 above which is therefore the procedure to be followed whenever possible.

1.13 For tankers in short haul trades operating on the principle outlined in 1.12 above it may be preferable to leave the necessary quantity of flush water in the ballast tanks throughout the loaded passage. In this case some part of the ballast water is simply left in the tanks at deballasting and used for line flushing after the following cargo discharge. Since a CBT tanker always has unused deadweight capacity, this small dead-freight will normally be of no importance. The effect on tank corrosion should be considered and necessary preventive measures taken.

1.14 When carrying out pipe flushing, water must always be routed from a ballast tank to a slop tank. In addition, in tankers where the piping can be connected as a ring line it is possible to pump water from the sea or from a slop tank through the pipe system and back to a slop tank but water which has passed through an oily pipe section must never be passed to a dedicated clean ballast tank. The amount of pipe flushing water used should be at least ten times the volume of the piping system to be flushed.

1.15 When flushing from ballast tanks containing the prescribed minimum amount of flush water it is important that the line has first been thoroughly drained of oil. Flushing should normally start from the tank farthest from the pump. After the line has been primed and suction established, the pumping is stopped and the valves are closed for a period of about half an hour to allow the oil from the pipe walls to separate out. Pumping is then resumed at a moderate speed, with throttling of the output at the pump delivery side.

1.16 When a ring line can be arranged, water is first drawn from the individual tanks to clear the branch pipes and as the tanks become empty and are closed off from the main line, the inlet to the ring is opened from a slop tank to permit continued closed loop flushing. Towards the end, the inlet should be switched to clean seawater.

1.17 Towards the end of the loaded passage, a normal amount of pipe flushing water is transferred to the CBT tanks, either by use of a clean deck line and related pump or via the cargo piping that has been left clean during the voyage. During short voyages and provided the CBT tanks have adequate corrosion protection, the pipe flushing water left in the tanks prior to loading may be retained in the tanks. This procedure eliminates the need for flushing the cargo piping during the loaded passage. In either alternative, the tanker should have the nominal quantity of pipe flushing water in the CBT tanks when entering the discharge port.

1.18 Before any CBT tank is ballasted a check should be made for any presence of hydrocarbon gases as a result of leakage. This check is also important from the safety point of view. Ballast water must never be loaded into a ballast tank containing hydrocarbon gases in a higher concentration than 20 per cent of the lower explosive limit in such a way that splashing or free fall of water can occur.

1.19 During unloading, the tanks which are served by the pump and piping used for ballast handling should be discharged first. At the point when ballast has to be taken on, the affected piping is first flushed using the procedure in paragraphs 1.14 - 1.16 whereupon the CBT tanks are ballasted to the extent required. Thereafter the ballast handling piping should be kept clean to permit any additional handling of ballast that may be necessary.

1.20 During the ballast voyage the piping is kept clean as a preparation for deballasting. Should any part become contaminated, for instance by its use during tank cleaning of cargo tanks, it is again flushed using ballast water, whereupon the ballast quantity may again be adjusted.

2 General operational checklists (section 5 of Manual)

The following checklists apply generally to all CBT tankers. However, when the checklists for a specific tanker are prepared, they should be expanded to include any other steps of relevance and be completed with appropriate identification of pumps, valves, etc.

2.1 Prior to arrival at the loading port

No.	Item
(1)	Have all remaining slops been transferred to a cargo tank ?
(2)	If simultaneous discharge of clean ballast while loading is intended, have the pumps and piping designated for clean ballast operation been properly cleaned ?
(3)	Have all valves to the slop tank and the cargo tanks been closed ?
(4)	Has a visual inspection of all clean ballast tanks and their contents been made for signs of contamination ?
(5)	Has a sufficient amount of clean ballast water been discharged to ensure that the remaining ballast water and cargo to be loaded will not exceed the permissible deadweight or draught? (A sufficient amount of water should be left for flushing the piping, and as a minimum, a quantity equal to ten times the volume of the affected piping should be left.)
(6)	Have all valves to the clean ballast tanks been closed ?
(7)	If no further ballast discharge is anticipated, has the clean ballast piping been drained ?

2.2 In the loading port

No.	Item
(1)	Is sufficient ullage in the slop tank available for the subsequent reception of cargo pump and pipe flushings which will be required after loading cargo ?
(2)	When applicable, has remaining clean ballast been discharged before the entire piping system is used for loading and has the required minimum quantity of flushing water been left in the clean ballast tanks ?
(3)	Have all valves to the clean ballast tanks been closed ?
(4)	Have all valves to the cargo tanks been closed upon completion of loading ?

2.3 Prior to departure from the loading port

No.	Item
(1)	Have the appropriate pumps and piping been flushed into a slop tank with sufficient water from clean ballast tanks?
(2)	Have valves to the slop tank been closed before pumping the remaining clean water overboard and has the discharge been monitored, either visually or by a content meter?
(3)	Have all valves in the clean ballast tanks been closed?

2.4 Prior to arrival at the final discharge port

No.	Item
(1)	Have all valves to the slop tank and the cargo tanks been closed?
(2)	Have the pumps and piping designated for clean ballast operation been properly cleaned?
(3)	Has the required amount of flushing water been taken into the ballast tanks?
(4)	Have all valves in the clean ballast tanks been closed after any necessary ballasting?

2.5 In the final discharge port

No.	Item
(1)	Have the necessary pumps and piping intended for clean ballast operation been prepared?
(2)	When draught conditions permit, has ballasting been completed to departure conditions?
(3)	Have all valves to the clean ballast tanks been closed?
(4)	Has unloading of cargo been completed?

2.6 After departure from the final discharge port

No.	Item
(1)	Have pumps and piping serving the clean ballast tanks been flushed into the slop tank?
(2)	Have clean ballast tanks been topped up as required?
(3)	Has the slop tank content been processed in accordance with LOT procedures?

Note: Items 2.2(1), 2.3(1) and 2.4(2) do not apply if flushing water is provided overdeck, i.e. by piping other than ships cargo piping.

3 **General guidelines for the carriage of additional ballast** (section 6 of Manual)

3.1 Under certain conditions as provided in Regulation 13(3) of Annex I of MARPOL 73/78 to which paragraphs (7) and (10) of the same Regulation refer, additional ballast may be carried. Before a decision is made to take on additional heavy weather ballast other measures such as reducing speed or altering course should always be considered.

3.2 If additional ballast has to be taken on board this should, if possible, be carried in tanks which have been cleaned for routine sediment control or maintenance. Ballasting of dirty tanks should be avoided. The additional ballast is discharged as dirty ballast in compliance with Regulation 9 of Annex I of MARPOL 73/78 and following the procedure described in section 7 of the Manual. The piping that will subsequently be used for discharging ballast from the dedicated clean ballast tanks may need to be flushed again by drawing some water from these tanks to the slop tank.

3.3 In case the vessel during its ballast voyage sails through special areas no discharge at sea of dirty ballast will be possible in the area.

4 **General guidelines for discharge of dirty ballast and the decanting of slops at sea** (section 7 of Manual)

4.1 *Discharge of dirty ballast*

4.1.1 Discharge of dirty ballast at sea must always be performed under strict control of pumping and in compliance with Regulation 9 of Annex I of MARPOL 73/78. Procedures to ensure that the discharge is restricted to permitted limits should be observed as follows:

- .1 Before discharging the dirty ballast overboard, flush main cargo lines to be used for discharging the dirty ballast into the slop tank.
- .2 Before flushing, prime the system, establish suction, stop the pump and close all valves and allow the oil to separate out of the pipe walls.
- .3 Resume pumping after half an hour at moderate rate with output throttled on the discharge side of the pump.
- .4 Commence to discharge dirty ballast.
- .5 Reduce discharge rates from individual tanks on approaching a water depth of about 20 per cent of the tank depth.
- .6 Thereafter reduce pumping rates to avoid drawing surface oil into the suction by vortex or weir effects. Observe carefully the trend of the oil content monitor reading.
- .7 Stop discharge of individual tanks when a level has been reached which, for the particular ship, is known not to give rise to any entrainment of oil. When all dirty ballast tanks have been discharged to this level, all discharge overboard must cease.
- .8 The officer in charge must verify that the slop tank can take the volume of dirty ballast remaining. If ullage is insufficient, the slop tank may be partially discharged (see paragraph 4.2 of this section) to provide the necessary capacity taking care to ensure that an adequate depth of water remains beneath the oil residue layer.
- .9 Transfer the remaining dirty ballast into the slop tank, using the stripping system.
- .10 Transfer to the slop tank the contents of the pump-room bilges and any other bilges connected to the cargo stripping system.
- .11 Flush the stripping system, which will then be dirty, into the slop tank.

4.2 Decanting of slop tanks

4.2.1 During pipe flushing oil residues will collect in the slop tanks together with water. These residues have to be processed using conventional retention on board techniques. After proper decanting of the water content of the slop tank the residues may remain in the slop tank or may be transferred to a cargo tank and new cargo loaded on top of them or they may be pumped ashore if preferred by the owner/charterer. If cargo is loaded in the slop tanks it is important that there is sufficient ullage to receive the water flushings when the dedicated clean ballast system is cleaned.

4.2.2 Decanting of the contents of the slop tank is a critical step in the retention of oil on board. Hence the timing of the various steps in the operation is important. Even a short delay in stopping a pump or closing a valve can allow oil to escape into the sea. The time required for oil and water to separate in the slop tank depends upon the motion of the ship as well as on the type of previous cargo. Under favourable conditions a few hours may be enough, but in most circumstances 36 hours or more should be allowed. Discharge from the slop tank must cease well before the interface is reached to avoid discharge of any oil-in-water emulsion overboard.

4.2.3 Before starting to decant the contents of the slop tank, an accurate interface and ullage reading, using an oil/water interface detector, must be taken to determine the depth of the oil layer.

4.2.4 Although every effort should be made to remove as much water as possible from the slop tank, the prime objective is to prevent oily water reaching the sea. Extreme care is therefore necessary, and a close check must be kept on the overboard discharge.

4.2.5 Agitation of the contents of the slop tank must be kept to a minimum to avoid drawing oil into the suction by vortex or weir effects, particularly as the oil/water interface approaches the top of the structural members in the tank bottom. Pumping rates must be strictly controlled. The following detailed procedures should be followed:

- .1 Cargo lines to be used for decanting slop tanks must be flushed as outlined in paragraphs 4.1.1.1 to 4.1.1.3 of these guidelines.
- .2 Pump down the slop tank using one main cargo pump at slow speed until a water depth of about 20 per cent of the tank depth is reached.
- .3 Stop the cargo pump, then take an oil/water interface and ullage reading and re-calculate the remaining water depth.
- .4 Resume pumping of the slop tank, this time using the stripping system, until a predetermined water depth is reached which, for the particular size and construction of the slop tank, is known not to give rise to discharge of oil. Pumping, which may initially be at a moderate rate, should be slowed as this predetermined water depth is approached.
- .5 Observe carefully the trend of the oil content monitor reading.
- .6 If oil should appear before the predetermined water depth is reached, stop pumping.
- .7 Should this occur, further settling of the slop tank contents should be allowed for as long as possible before repeating the steps given above.
- .8 Any decanting beyond this limit must be carried out with extreme care and by strictly observing the oil content monitor reading. When the trend of the monitor reading indicates that the interface is being entrained, the discharge must be stopped immediately.

4.3 *Final line and pump flush*

4.3.1 After these operations have been completed the lines and pumps used will contain traces of oil. The lines and pumps which will be used to discharge ballast must therefore be thoroughly flushed into the slop tank, or while the ship is still more than 50 nautical miles from the nearest land and outside a special area thoroughly flushed to sea, ensuring that the permitted instantaneous rate of discharge of oil and the permitted total quantity of oil discharged are not exceeded.

4.3.2 As a final preparation, pumps that will be used for the discharge of the arrival ballast should take suction from each tank containing arrival ballast for a short period of time.

5 **General guidelines for dealing with oil contamination of the dedicated clean ballast tanks** (section 8 of Manual)

5.1 Oil may enter the dedicated clean ballast tanks through operational or equipment failure. The following additional precautions should therefore be observed:

- .1 During the loaded voyage and ballast voyage periodic checks must be made in the ballast tanks for any hydrocarbon gas content and if any gas is detected vent the tank until safe for entry and inspect for leakage in bulkheads and piping.
- .2 If oil is detected in ballast water the latter should be considered as dirty ballast and be discharged to reception facilities or at sea during the voyage in compliance with Regulation 9 of Annex I of MARPOL 73/78. After discharging contaminated ballast, washing out clean ballast tanks and flushing of piping, new ballast may be taken in these tanks.
- .3 If any oil contamination is found in the dedicated clean ballast tanks the cause should be carefully investigated and the necessary corrective action, whether a repair, a change in the operational procedure or a change in the instructions and training, should be initiated. Any oil contamination in the dedicated clean ballast tanks should be noted in the Oil Record Book together with information about the action taken.

APPENDIX 2

SPECIMEN MANUAL FOR A TANKER OPERATING WITH DEDICATED CLEAN BALLAST TANKS

INTRODUCTION

1 This Manual is written in accordance with the requirements of Regulation 13A of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)*.

2 The purpose of the Manual is to meet the requirements for tankers operating with dedicated clean ballast tanks (CBT tankers) in accordance with the revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks (IMCO Assembly resolution A. 495(XII)) and provides standard operational guidance for CBT tankers.

* The provision of the revised Specifications for Oil Tankers with Dedicated Clean Ballast Tanks requiring double valve separation between clean ballast tanks and cargo lines not later than 1 July 1983 and proposed amendments to MARPOL 73/78 agreed by the MEPC at its fourteenth session which might affect operational procedures of a CBT tanker have not been considered in this specimen manual.

3 The Manual contains all the information and operational instructions required by the Specifications.*

4 The Manual has been approved by the Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration.

INDEX (To be inserted)

SECTION 1: TEXT OF THE SPECIFICATIONS

THIS SECTION CONTAINS THE COMPLETE TEXT OF
THE REVISED SPECIFICATIONS FOR OIL TANKERS
WITH DEDICATED CLEAN BALLAST TANKS





























(Revised Specifications to be inserted)

SECTION 2: DRAWINGS OF THE DEDICATED CLEAN BALLAST TANK SYSTEMS

THIS SECTION CONTAINS LINE DRAWING(S) OF
SYSTEMS CONNECTED TO THE DEDICATED CLEAN
BALLAST TANKS SHOWING:

- (1) TANK ARRANGEMENTS;
- (2) CARGO PUMP(S), LINES AND VALVES;
- (3) BALLAST SYSTEMS (WHERE FITTED);
- (4) STRIPPING SYSTEMS;
- (5) DECK SERVICE LINES USED FOR SUPPLYING
FLUSH WATER (WHERE APPLICABLE);
- (6) SAMPLING POINTS FOR OIL CONTENT METER.

* This specimen Manual covers only the information required by the Specifications; it therefore consists of one part only as explained in the footnote to the standard text of the introduction in the standard format for the Dedicated Clean Ballast Tank Operation Manual.

SYMBOLS	
	BUTTERFLY VALVE (MANUAL OPERATED)
	BUTTERFLY VALVE (MANUAL SPINDLE OPERATED FROM UPP, DK.)
	BUTTERFLY VALVE (HYDRAULIC VALVE SIDE OPERATED)
	BUTTERFLY VALVE (HYDRAULIC LOCAL OPERATED FROM UPP, DK.)
	BUTTERFLY VALVE (HYDRAULIC REMOTE OPERATED WITH OPEN/SHUT INDICATOR OF I.S. DIRECT COUPLING)
	BUTTERFLY VALVE (HYDRAULIC REMOTE OPERATED WITH OPEN/SHUT INDICATOR OF I.S. FLOW METER)
	BUTTERFLY VALVE (HYDRAULIC REMOTE OPERATED WITH POSITION INDICATOR OF I.S. DIRECT COUPLING)
	BUTTERFLY VALVE (HYDRAULIC REMOTE OPERATED WITH POSITION INDICATOR OF I.S. FLOW METER)
	BUTTERFLY VALVE (HYDRAULIC REMOTE OPERATED WITH AUTO FLOW CONTROL FOR J.S.S.)
	SLUICE VALVE (MANUAL OPERATED)
	SLUICE VALVE (MANUAL SPINDLE OPERATED FROM UPP, DK.)
	GLOBE VALVE (MANUAL OPERATED)
	CHECK VALVE
	CHECK ANGLE VALVE
	SCREW-DOWN NON-RETURN VALVE (MANUAL OPERATED)
	SCREW-DOWN NON-RETURN VALVE (MANUAL SPINDLE OPERATED FROM UPP, DK.)
	RELIEF VALVE
	BELLMOUTH
	ROSE BOX
	STRAINER
	REDUCER
	SEA CHEST
	SPECTACLE FLANGE
	CAST STEEL VALVE
	CROSSING PIPES NOT CONNECTED
	CROSSING PIPES CONNECTED
	PIPING GOING UPWARDS
	PIPING GOING DOWNWARDS

