ANNEX II TO MARPOL 73/78 AND OTHER IMO RELATED REQUIREMENTS

by

G. PATTOFATTO

Technical Bollettin No. 99

Genova, December 1986

CONTENTS

TABLES

ENCLOSURES

5 - List of substances already belonging to Chapter 17 of the IBC Code (or to Chapter VI of the BCH Code) for the carriage of which more stringent requirements in connection with ship type or additional arrangements have been introduced

6 - Factors influencing residues in tank

7 - Considerations on discharge outlets and relating piping

FOREWORD

On 6 April 1987 the Annex II of MARPOL 73/78 will enter into force internationally.

After four years from the entry into force of Annex I, whose aim is the control of sea pollution by oil, the second more important Annex of MARPOL Convention, relating to the prevention of sea pollution from ships, enters into force.

The aim of Annex II is to prevent and control the sea pollution by substances, carried in bulk, having such characteristics as to present hazard to either the marine environment or human health.

The present bulletin is aimed at illustrating Annex II and the other IMO requirements related to Annex II which will enter into force on even date (see Table 3), as an integration of the information already supplied by Circular II/2718/(E1) dated 21 April 1986.

Taking into account the complexity of these requirements and the fact that they are divided into several documents, an attempt has been made to give the reader a general view of the problem.

The present bulletin is therefore formed by a first part, composed of Chapters 1 to 7 inclusive, which describes such requirements, and by a second one formed by a series of tables. In the first part, under Chapter 2 dealing with Annex II, frequent and useful references to the remaining requirements have been included; in the second part the tables give a complete, even if summary, picture, of the various points of the requirements relating to the specific subject dealt with.

In Enclosures 1 to 5 inclusive are contained, for prompt reference, some documents and lists of products not yet introduced into IMO publications.

In Enclosure 6 are contained some considerations on various factors influencing the quantity of residue in tanks, based upon R.I.NA. experience acquired during tests on board.

In Enclosure 7 some considerations concerning the discharge outlet and relating piping are contained.

For easy reference the abbreviations most frequently used in the text are listed hereinafter:

IMO	: International Maritime Organization
MSC	: Maritime Safety Committee of IMO
MEPC	: Marine Environment Protection Committee of IMO
Annex II	: Annex II of MARPOL 73/78 Convention, as amended with Resolution MEPC 16(22)
MARPOL 73/78	: International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
Convention	: MARPOL 73/78 Convention
IBC Code	: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, adopted by Resolution MEPC 19(22)
BCH Code	: Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, adopted by Resolution MEPC 20(22)
Standards	: Standards for Procedures and Arrangements for the Discharge of Noxious Liquid Substances, adopted by Resolution MEPC 18(22)
P & A Manual	: Procedures and Arrangements Manual
ICOF	: International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk (IBC Code Certificate of Fitness)
COF	: Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk (BCH Code Certificate of Fitness)
IPPC	: International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk
Domestic voyages	: Voyages between ports of the same State

CHAPTER 1 - MARPOL 73/78 CONVENTION

The **"International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73)"** has been adopted in 1973 by the International Conference on Marine Pollution held in London from 8 October to 2 November 1973. This Convention has been subsequently modified by the Protocol adopted by the "International Conference on Tanker Safety and Pollution Prevention (TSPP Conference)" held in London from 6 to 17 February 1978. The 1973 Convention as amended by the Protocol of 1978 is known as **MARPOL 73/78** (hereinafter referred to as the **"Convention"**). The Annexes and Protocols of MARPOL 73/78 are indicated in Table 1.

CHAPTER 2 - ANNEX II OF MARPOL 73/78

2.1 - General

Annex II of MARPOL 73/78 (hereinafter referred to as **"Annex II"**) is relating to the prevention of the pollution of marine environment by noxious liquid substances carried in bulk by ships.

In accordance to the definition under Reg. 1(6) of said Annex, **"noxious liquid substance"** means any substance designated in Appendix II to Annex II or provisionally assessed under the provisions of Reg. 3(4), as falling into Category A, B, C or D.

Substances are categorized into the four categories A, B, C or D depending on the hazard they present either for marine resources or human health or the harm they may cause to amenities or other legitimate uses of the sea. According to such criteria Cat. A substances are the most dangerous and for them stringent anti-pollution measures are therefore required; Cat. D substances are the less dangerous and for them only some attention in operational conditions is required.
Categories B and C contain substances of intermediate hazard.

Annex II enters into force on 6.04.1987 and applies to all ships (irrespective of date of construction and tonnage) entitled to fly the flag of a Party to the Convention, carrying Annex II substances on international or domestic voyages.

The entry into force procedure of Annex II is illustrated in Table 2.

On the contrary, Annex II shall not apply to ships carrying substances listed in Appendix III to the same Annex.

For ships constructed before 1.07.1986, as hereinafter exposed, some relaxations and exemptions are granted but, in general, when their constructive characteristics may give rise to a higher pollution hazard, more severe requirements are to be complied with.

2.2 - Other IMO requirements relating to the control of pollution from noxious liquid substances carried in bulk

It is advisable to highlight the relations of Annex II with the other requirements entering into force on even date.

Annex II (Reg. 13), to the purpose of minimizing the risk of accidental pollution of sea by chemical tankers carrying Category A, B or C substances, requires that they comply with the requirements of the IBC Code or of the BCH Code (depending on the date of construction of the ship). This means that requirements relating to ship's survival capability in case of collision or grounding, depending on the pollution hazard of the carried substance, have been introduced.

The above mentioned Codes, which previously contained requirements regarding only safety aspects, have thus been amended by IMO with pollution prevention requirements.

Moreover, as IMO has developed specific requirements pursuant to what required by the different Regulations of Annex II, beside such Annex there is a set of requirements, listed in Table 3, which is referred to as "other IMO requirements relating to the control of pollution from noxious liquid substances carried in bulk", which enters into force on 6.04.1987 too.

As said in the foreword, to the purpose of giving the reader a general view of the subject, in the illustration of the different Regulations of Annex II, as hereinafter made, frequent references have been made to the remaining requirements pertaining to the subject dealt with.

2.3 - Annex II Regulations

2.3.1 - Reg. 1 - Definitions

For what Special Areas are concerned (areas requiring special measures for pollution prevention) it is pointed out that the Mediterranean Sea, which is considered a Special Area in respect of Annex I is not considered as such to the aim of Annex II. Special Areas are:

- **the Baltic Sea Area** which includes the Baltic sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance of the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57° 44,8' N;
- **the Black Sea Area** which includes the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41°N.

For what the definitions of "IBC Code" and "BCH Code" are concerned, reference is made to Chapters 3 and 4 of the present bulletin.
For what the definition of "**clean ballast**" and of "**segregated ballast**" is concerned, reference is made to paragraph 2.3.4 hereinafter.

2.3.2 - Reg. 2 - Application

As already said, Annex II applies to all ships carrying in bulk noxious liquid substances contained in Appendix II to said Annex. It does not apply to substances listed in Appendix III.

Paragraph (4) of such Regulation requires, for ships constructed before 1 July 1986, that the provisions of Regulation 5 in respect of the requirement to discharge below the waterline and maximum concentration in the wake astern the ship shall apply as from 1 January 1988.

For what application of Annex II to gas tankers carrying certain noxious substances is concerned, an interpretation of Regulations 2(5) and 2(6) has been developed by IMO, based upon the equivalence criterion, which is indicated in Table 4D.

For what application of Annex II to oil tankers carrying noxious "oil-like" substances is concerned, reference is made to Reg. 14 of Annex II dealt with in paragraph 2.3.16 hereinafter.

2.3.3 - Reg. 3 - Categorization and listing of noxious liquid substances

The categorization criteria of noxious liquid substances into the four Categories A, B, C and D has already been mentioned in section 2.1 of the present bulletin.

It is important to stress the fact that, for the carriage of a noxious liquid substance, its evaluation is necessary both from the point of view of pollution and of safety.
Substances not evaluated by IMO may be carried at the conditions under paragraph (4) of the present Regulation, for what the pollution

hazard is concerned, and at the conditions mentioned under paragraph 1.1.3 of the IBC Code and 1.8 of the BCH Code, for what safety is concerned. The above mentioned paragraphs require the agreement of the Administrations involved and the notification to IMO of the conditions established for the carriage.
The substances evaluated by IMO from the pollution point of view are those contained in Appendices II and III to Annex II; from pollution and safety point of view are those contained in Chapters 17 and 18 or in Chapters VI and VII of the IBC Code or BCH Code respectively.
Water containing residues of substances which have not been categorized (by IMO or at least by the involved Administrations by a provisional assessment) cannot be discharged into the sea (Reg. 5(6) and 5(11) of Annex II) and reception facilities ashore are therefore needed.
Having in mind what above, IMO, to the purpose of facilitating the involved Administrations and, at the same time, to avoid the further necessity of reception facilities, has approved:

(i) guidelines for a provisional assessment of noxious substances which may be carried in bulk, containing also criteria for defining the type of ship suitable for their carriage;

(ii) a list of substances with a provisional assessment of the relating carriage conditions.

The guidelines and the list mentioned under the above points (i) and (ii) are attached herewith as Enclosures 1 and 2, respectively.
The list, developed by IMO, of substances known to be moved in bulk but not yet evaluated for pollution or safety is also given in Enclosure 2.

As regards the problems which may arise due to more stringent carriage conditions established during final categorization of the substances, mainly for what the compliance with the survival capability requirements in case of collision or grounding of ships dedicated to the carriage of specific substances is concerned, MEPC has decided that the problem will be examined on case by case basis taking into account the increased degree of stringency introduced and of the consequent impact on the existing fleet.

2.3.4 - Reg. 4 - Other liquid substances

This Regulation refers to Appendix III where substances to which Annex II does not apply are listed and, besides, establishes, in paragraph (3), that the discharge into the sea of clean ballast or segregated ballast is not subject to any requirement of Annex II.

It is reminded that, according to the definition as per Regulation 1(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 Annex II.
In connection with the above definition, there may be freely discharged into the sea the ballast water introduced into a tank:

(i) which has contained a Category A, B, C or D substance; and

(ii) which has been prewashed or not, with discharge of generated residue/water mixture to reception facilities, in accordance with the requirements of Annex II and of the Standards; and

(iii) from which any water subsequently introduced has been discharged into the sea in accordance with the requirements of Annex II and of the Standards.

In addition, there may be freely discharged into the sea any water introduced into tanks whose cargo residues have been removed by an approved ventilation procedure (see also points (5) and (10) of Reg. 5), as well as the **"segregated ballast"**, by which is intended any ballast water introduced into a tank permanently dedicated to the carriage of ballast or of cargoes different from oil or from noxious liquid substances as defined in the Annexes to the Convention and which is completely separated from the liquid cargo system and from the fuel oil system (see definition of "segregated ballast" in Reg. 1(3)).

As regards the compulsoriness or not of prewash and the procedures for discharge into the sea of waters containing residues of noxious liquid substances, reference is made to Tables 7A, 7B, 8A and 8B of the present bulletin.

2.3.5 - Reg. 5 - Discharge of noxious liquid substances

This Regulation establishes the conditions according to which the cargo residues and ballast water or tank washings containing residues of noxious substances may be discharged into the sea.

The residues of Cat. A substances (which present a major pollution hazard), washings or prewashings of tanks which have contained Cat. A substances cannot be discharged into the sea.

Tanks which have contained Cat. A substances are to be washed before the ship leaves the port of unloading and the washings are to be discharged to a reception facility.

Cargo tank washing is to be prolonged until the concentration of the substances in the effluent is below the values indicated for each substance in Appendix II to Annex II (see Regulations 5(1) and 5(7)).

As the above mentioned washing procedure may present practical difficulties in ascertaining the concentration of the substance, Reg. 8(4), to the purpose of avoiding delays to the ship, provides that, alternatively, the washing may be effected according to the standard prewashing procedure contained in Appendix B to the Standards. Any water subsequently introduced into tanks may be discharged into the sea in accordance with the same requirements in respect of ship's position, speed and discharge outlet location shown in the synopsis at page 10 of the present bulletin for Cat. B and C substances.
By the way it is stressed that both in the Standards and in the present bulletin by the term "prewash" is meant the washing required for cargo tanks, before the ship leaves the port, to be effected according to the procedure indicated in Appendix B to the Standards.

The conditions relating to the discharge of Category B and C substances set forth in the present Regulation are those initially established by MARPOL 73.
As the required limitations for the maximum concentration in the wake astern of the ship present practical difficulties for its control, there have been introduced, through the new Reg. 5A and the development of the Standards, constructional and operational requirements which guarantee, also taking account of the area where the discharge is made (within or outside special areas), equivalent pollution conditions.

The introduced requirements are:

(i) **efficiency of the stripping system:**
maximum quantities of residues in tank after unloading and stripping of cargo tanks and the procedures for their ascertainment have been established (see Reg. 5A);

(ii) **characteristics of viscosity and melting point of the substances:**
the concept has been introduced that low viscosity and/or low melting point substances are more easily pumped, give rise to lower quantities of residues on tank walls and therefore generate, globally, lower quantities of residue in tank; the reference temperature for viscosity and melting point is the temperature at the time of unloading (see section 5.2 of the present bulletin);

(iii) **discharge outlet:**
it is to be located in vicinity of the turn of the bilge and to

have a diameter depending on the maximum expected discharge rate so as to limit the outflow velocity of polluted water.
Discharged water thus remains in the proximity of the hull, below the waterline, and is therefore led to the ship's wake where the turbulence caused by the propeller facilitates its dilution and limits its concentration (see paragraph 5 of Chapter 3 and paragraph 6 of Chapter 8 of the Standards).

Taking therefore into account the efficiency of the stripping system, the viscosity and melting point characteristics of the substances at the time of unloading and the area in which the ship is (within or outside special areas), prewash of tanks before the ship leaves the port is required or not.
The prewash procedure is to be based on the requirements of Appendix B to the Standards.

The conditions at which prewash is compulsory are summarized in Table 7A. The possible exemptions from prewash are summarized in Table 7B of the present bulletin.

The procedures for discharging any water subsequently introduced into the tank are indicated in Tables 8A and 8B of the present bulletin.

Reg. 5 provides, in addition, under paragraph (10), that ventilation procedures, approved by the Administration and based on Standards elaborated by IMO, may be used to remove cargo residues. The Standards define as suitable for being removed by ventilation the substances with a vapour pressure greater than 5.10^3 Pa at 20°C and therefore remarkably volatile.

Appendix C to the Standards contains requirements for the ventilation procedure and gives in particular the minimum inflow rate of air into the tank, depending on the height of the tank and on the inlet diameter, so as to guarantee a sufficient inlet jet penetration and therefore the reaching of all involved surfaces. The use of ventilation does not, anyhow, exempt from the requirement to provide the ship with a stripping system complying with Reg. 5A.
It is reminded that any water subsequently introduced into tanks from which residues have been removed by an approved ventilation procedure is to be considered as "clean ballast" and may be therefore freely discharged into the sea as already mentioned in paragraph 2.3.4 of the present bulletin.
For Cat. B, C and D substances the conditions relating to the discharge are summarized in the synopsis of following page.

2.3.6 - Reg 5A - Pumping, piping and discharge arrangements

This is the most important innovation introduced into Annex II during its revision. It was decided that one of the most important measures

REG. 5 - CONDITIONS FOR THE DISCHARGE

The discharge of substances and of ballast water or washings containing residues of substances is prohibited unless the following conditions are complied with	Cat. B substances		Cat. C substances		Cat. D substances
	Outside Special Areas	Within Special Areas	Outside Special Areas	Within Special Areas	Within or Outside Special Areas
Maximum quantity of substance: in accordance with the Standards but in no case greater than the highest of the indicated values	$1\ m^3$ or $1/(3000\ V)$ (*)	Prewash (**)	$3\ m^3$ or $1/(1000\ V)$ (*)	$1\ m^3$ or $1/(3000\ V)$ (*)	It is only required that the concentration be not greater than one part of the substance in ten parts of water
The discharge is to be made with procedures and arrangements approved by the Administration and based on the Standards developed by IMO and is to insure that the maximum concentration of substance in the wake astern of the ship does not exceed:	1 ppm	1 ppm	10 ppm	1 ppm	
The discharge is to be made below the waterline at the following conditions:					Only the compliance of distance from nearest land (12 miles) and water depth (25 m) is required. Discharge may also be made above the waterline
- ship's speed	.....7 knots for self-propelled ships; 4 knots for other ships				
- distance from nearest land	.....12 miles				
- water depth	.....25 m				

(*) V is the tank capacity, in m^3

(**) The prewashing procedures of cargo tanks are to be approved by the Administration and based on the Standards developed by IMO; the effluent from prewash operations is to be discharged to reception facilities

to reduce sea pollution and to insure the compliance with the maximum substance concentration values in the ship's wake, established by Reg. 5, was to reduce the quantity of cargo residue in tanks after unloading of cargo and stripping of tanks. There was thus required, for ships intended to carry Cat. B and/or C substances, the provision for an efficient stripping system, capable of limiting the residues in tanks so as not to exceed the hereinafter indicated maximum values:

(i) maximum values of residues in each tank and associate piping: 1 m^3 for Cat. B substances (or 1/3000 of tank capacity in m^3, if greater) and 3 m^3 for Cat. C substances (or 1/1000 of tank capacity in m^3, if greater). **These values are acceptable, for ships built before 1.07.86, until 2.10.1994. After this date, for the ship to continue to be allowed to carry Cat. B and C noxious substances, the stripping system shall be improved so as to comply at least with the requirements of the following point (ii).**

As these values are greater than those under the following points (ii) and (iii), the Standards establish more stringent conditions for the discharge of waters containing residues of such substances (see also paragraph 5.2.5 of the present bulletin).

The above mentioned maximum values of residues in each tank are referred to the sum of the two following quantities:

a) residue quantities on tank surfaces calculated by the formula under section 4 of Appendix A to the Standards;

b) residue quantity due to liquid that cannot be stripped in vicinity of the suction point of the stripping system and to the liquid remaining in the relating piping. This quantity, termed "stripping quantity", is to be measured by the test procedure specified under section 3 of Appendix A to the Standards (water test);

(ii) maximum values of residues in each tank due to the stripping system (these are the quantities mentioned under the preceding point (i)(b): 0,3 m^3 for Cat. B substances and 0,9 m^3 for Cat. C substances.

These values are acceptable, for ships built before 1.07.1986, without any time limit.

Although these values are greater than those under the following point (iii), in order to encourage owners of ships built before 1.07.86 to adopt at once the present solution instead of that under (i), the Standards establish that, to the ships complying with the present point, there be applied the same polluted water discharge requirements established for ships of more recent construction mentioned under the following point (iii);

(iii) maximum values of residues in tank due to the stripping system (these are the quantities mentioned under the preceding point (i)(b)): 0,1 m^3 for Cat. B substances and 0,3 m^3 for Cat. C substances.
These values are required for ships constructed after 1.07.1986.

The above mentioned values are also set forth in Tables 4A and 4B of the present bulletin in which also the constructional requirements and required certifications for chemical tankers are indicated.

For what said above, there is pointed out the fact that maximum values for residues in tank are not fixed by Reg. 5A for Cat. A and D substances. For the first ones there is always required, as per Reg. 5, the washing or prewash of tanks with discharge of effluent to reception facilities; for the second ones, as no maximum quantity that may be discharged into the sea is foreseen by Reg. 5, the required dilution with ten water parts for each substance part remained in tank, specified by Reg. 5(4)(b), has been kept unchanged.

Paragraphs (6) and (7) of Regulation 5A define the possible conditions for exemption from the installation of a stripping system complying with what stated above. These conditions are set forth in Table 6 of the present bulletin.

2.3.7 - Reg. 6 - Exceptions

In this regulation are established the conditions for which Reg. 5 does not apply and therefore the discharge into the sea of noxious liquid substances is allowed. This is allowed when it is necessary for the purpose of securing the safety of a ship or saving life at sea, or when such a discharge results from damage to a ship or its equipment or is being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution.

2.3.8 - Reg. 7 - Reception facilities and cargo unloading terminal arrangements

By this Regulation the Government of each Party to the Convention is to undertake to ensure the provision of reception facilities for residues and mixtures containing noxious liquid substances which are to be discharged on shore by ships in compliance with Annex II.

Reg. 5, and in a more detailed way Reg. 8, establish the compulsoriness of prewash of cargo tanks before the ship leaves the port of unloading, depending on the efficiency of the stripping system, on the characteristics of the unloaded substance and on the area where the unloading takes place.

Reg. 7 therefore specially refers to unloading ports which are to receive washings from tanks and are therefore to be adequately equipped depending on the substances they handle and on the quantities of the resulting washing water.

In particular, paragraph (3) requires that the arrangements be such as to facilitate stripping of cargo tanks after unloading and that cargo hoses and piping systems of the terminal, after unloading, shall not be drained back to the ship.

This is in strict connection with the test carried out on board (water test) intended to ascertain the characteristics of the stripping system to the purpose of compliance with Reg. 5A.

As the Standards provide that the water test may be carried out with a back pressure of not less than 1 bar at the unloading manifold, it is clear that if the terminal gives rise, during cargo tank stripping, to a back pressure greater than the one with which the test was carried out, the residues in tank may be, under the same conditions, greater, and greater may be the pollution caused by the ship.

Terminals shall therefore be equipped in such a way that the test conditions may be complied with during cargo tank stripping.

It is anyhow stressed that the quantities measured with the water test are reference quantities for the acceptability of the stripping system. The actual quantities which may be found on board after stripping may differ from these depending on the characteristics of the unloaded cargo (density, viscosity, temperature etc.).

The conditions for which prewash is compulsorily required, with consequent discharge to shore of the effluent, are indicated in Table 7A of the present bulletin; Table 7B indicates the foreseen exemptions from such an obligation.

IMO, pursuant to the present regulation, has developed the **"Guidelines on the Provision of Adequate Reception Facilities in Ports".**

These Guidelines contain, in particular, reference values for the calculation of the water quantity necessary for cargo tank washing, which are useful for the evaluation of the type and of the dimensions of shore arrangements for the reception of such washings. Besides, in these Guidelines are indicated, in addition to Cat. A substances, Cat. B and C substances having a viscosity greater than 25 mPa.s at 20°C and a melting point greater than 0°C, which are the critical substances from the point of view of the necessity of prewashing and discharging the effluent to shore reception facilities.

In this respect it is pointed out once again that the viscosity and the melting point, which are determinant from the point of view of the compulsoriness of prewash, are those relating to the temperature at the time of unloading (see section 5.2 and table 7A of the present bulletin).

2.3.9 - Reg. 8 - Measures of control

This Regulation

(i) specifies, for Cat. A, B or C substances, when prewash of cargo tanks before the ship leaves the unloading port, outside or within special areas, is required, with reference:

- to Reg. 5 for the general conditions for residue treatment;
- to Reg. 5A, for allowable limits for residues in cargo tanks;
- to the Standards, for the detailed conditions for residue treatment;
- to the Standards for residue removal procedures (washing or ventilation);

(ii) specifies the exemptions from prewash which may be granted;

(iii) specifies the notations which are to be entered, by board personnel, into the Cargo Record Book with reference to the operations referred to under the preceding points (i) and (ii);

(iv) requires that the Government of each Party to the Convention appoint or authorize surveyors for the control of the operations foreseen by the present Regulations;

(v) specifies which notations, entered into the Cargo Record Book referred to under point (iii), are to be endorsed by the surveyor referred to under sub-paragraph (iv);

(vi) requires that the controls executed by the surveyors referred to under point (iv) be carried out in accordance with the control procedures developed by IMO.

The conditions for which prewash is required, referred to under point (i), are indicated in Table 7A of the present bulletin.

Exemptions from prewash, referred to under point (ii), are indicated in Table 7B of the present bulletin.

For what the controls under point (vi) are concerned, IMO has developed the **"Procedures for the Control of Ships and Discharges under Annex II of MARPOL 73/78".**
Chapter 2 and relating Appendix 1 of said document concern the controls of the certification the ship is to be provided with. It is foreseen that if, during said inspection, there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of the certificates, the competent Authority should proceed to the further technical ascertainments, as necessary.
Chapter 3 and Appendix 2 are relating to the investigations and consequent actions for the cases of contravention of the provisions of Annex II and related requirements.
The controls relating to cargo tank unloading, stripping and prewash operations are contained in Chapter 4 and in relating Appendix 3.
Chapter 5 is relating to the treatment of ships flying the flag of States non-Parties to the Convention.
Chapter 6 and relating Appendix 4 contain the procedure for notification to IMO of cases of non compliance with the Convention:

In compliance with Reg. 8(1)(a), the above mentioned controls are to be carried out by Surveyors appointed or authorized to this purpose by the Governments Parties to the Convention. These Surveyors are to act basing upon the above mentioned IMO "Procedures".

2.3.10 - Reg. 9 - Cargo Record Book

This Regulation requires that every ship to which Annex II applies be provided with a Cargo Record Book on which, under the care of board personnel, the necessary entries relating to operations concerning cargo, cargo residues, washings or ballast water containing residues of substances, ballasting, tank cleaning, discharge to reception facilities, removal of cargo residues are to be made.
Particularly important operations such as:

(i) the washing or prewash of tanks which have contained Cat. A substances (see Regulations 8(3) and 8(4)),

(ii) the granting of exemption from prewash of tanks which have contained Cat. A, B or C substances (see Regulations 8(2)(b), 8(5)(b), 8(6)(c) and 8(7)(c)),

(iii) the control that unloading, stripping and prewash operations have been carried out in compliance with approved procedures (see paragraphs 5.4 and 5.9 of Appendix 3 to the IMO "Procedures for the control of ships and discharges under Annex II of MARPOL 73/78");

are to be endorsed on the Cargo Record Book by the Surveyor appointed or authorized by the Government (see Regulation 8(1)(a)).

The Cargo Record Book is to be drawn up according to the model given in Appendix IV to Annex II.

2.3.11 - Reg. 10 - Surveys

The following surveys are foreseen:

(i) an **initial survey**, before the ship is put in service or before the "International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk" required by Reg. 11 is issued for the first time. This survey is to include the execution of the ascertainments to check the performance of the stripping system (see Reg. 5A);

(ii) **periodical surveys** at intervals specified by the Administration, but not exceeding five years;

(iii) a minimum of one **intermediate survey** during the period of validity of the Certificate referred to under Reg. 11;

(iv) an **annual survey** within three months before or after the day and the month of the date of issue of the Certificate referred to under Reg. 11.

Pursuant to this Regulation, IMO has developed the **"Guidelines for Surveys under Annex II of MARPOL 73/78"**.

2.3.12 - Reg. 11 - Issue of Certificate

An **"International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk" (IPPC)** shall be issued, after good result of the initial survey carried out in accordance with the provisions of Reg. 10, to any ship carrying noxious liquid substances in bulk and which is engaged on voyages to ports or terminals under the jurisdiction of other Parties to the Convention.

No IPPC shall be issued to ships flying the flag of a State which is not a Party to the Convention.

The certificate shall be issued in the form corresponding to the model given in Appendix V to Annex II.

By dispositions of the Italian Ministry of Merchant Marine this Certificate is to be issued also to ships engaged on domestic or more restricted voyages.

For Italian ships the IPPC is issued by Registro Italiano Navale.

As regards the certifications, which the ship is to be provided with, reference is made also to paragraph 2.3.14, to Tables 4A to 4E inclusive and in particular to Chapter 7 of the present bulletin.

2.3.13 - Reg. 12 - Duration of Certificate

An IPPC shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue.

The validity of the Certificate is anyhow subject to the carrying out of the surveys referred to under Reg. 10 and to the approval by the Administration of significant alterations in the construction, equipment, systems, fittings, arrangements or materials required.

2.3.14 - Reg. 12A - Survey and Certification of Chemical Tankers

Considering the fact that, as required by Reg. 13, ships carrying Cat. A, B and C substances are to comply also with IBC Code or BCH Code requirements (depending on their date of construction), in order to avoid the issue of two certificates, the present Regulation states that the provisions referred to under Regulations 10, 11 and 12 shall be deemed to be complied with for chemical tankers provided with an IBC Code Certificate of Fitness (ICOF) or with a BCH Code Certificate of Fitness (COF).
The Certificate of Fitness in compliance with one of the above mentioned Codes shall have the same force and receive the same recognition as the IPPC issued under Reg. 11 of Annex II.

For Italian ships the ICOF and the COF are issued by Registro Italiano Navale.

As regards the certifications with which the ship is to be provided, reference is made also to Tables 4A to 4E inclusive and to Chapter 7 of the present bulletin.

2.3.15 - Reg. 13 - Requirements for minimizing accidental pollution

To the purpose of minimizing the risk of accidental pollution by chemical tankers carrying Cat. A, B or C substances, there has been introduced, in the present Regulation, the requirement that such ships, for what design, construction, equipment and operation are concerned, comply with the requirements of the IBC Code or BCH Code, depending on date of construction.

To these ships, therefore, the Certificate of Fitness relating to one of the above mentioned Codes, amended with the new requirements relating to pollution prevention (see also sections 3.2 and 4.2 of the present bulletin), is issued. The IPPC is not necessary for what stated by Reg. 12A.

For more detailed information on the application of the IBC Code or of the BCH Code, reference is made to Chapters 3 and 4 and to Table 5 of the present bulletin.

The compliance with the provisions of the IBC Code or BCH Code is not required for ships carrying Cat. D substances. For these substances the following two cases may occur:

(i) **Cat. D substances listed in Chapter 17 of the IBC Code or in Chapter VI of the BCH Code**
These substances are listed in the above mentioned Chapters because they present also safety hazards; they may therefore be carried only by chemical tankers to which the IBC Code or the BCH Code apply; the Certificates of Fitness relating to said Codes also cover the pollution aspect.

(ii) **Cat. D substances listed in Chapter 18 of the IBC Code or in Chapter VII of the BCH Code**
These are substances to which the Codes (IBC or BCH Codes) do not apply and which may be carried:
- in chemical tankers (see also note (1) to Table 9 of the present bulletin);
- in oil tankers or gas carriers with possible further requirements, to the satisfaction of the Administration of the State the flag of which the ship is flying, which take account of the characteristics of the substances;
- in dry cargo ships in the case where these substances are only polluting and therefore do not present safety hazards.
  In this respect it is pointed out that MSC agreed that bulk carriage of hazardous chemicals in deep tanks of dry cargo ships is prohibited (see MSC 52/28 item 7.5).

For a synoptical picture of the different categories of substances, of the ships suitable for their carriage, of the constructional requirements and of the required certifications, reference is made to Tables 4A to 4E inclusive of the present bulletin.

It is, in addition, pointed out that paragraph (4) of the present Regulation delegates to the Administrations the task of establishing

suitable measures, which, in any case, should be based on guidelines, developed by IMO, for the carriage of Cat. A, B or C substances by ships different from chemical tankers.
Pursuant to what above, IMO is preparing guidelines for the carriage of limited quantities of some of the above mentioned substances on vessels which are intended to supply off-shore installations and to support the off-shore industry.

MSC agreed that off-shore support vessels carrying "safety hazard chemicals" could be excluded from the scope of the IBC, subject to their compliance with said guidelines. An amendment to the Code to that effect would be introduced on completion of said guidelines.

In the interim period, after 1 July 1986, off-shore support vessels carrying bulk chemicals having safety hazard should be constructed in accordance with the requirements of their flag Administration.
Competent Authorities of interested port States were urged to accept evidence of such compliance as equivalent to the standards to be developed by IMO (see MSC 52/28 item 7.4).

2.3.16 - Reg. 14 - Carriage and discharge of oil-like substances

This Regulation states the conditions for the carriage of oil-like substances.

Pursuant to the present Regulation, oil-like substances, the majority of which belongs to Cat. C and should therefore be subject to the provisions of the IBC Code or of the BCH Code, may continue to be carried, under certain conditions, by oil tankers.

The list of oil-like substances classified by IMO up to today and the relating carriage conditions are set forth in Table 4C of the present bulletin.

In compliance with this Regulation, IMO has developed the identification criteria of the substances which are set forth in Enclosure 3 of the present bulletin.

CHAPTER 3 - IBC CODE

3.1 - General

As previously stated (see section 2.2, paragraph 2.3.15 and Table 5 of the present bulletin), Reg. 13 of Annex II compulsorily requires the compliance with the IBC Code requirements for chemical tankers constructed on or after 1.07.1986 and carrying Cat. A, B or C noxious liquid substances in bulk (see also Table 4A).

Paragraph (10) of Reg. 1 of Annex II specifies that, for the purposes of same Annex, by IBC is meant the "International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk" adopted by MEPC by Resolution MEPC 19(22), as may be amended by IMO.

The IBC Code, adopted by the above mentioned Resolution, is composed of:

(i) the Code, containing the safety requirements, adopted by MSC Resolution 4(48) dated 17.06.1983;

(ii) amendments to said Code concerning the carriage of hydrogen peroxide as well as of propylene oxide and mixtures of ethylene oxide and propylene oxide, adopted by MSC on 26.11.1984;

(iii) new substances, evaluated in the meantime by IMO, included in Chapter 17;

(iv) amendments relating to pollution prevention, which are dealt with under the following section 3.2.

The Code, amended as above, enters into force on 6.04.1987 as part of the entire set of requirements related to Annex II (see also Table 3 of the present bulletin).

The Code, amended as above, covers therefore both safety and pollution prevention aspects. For this reason, as already stated in paragraph 2.3.14 of the present bulletin, for ships provided with an IBC Code Certificate of Fitness (ICOF), the issue of the International Pollution Prevention Certificate (IPPC) referred to under Reg. 11 of Annex II is not necessary.

It is further pointed out that the IBC referred to under the foregoing point (i), i.e. without the amendments relating to pollution prevention, already entered internationally into force on 1.07.1986 as integrant part of SOLAS 74(83), as required under Chapter VII of same SOLAS.

The retroactive application of the IBC Code to ships constructed between 1.07.1986 and 6.04.1987 concerns therefore only the amendments relating to pollution prevention, since the part relating to safety already entered into force on 1.07.1986.

3.2 - Amendments to IBC Code relating to pollution prevention

The main amendments introduced are:

- **Chapter 16:** it is specified that, where column "o" in the product table of Chapter 17 refers to paragraphs 16.2.6, 16.2.7, 16.2.8 and 16.2.9, the viscosity at 20°C and the melting point of the carried substance should be indicated on the shipping document.
  When this viscosity is greater than:
  - 25 mPa.s for Cat. B substances,
  - 60 mPa.s for Cat. C substances,
  - 25 mPa.s for Cat. C substances when the unloading within a Special Area is foreseen;

  also the temperature, at which these values (25 or 60 mPa.s) are not exceeded, is to be indicated. The reasons for these requirements are:

  (i) the viscosity and melting point characteristics of the substance which is actually carried are exactly known by the producing industry which exports the substances;

  (ii) knowing the temperature above which the substance may be treated as a "low viscosity and non-solidifying substance", the carriage and unloading may be made at such temperature conditions as to avoid the subsequent prewash of the tanks, where allowed, (see also section 5.2 of the present bulletin);

  (iii) the indicated data are used by the competent Authority for the control of the operations connected with the unloading, discharge and stripping pursuant to Reg. 8 of Annex II.

- **Chapter 16 A:** this is a new Chapter relating to the additional measures for the protection of marine environment and applies to ships carrying products noted as Category A, B or C noxious liquid substances in Chapter 17. It specifies that:

  (i) the condition of carriage for products listed in the ICOF should reflect the requirements of Reg. 5A of Annex II;

  (ii) Cat. B substances 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 and should only be carried in cargo tanks fitted with a cargo heating system; (the same condition is required under sections 3.2 and 8.2 of the Standards for ships constructed after or before 1.07.1986, respectively);

(iii) the ship is to be provided with a P&A Manual, drawn up according to the requirements of the Standards and approved by the Administration;

(iv) the ship is to be fitted with the arrangements and equipment indicated in the P&A Manual.

- **Chapter 17:** this Chapter was modified as follows:

(i) Cat. A, B and C substances previously listed in Chapter 18 have been transferred to this Chapter.
In fact, to these substances, according to the requirements of Reg. 13 of Annex II, the Code applies. The list of these substances is set forth in Enclosure 4 of the present bulletin;

(ii) in the table of substances two columns have been added: in the first one there is the indication of the category (A, B, C, D or III in the case where the substance is not polluting and is therefore listed in the Appendix III to Annex II); in the second one there is the indication whether the substance presents safety hazards (S) or pollution hazards (P) or both (P/S);

(iii) for some substances presenting a high pollution hazard, previously present in the table of substances of this Chapter, the ship type required in connection with ship's survival capability in case of collision or grounding has been rendered more stringent and additional requirements for carriage have been introduced. The list of these substances is set forth in Enclosure 5 of the present bulletin.

Attention is called to the impact that what stated under point (i) may have on existing oil tankers (which are no more authorized to carry these products) and what stated under (iii) may have on existing chemical tankers which might no more be suitable for substances for which the carriage requirements have been made more stringent.

CHAPTER 4 - BCH CODE

4.1 - General

As already stated (see section 2.2 and paragraph 2.3.15 of the present bulletin), Reg. 13 of Annex II compulsorily requires the compliance with the BCH Code requirements for chemical tankers constructed before 1.07.1986 and carrying Cat. A, B or C noxious liquid substances in bulk (see also Table 4B).

Paragraph (11) of Reg. 1 of Annex II specifies that, for the purposes of same Annex, by BCH Code is meant the "Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk" adopted by MEPC by Resolution MEPC 20(22), as may be amended by IMO.

The BCH Code, adopted by the above mentioned Resolution, is composed of:

(i) the Code, containing the safety requirements, adopted by Resolution A.212(VII) dated 12.10.1971;

(ii) the first 10 sets of amendments to said Code adopted by MSC in the period 1972 to 1983 inclusive;

(iii) amendments to said Code concerning the carriage of hydrogen peroxide as well as of propylene oxide and mixtures of ethylene oxide and propylene oxide, adopted by MSC on 26.11.1984;

(iv) new substances, evaluated in the meantime by IMO, included in Chapter VI;

(v) amendments relating to pollution prevention, which are dealt with under the following section 4.2.

The Code, amended as above, enters into force on 6.04.1987 as part of the entire set of requirements relating to the control of pollution from noxious liquid substances carried in bulk (see also Table 3 of the present bulletin).

The modalities for application of the BCH Code according to Reg. 13 of Annex II are set forth in detail in Table 5 of the present bulletin.

The Code, amended as above, covers therefore both safety and pollution prevention aspects. For this reason, as already said in paragraph 2.3.14 of the present bulletin, for ships provided with a BCH Code Certificate of Fitness (COF), the issue of the International Pollution Prevention Certificate (IPPC) referred to under Reg. 11 of

Annex II is not necessary.

It is further pointed out that the BCH Code, contrary to what required for the IBC Code, is not part of SOLAS. Therefore it becomes compulsory only due to the entry into force of MARPOL 73/78. The retroactive application of the BCH Code to ships constructed before 1.07.1986 therefore regards both the previous safety requirements and the new amendments relating to pollution prevention.

The BCH Code, however, without the amendments relating to pollution prevention, has already been adopted by some States, among which Italy, by a voluntary act on the basis of an IMO Recommendation.

In Italy the BCH Code has been introduced with the Decree of the President of the Republic No. 50 dated 4.02.84 and the relating Ministerial Decrees dated 9.03.84.

As some points of said decrees are not in line with the provisions of Annex II, the directions to be issued on this subject by the Ministry of Merchant Marine shall apply.

4.2 - Amendments to BCH Code relating to pollution prevention

The considerations already made for the IBC Code under section 3.2 of the present bulletin apply but instead of:

- Chapter 17 read Chapter VI; column "o" read column "m";
- paragraphs 16.2.6, 16.2.7, 16.2.8 and 16.2.9 of Chapter 16 read paragraphs 5.2.5, 5.2.6, 5.2.7 and 5.2.8 of Chapter V;
- Chapter 16A read Chapter VA;
- Chapter 18 read Chapter VII.

CHAPTER 5 - STANDARDS FOR THE PROCEDURES AND ARRANGEMENTS FOR THE DISCHARGE OF NOXIOUS LIQUID SUBSTANCES ("STANDARDS")

5.1 - General

The requirements under caption have been developed pursuant to the Regulations of Annex II which require that certain operations be based on Standards developed by IMO.

These operations are:

- the efficiency tests for the stripping system (Reg. 5A);
- the calculation of residue quantities on cargo tank walls after unloading (Reg. 5A);
- the identification of the limit quantities of residues that may be discharged into the sea according to Reg. 5 (Reg. 8);
- the procedure for cargo tank washing before the ship leaves the port of unloading (Reg. 5 and Reg. 8);
- the procedure for removal of residue by ventilation of cargo tanks (Reg. 5 and Reg. 8);
- the procedures and arrangements for discharge into the sea (Reg. 5 and Reg. 8).

5.2 - The Standards requirements

Attention is called to the following points:

.1 - paragraph 1.3 of Chapter 1 contains the following definitions of "solidifying substance" and "high viscosity substance"

- "**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.
- "**Non solidifying substance**" means a noxious liquid substance which is not a solidifying substance
- "**High viscosity substance**" means:
  - .1 in the case of Category 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 or greater than 60 mPa.s at the unloading temperature.

- **"Low viscosity substance"** means a noxious liquid substance which is not a high viscosity substance.

High viscosity and/or solidifying substances are indicated in the tables of the present bulletin by the symbols:

- Cat. B substances **VS**
- Cat. C substances outside Special Areas **VS ($\geq$ 60)**
- Cat. C substances within Special Areas **VS ($\geq$ 25)**

Low viscosity non-solidifying substances are indicated in the tables of the present bulletin by the symbols:

- Cat. B substances **IVnS**
- Cat. C substances outside Special Areas **IVnS ($\leq$ 60)**
- Cat. C substances within Special Areas **IVnS ($\leq$ 25)**

The above mentioned definitions are fundamental for the present requirements.
In fact, depending on viscosity and melting point characteristics of the substances during unloading, there are different requirements for cargo tank prewash (see Table 7A), for discharge into the sea (see Tables 8A and 8B) and for the availability of reception facilities (see paragraph 2.3.8 of the present bulletin).
Taking account of the importance of viscosity and melting point values, for substances which may present viscosity and solidification problems during unloading, it was decided to require the indication of these characteristics on the shipping document so as to exactly refer to the characteristics of actually carried substances (see also point (ii) of Chapter 16A contained in section 3.2 of the present bulletin).

.2 - Chapter 2 requires that all ships carrying noxious liquid substances in bulk be provided with a **Procedures and Arrangements Manual (P & A Manual)** and lists the information and operational instructions which are to be contained therein.
This Manual is to be drawn up according to the standard format indicated in Appendix D to the Standards (see also Chapter 6 of the present bulletin).

.3 - Chapter 3 and Chapter 8, for ships constructed after or before 1.07.1986, respectively, contain equipment and constructional

standards.
There are given, in particular, provisions regarding the location and size of sea discharge outlet (outlets).
As regards the outlet location, it is required that it be located within the cargo area, in the vicinity of the turn of the bilge and be so arranged as to avoid the re-intake of polluted water by the ship's sea water intakes.
The equation governing the minimum diameter of the outlet, depending on the maximum rate foreseen for the discharge and the distance from the forward perpendicular to the outlet ($D \geqslant Q/(5L)$), is based on the criterion to limit the outflow velocity of the effluent so as to facilitate the leading of polluted waters to the ship's wake (see also paragraph 2.3.5(iii) and Enclosure 7 of the present bulletin).
As particular condition for the carriage it is required that Cat. B substances having a melting point equal to or greater than 15°C should not be carried in cargo tanks any boundary of which is formed by the ship's shell and should only be carried in cargo tanks fitted with a cargo heating system. (In this connection reference is made to what stated for this matter in the new Chapters 16A and VA of the IBC Code and of the BCH Code).

.4 - Chapters 4-5-6-7 and 9-10-11-12, for ships constructed after or before 1.07.1986, respectively, contain operational standards relating to Cat. A, B, C and D substances.
As already stated under paragraph 2.3.6 of the present bulletin, Chapters 4, 5, 6, 7 apply also to tanks of ships constructed before 1.07.86 and characterized by values of residues due to the stripping system not greater than 0,3 m^3 for Cat. B substances and 0,9 m^3 for Cat. C substances.

.5 - The main differences between the requirements of the two sets of Chapters 3-4-5-6-7 and 8-9-10-11-12 are relating to Cat. B and C substances and concern the compulsoriness of prewash of cargo tanks, for which reference to Table 7A of the present bulletin is made, and the requirements relating to discharge outlets and to the maximum discharge rate of polluted waters, for which the following is pointed out:

(i) Number of outlets: both Chapters 3 and 8 (under paragraph 3.4 and 8.5.1, respectively) allow for the fitting of more than one outlet, but from paragraph 8.5.2 it results that, for existing ships, no more than two outlets are allowed which, if fitted, are to be located on opposite sides of the ship.

(ii) Maximum discharge rate: both Chapters 3 and 8 leave

to the interested parties the selection of the maximum discharge rate, depending on which the minimum diameter of the discharge outlet is to be determined. Only for Cat. B substances Chapter 10 gives criteria for the calculation of said rate (see paragraphs 10.5.3 and 10.6.2 of the Standards for miscible and immiscible mixtures, respectively).

(iii) Recording of the discharge: only for Cat. B substances, Chapter 10 requires the provision of means for:
- the recording of the date and of the start and stop time of the discharge;
- the measuring of the outflow rate if variable capacity pumps are used.

From what above it results that, in the case of variable capacity pumps, it is not necessary for the selected discharge rate to correspond to the maximum capacity of the pump used to this purpose.
This rate shall be indicated in the Manual, along with the relating operating parameters of the pump corresponding to this rate, the compliance with which is left to the responsibility of board personnel. Only for the discharge of waters containing residues of Cat. B substances, pursuant to Chapter 10, the discharge will be recorded and measured according to what stated under the foregoing subparagraph (iii).

.6 - The Appendices to the Standards contain:

- App. A: Assessment of residue quantities in cargo tanks, pumps and piping
- App. B: Prewash procedures
- App. C: Ventilation procedures
- App. D: Standard format for the Procedures and Arrangements Manual (P & A Manual)

CHAPTER 6 - PROCEDURES AND ARRANGEMENTS MANUAL (P & A MANUAL)

The Standards for Procedures and Arrangements, referred to by Annex II, require each ship, carrying noxious liquid substances in bulk, to have a **Procedures and Arrangements Manual (P & A Manual).**

The purpose of the Manual is to identify the arrangements and the equipment the ship is to be fitted with, and to establish, for the use of 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.

In addition, the Manual, together with the Certificate the ship is provided with (IBC Code Certificate of Fitness or BCH Code Certificate of Fitness or IPPC) and with the Cargo Record Book, will be used by Administrations for control purposes in order to ensure full compliance with the requirements of Annex II by this ship.

The Manual is to be drawn up according to what stated in Appendix D to the Standards and, for Italian ships, is to be approved by Registro Italiano Navale.

CHAPTER 7 - CERTIFICATIONS

In Tables 4A, 4B, 4C and 4E is indicated, among others, the certification which is to be issued to the ships, of different type, carrying noxious liquid substances in bulk. For convenience, the required certification is summarized in Table 9.

TABLES

MARPOL 73/78 CONVENTION	TABLE 1

The International Conference on Marine Pollution held at IMO in 1973 adopted, in addition to the text of the "International Convention for the Prevention of Pollution from Ships, 1973", five Annexes, each relating to different pollution sources, and two Protocols.

The five Annexes are:

- **Annex I** : Regulations for the Prevention of Pollution by Oil;
- **Annex II** : Regulations for the Control of Pollution by Noxious Liquid Substances Carried in Bulk;
- **Annex III**: Regulations for the Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Forms, or in Freight Containers, Portable Tanks or Road and Rail Tank Wagons;
- **Annex IV** : Regulations for the Prevention of Pollution by Sewage from Ships;
- **Annex V** : Regulations for the Prevention of Pollution by Garbage from Ships.

The first two Annexes are compulsory for States-Parties to the Convention.

Annex I entered internationally into force on 2.10.1983.

Annex II shall enter internationally into force on 6.04.1987.

Annexes III, IV and V are optional and shall enter internationally into force one year after the date on which not less than 15 States, the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant shipping, have become parties to them (Art. 15(2) of the Convention).

Protocol I: Provisions Concerning Reports on Incidents Involving Harmful Substances; contains the obligations and procedures relating to the reporting of incidents involving harmful substances, in accordance with Art. 8 of the Convention. This Protocol was amended by MEPC during its twenty-second session by Resolution MEPC 21(22).

Protocol II: Arbitration; contains the arbitration procedures for disputes between States-Parties to the Convention, according to Art. 10 of the Convention.

PROCEDURE FOR ENTRY INTO FORCE OF ANNEX II

TABLE 2

The Convention, in its initial version provided for the simultaneous entry into force of Annex I and Annex II.

Protocol '78 modified this situation by introducing Art. II "Implementation of Annex II of the Convention".

This article sanctioned a delayed entry into force of Annex II, in respect to the entry into force of the Protocol itself (and of Annex I), by three years or by a longer period, if so decided by a majority of 2/3 of IMO MEPC Members.

Annex II should thus have entered into force on 2.10.1986 i.e. three years after the entry into force of the Protocol and of Annex I.

Having subsequently recognized the necessity of technical amendments for its easier application, it was necessary to shift the date of entry into force by adopting the "tacit acceptance" procedure, in accordance to the provisions of Art. 16 of the Convention.
The stages through which Annex II entered into force are set forth hereinafter:

- MEPC 21 (April 1985)	Approval of amendments and their circulation to States-Parties to the Convention and to all States Members of IMO (Art. 16(a));
- MEPC 22 (December 1985)	Adoption of amendments on 5.12.1985 (Art. 16(d)) by Resolution MEPC 17(22)
- 6.10.1986	Acceptance of amendments according to the "tacit acceptance" procedure with the minimum period of 10 months from the date of adoption (Art. 16(f)(iii) of the Convention)
- 6.04.1987	Entry into force 6 months after the acceptance (Art. 16(g)(ii) of the Convention)

Italy ratified the Convention and acceded to the Protocol '78 by the following Acts:

- Act No. 662 dated 29 September 1980	Ratification and execution of the International Convention for the Prevention of Pollution from Ships and of the Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other than Oil, with Annexes, adopted in London on 2 November 1973 (published in the ordinary supplement to the Italian "Official Gazette" No. 292 dated 23 October 1980).
- Act No. 438 dated 4 June 1982	Accession to the Protocols relating to the International Conventions for the Prevention of Pollution from Ships and for the Safety of Life at Sea, respectively, with enclosures, adopted in London on 17 February 1978, and their execution (published in the ordinary supplement to the Italian "Official Gazette" No. 193 dated 15 July 1982).

OTHER IMO REQUIREMENTS RELATING TO THE CONTROL OF POLLUTION FROM NOXIOUS LIQUID SUBSTANCES CARRIED IN BULK All the following requirements enter into force on 6.04.1987	TABLE 3
1) Amendments of Annex II of MARPOL 73/78 Convention	Res. MEPC 16(22)
2) International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)	Res. MEPC 19(22)
3) Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code)	Res. MEPC 20(22)
4) Standards for the Procedures and Arrangements for the Discharge of Noxious Liquid Substances	Res. MEPC 18(22)
5) Guidelines on the Provision of Adequate Reception Facilities in Ports	
6) Guidelines for Surveys under Annex II of MARPOL 73/78	Res. MEPC 25(23)
7) Procedures for the Control of Ships and Discharges under Annex II of MARPOL 73/78	Res. MEPC 26(23)

REQUIREMENTS AND CERTIFICATIONS FOR CHEMICAL TANKERS CONSTRUCTED ON OR AFTER 1.07.1986				TABLE 4A
		CARRIAGE OF SUBSTANCES LISTED IN CHAPT. 17 OF IBC CODE (1) PERTAINING TO CATEGORY:		
		A	B	C
GENERAL REQUIREMENTS		IBC Code (Reg. 13 Annex II)		
PARTICULAR REQUIREMENTS FOR POLLUTION PREVENTION	Maximum values of residues in tank	Not applicable	$0.1\ m^3$ (6)(2) (Reg. 5A(1) - Annex II)	$0.3\ m^3$ (6)(2) (Reg. 5A(3) - Annex II)
	Particular requirements for cargo tanks	None	Substances with melting points $\geq 15°C$ should not be carried in a cargo tank any boundary of which is formed by ship's shell plating and cargo tanks should be fitted with a cargo heating system (sect.3.2-Standards)	None
	Discharge below waterline (3)	- Outlet diameter $D \geq Q/(5\ L)$ (sect. 3.5 - Standards) - Location within cargo area, in the vicinity of the turn of the bilge and so arranged as to avoid the re-intake of residues by the ship's sea water intakes (sect. 3.4 - Standards)		
	Cargo tank prewash system (4)	- For compulsoriness of tank prewash, see Table 7A - For exemptions from said compulsoriness, see Table 7B		
	Cargo tank ventilation system (5)	- Application of ventilation for residue removal is optional and does not exempt from compliance with the above mentioned maximum values of residues - Substances which may be removed by ventilation are those with vapour pressure $> 5.10^3$ Pa at 20°C (sect. 4.3, 5.6 and 6.6 - Standards)		
	Certificate	- IBC Code Certificate of Fitness (ICOF), issued by R.I.NA. for Italian ships (Reg. 12A - Annex II)		
CERTIFICATIONS	P&A Manual	- Procedures and Arrangements Manual drawn up according to the format indicated in Appendix D of Standards, approved by R.I.NA. for Italian ships (sect. 2.1 - Standards)		
	Cargo Record Book	- Cargo Record Book, drawn up according to the model given in Appendix IV of Annex II (Reg. 9 - Annex II)		

See notes on the rear

NOTES TO TABLE 4A

(1) In addition to Cat. A, B and C substances listed in Chapter 17 of the IBC Code, chemical tankers may carry also:

(i) other substances listed in Chapter 17 of the IBC Code, provided that the ship meets the requirements for carrying these substances;

(ii) other substances listed in Chapter 18 of the IBC Code, either pertaining to Cat. D or not.

(2) The exemptions from compliance with maximum values of residues in tank are listed in Table 6.

(3) The provisions relating to discharge of washings and ballast water containing residues of noxious liquid substances are indicated in Table 8A for cargo tanks and in Table 8B for slop tanks.

(4) The cargo tank prewash procedures are contained in Appendix B to the Standards.

(5) The ventilation procedures for residue removal from tanks are contained in Appendix C to the Standards.

(6) Residue quantity due to liquid that cannot be stripped in vicinity of the suction point of the stripping system and to the liquid remaining in the relating piping.
This quantity, termed "stripping quantity", is to be measured by the test procedure specified under section 3 of Appendix A to the Standards.

REQUIREMENTS AND CERTIFICATIONS FOR CHEMICAL TANKERS CONSTRUCTED BEFORE 1.07.1986			TABLE 4B
		CARRIAGE OF SUBSTANCES LISTED IN CHAPT. VI OF BCH CODE (1) PERTAINING TO CATEGORY:	
		A	B	C
GENERAL REQUIREMENTS		- BCH Code according to what indicated under Table 5 (Reg. 13 Annex II) - **For ships with GT≤1600 on domestic voyages said requirements are to be complied with by 1.07.1994** (Reg. 13(3)(b)(ii) Annex II)		
PARTICULAR REQUIREMENTS FOR POLLUTION PREVENTION	Maximum values of residues in tank	Not applicable	- 1 m^3 (or 1/(3000 V) if greater) **acceptable until 2.10.94** (6) (2), or - 0.3 m^3 (7) (2) (Reg.5A(2)-Annex II)	- 3 m^3 (or 1/(1000 V) if greater) **acceptable until 2.10.94** (6) (2), or - 0.9 m^3 (7) (2) (Reg.5A(4)-Annex II)
	Particular requirements for cargo tanks	None	Substances with melting points ≥15°C should not be carried in a cargo tank any boundary of which is formed by ship's shell plating and cargo tanks should be fitted with a cargo heating system(sect.8.2-Standards)	None
	Discharge below waterline (3)	- Outlet diameter D≥Q/(5 L) (sect. 8.6 - Standards) - Location within cargo area, in the vicinity of the turn of the bilge and so arranged as to avoid the re-intake of residues by the ship's sea water intakes (sect. 8.5 - Standards)		**to be complied with by 31.12.1987**
	Monitoring of discharge from slop tanks (8)	None	If residues ≥0.3 m^3 (6)(ii) recording of time of discharge and of discharge rate of variable capacity pumps (para. 10.5.5-Standards)	None
	Cargo tank prewash system (4)	- For compulsoriness of tank prewash, see Table 7A - For exemptions from said compulsoriness, see Table 7B		
CERTIFICATIONS	Cargo tank ventilation system (5)	- Application of ventilation for residue removal is optional and does not exempt from compliance with the above mentioned maximum values of residues - Substances which may be removed by ventilation are those with vapour pressure ≥5.10^3 Pa at 20°C (sect. 9.3, 10.7 and 11.6 - Standards)		
	Certificate	- BCH Code Certificate of Fitness (COF), issued by R.I.NA. for Italian ships (Reg. 12A - Annex II)		
	P&A Manual	- Procedures and Arrangements Manual drawn up according to the format indicated in Appendix D to the Standards, approved by R.I.NA. for Italian ships (sect. 2.1 - Standards)		
	Cargo Record Book	- Cargo Record Book, drawn up according to the model given in Appendix IV of Annex II (Reg. 9 - Annex II)		

See notes on the rear

NOTES TO TABLE 4B

(1) In addition to Cat. A, B and C substances listed in Chapter VI of the BCH Code, chemical tankers may carry also:

(i) other substances listed in Chapter VI of the BCH Code, provided that the ship meets the requirements for carrying these substances;

(ii) other substances listed in Chapter VII of the BCH Code, either pertaining to Cat. D or not.

(2) The exemptions from compliance with maximum values of residues in tank are listed in Table 6.

(3) The provisions relating to discharge of washings and ballast water containing residues of noxious liquid substances are indicated in Table 8A for cargo tanks and in Table 8B for slop tanks.

(4) The cargo tank prewash procedures are contained in Appendix B to the Standards.

(5) The ventilation procedures for residue removal from tanks are contained in Appendix C to the Standards.

(6) This quantity (1 m^3 or 1/(3000 V) for Cat. B, 3 m^3 or 1/(1000 V) for Cat. C, where V is the tank capacity in m^3), refers to the sum of the following quantities:

(i) residue quantity on tank surfaces calculated by the formula under section 4 of Appendix A to the Standards;

(ii) residue quantity due to the liquid that cannot be stripped in vicinity of the suction point of the stripping system and to the liquid remaining in the relating piping.
This quantity, termed "stripping quantity", is to be measured by the test procedure specified under section 3 of Appendix A to the Standards.

(7) Stripping quantity: see preceding point (6)(ii)

(8) Monitoring of discharge (see paragraph 10.5.5 of Standards) is required only for the discharge of effluents containing residues of Cat. B substances for ships characterized by a "stripping quantity" (see preceding note (6)(ii)) greater than 0,3 m^3. It applies therefore only to ships constructed before 1.07.1986.

REQUIREMENTS AND CERTIFICATIONS FOR OIL TANKERS	TABLE 4C

Oil tankers constructed before or after 1.07.1986 may carry the following noxious liquid substances in bulk:

1) Cat. D substances listed in Chapter 18 of the IBC Code or Chapter VII of the BCH CODE

The ship is to be provided with:

(a) International Pollution Prevention Certificate (IPPC), issued by R.I.NA. for Italian ships;

(b) Procedures and Arrangements Manual, approved by R.I.NA. for Italian ships;

(c) Cargo Record Book, drawn up according to the model given in Appendix IV of Annex II.

Additional requirements for the carriage may be established by the Administrations, taking into account the characteristics of the substances.

2) Oil-like Cat. C and D substances which are listed in Chapter 17 or 18 of the IBC Code or in Chapters VI or VII of the BCH Code, respectively

The identification criteria of these substances, defined by IMO, are set forth in Enclosure 3. The substances presently classified by IMO as belonging to this category are:

Cat. C	Cat. D
Cyclohexane	Alkyl (C9-C17) benzene straight or branched
p-Cymene	Butene oligomer
Diethyl benzene	Diisopropyl naphthalene
Dipentene	Dodecane
Dodecyl benzene	Ethylcyclohexane
Ethyl benzene	Isopentane
Heptene (mixed isomers)	Nonane
1-Hexene	Octane
2-Methyl-1-pentene	n-Paraffins (C10-C20)
n-Pentane	
Pentenes, all isomers	
Phenylxylylethane	
Propylene dimer	
Tetrahydro naphthalene	
Toluene	
Xylene	

The carriage may be effected under Annex I of MARPOL 73/78 at the hereinafter stated conditions, specified under Reg. 14 of Annex II and its IMO interpretations:

(a) the ship complies with the provisions of Annex I of the Convention as applicable to product carriers as defined in that Annex;

REQUIREMENTS AND CERTIFICATIONS FOR OIL TANKERS — **TABLE 4C (cont.)**

(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 Reg. 14 of Annex II 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 the:

(i) International Bulk Chemical Code in the case of a ship constructed on or after 1.07.1986;

(ii) Bulk Chemical Code, as applicable under Regulation 13 of Annex II, in the case of a ship constructed before 1.07.1986; and

(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 also the note in Enclosure 3).

Note: A new ship of 150 metres or greater in length under Annex I should be considered to comply with above point (c) if compliance with Regulation 25 of Annex I has been demonstrated.

REQUIREMENTS AND CERTIFICATIONS FOR GAS CARRIERS	TABLE 4D

A) In the lists of substances allowed to be carried by gas carriers (Chapter 19 of the International Gas Code or Chapter XIX of the Gas Code) are included some substances to which Annex II applies. These are at present:

- Acetaldehyde (Cat. C)
- Ethylene oxide-propylene oxide mixtures (Cat. D)
- Isoprene (Cat. C)
- Isopropylamine (Cat. C)
- Monoethylamine (Cat. C)
- Propylene oxide (Cat. D)
- Vinyl ethyl ether (Cat. C).
- Vinylidene chloride (Cat. B)

For ships carrying said substances, compliance with BCH Code or IBC Code should be required. Taking, however, into account the constructional features of these ships, IMO established that the above mentioned substances may be carried by gas carriers satisfying the hereinafter specified conditions, judged to be equivalent to those required by Annex II.
The ship is to be provided with:

(1) segregated ballast arrangements;

(2) deep well pumps and arrangements which minimize the amount of cargo residue remaining after unloading, 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) (1 m^3 or 1/(3000V) if greater, for Cat. B, 3 m^3 or 1/(1000V) if greater for Cat. C, where V is the tank capacity in m^3) without regard to the limiting date, are met and the cargo residue can be vented to the atmosphere through the approved venting arrangements;

3) Certificate of Fitness under the Gas Carrier Code or International Gas Carrier Code (for ships constructed before or after 1.07.1986 respectively), issued by R.I.NA. for Italian ships;

4) International Pollution Prevention Certificate (IPPC), issued by R.I.NA. for Italian ships, in which it is certified that the ship carries only those Annex II noxious liquid substances which are also listed in the appropriate Gas Code;

5) Procedures and Arrangements Manual, approved by R.I.NA. for Italian ships. This Manual is to ensure that, during operations, no mixing of cargo residue with water takes place, and that, after venting to the atmosphere, no cargo residues remain in the tank.

6) Cargo Record Book.

B) If the ship complies with the conditions sub A), she may carry also Cat. D substances listed in Chapter 18 of the IBC Code or in Chapter VII of the BCH Code. Additional requirements for the carriage shall be established by the Administration, taking account of the characteristics of the substances.

C) If the ship carries, of Annex II, only Cat. D substances which are listed in Chapter 1B of the IBC Code or in Chapter VII of the BCH Code, it is sufficient for the ship to be provided with the following certification. Further requirements for carriage, taking account of the characteristics of the substances, shall be established by the Administration.

1) International Pollution Prevention Certificate (IPPC), issued by R.I.NA for Italian ships;

2) Procedures and Arrangements Manual, approved by R.I.NA. for Italian ships;

3) Cargo Record Book.

REQUIREMENTS AND CERTIFICATIONS FOR DRY CARGO SHIPS	TABLE 4E

Dry cargo ships, fitted with tanks, may carry, in bulk, only Cat. D noxious liquid substances which present only pollution hazard (i.e. which do not present safety hazards).

In this case the ship is to be provided with:

1) International Pollution Prevention Certificate (IPPC), issued by R.I.NA. for Italian ships;

2) Procedures and Arrangements Manual, approved by R.I.NA for Italian ships;

3) Cargo Record Book.

APPLICATION OF IBC CODE AND BCH CODE REQUIREMENTS TO SHIPS CARRYING CAT. A, B OR C NOXIOUS LIQUID SUBSTANCES IN BULK
(REG. 13 OF ANNEX II)

TABLE 5

Date of construction	Other conditions		Applicable Code
On or after 1.07.1986	-		IBC Code
Before 1.07.1986	International voyages	Contract of construction: on or after 2.11.1973	BCH Code
		Contract of construction: before 2.11.1973	BCH Code with relaxations as per para. 1.7.3 (see note)
	Domestic voyages	Ship constructed on or after 1.07.1983	BCH Code
		Ship constructed before 1.07.1983	BCH Code with relaxations as per para. 1.7.3 (*)(see note)

(*) For ships with GT<1600 these requirements are to be complied with by 1.07.1994

Note: Para 1.7.3 of the BCH Code provides for the following relaxations:

(a) tanks for cargoes required to be carried in type I ships should comply with 2.2.4 (a)(iii)(cargo tank location); however, small departures from the distances specified in 2.2.2(a)(ii) and 2.2.2(b)(iii)(transverse extent of collision damage and vertical extent of stranding damage) may be accepted by the Administration;

(b) tanks for cargoes required to be carried in type II ships should be located outside the extent of minor side damage specified in 2.2.2(c), subject to such minor relaxation as may be acceptable by the Administration;

(c) compliance with subparagraphs (b)(ii) (ship survival capability) and (c) (requirements for type III ships) of paragraph 2.2.4 is not required;

(d) compliance with the intent of subparagraph (b)(iii) (cargo tank location) of paragraph 2.2.4 would be expected, but relaxations from the required side and bottom distances may be allowed provided that cargo tanks on existing type II ships are located at least 760 mm above the bottom shell;

(e) when an existing chemical tanker is converted from a type III ship to a type II ship the full requirement of 2.2.4 (ship type requirements) should be met except that the ability to survive damage in the machinery space should be determined by the Administration;

(f) full compliance with para 2.7.1 (accomodation space location) would not be expected

EXEMPTIONS FROM THE COMPLIANCE WITH THE MAXIMUM VALUES OF RESIDUES IN TANKS ESTABLISHED BY REG. 5A (Reg. 5A(6) AND 5A(7))	TABLE 6

1) **Ships constructed before 1.07.1986 engaged in restricted voyages, as determined by the Administration, on domestic and international voyages** (Reg. 5A(6))

Conditions:

(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 IMO 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 Annex II;

(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 on voyages to ports or terminals under the jurisdiction of other States-Parties to the present Convention, the Administration communicates to IMO, for circulation to the Parties to the Convention, particulars of the exemptions, for their information and appropriate action, if any;

(v) the Certificate required under Annex II is endorsed to the effect that the ship is solely engaged in such restricted voyages.

2) **Ships 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 drydocking** (Reg. 5A(7))

Conditions:

(i) the design, construction and equipment of the ship are approved by the Administration, having regard to the service for which the ship is intended;

(ii) 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;

(iii) the Certificate required under Annex II states:
  (i) that each cargo tank is certified for the carriage of only one substance whose name is indicated in the Certificate;
  (ii) the particulars of the exemptions;

(iv) the ship carries a suitable operational manual approved by the Administration;

(v) in the case of ships engaged on voyages to ports or terminals under the jurisdiction of other States-Parties to the present Convention, the Administration communicates to IMO, for circulation to the Parties to the Convention, particulars of the exemption, for their information and appropriate action, if any.

COMPULSORINESS OF CARGO TANK PREWASH:

- **Cargo tanks which have contained Cat. A substances are to be washed in accordance to Reg. 8(3) or prewashed in accordance to Reg. 8(4) before the ship leaves the port.**
- **Cargo tanks, containing substances under column 1, with characteristics under column 2, unloaded in areas under column 3, are to be prewashed before the ship leaves the port. In column 4 some information, relating to substances for which prewash is not required, is set forth.**

TABLE 7A

Ship	1 Substances	2 Viscosity and solidifiability characteristics	3 Outside or Within Special Areas	4 Notes relating to substances for which prewash is not required
Ships constructed after 1.07.1986 (*)	B	VS VS 1VnS	OSA WSA WSA	-1VnS may be discharged into the sea OSA -1VnS WSA, alternatively to prewash in port, may be kept on board for discharge into the sea OSA
	C	VS (≥60) VS (≥25) 1VnS (≤60)	OSA WSA WSA	-1VnS (≤ 60) may be discharged into the sea OSA -1VnS (≤25) may be discharged into the sea also WSA -1VnS (≤60) WSA, alternatively to prewash in port, may be kept on board for discharge into the sea OSA
Ships constructed before 1.07.1986 (*)	B	VS or 1VnS VS or 1VnS	OSA WSA	-1VnS, OSA or WSA, alternatively to prewash in port, may be washed at sea, transferred to the slop tanks and discharged into the sea at reduced rate (sections 10.5 and 10.6 of the Stand.)
	C	VS (≥60) VS (≥25) 1VnS (≤60) 1VnS (≤25)	OSA WSA WSA WSA	-1VnS (≤ 60) may be discharged into the sea OSA -1VnS (≤25) may be discharged into the sea also WSA -1VnS (≤60) WSA, alternatively to prewash in port, may be kept on board for discharge into the sea OSA

(*) To ships constructed before 1.07.1986 the same conditions indicated for ships constructed after that date may apply provided that the "stripping quantity" does not exceed 0,3 m^3 for Cat. B substances or 0,9 m^3 for Cat. C substances

OSA: Outside Special Areas
WSA: Within Special Areas

If: TU: temperature of the substance at the time of unloading
MP: Melting point of the substance
Solidifying: a substance with TU≤(MP + 5) °C for substances with MP≤15 °C or with TU≤(MP + 10) °C for substances with MP≥15°C

one has: - Cat. B VS viscous (viscosity ≥25mPa.s at TU) and/or solidifying substance
1VnS non viscous and non solidifying substance

- Cat. C VS (≥60) viscous (viscosity≥60 mPa.s at TU) and/or solidifying substance (OSA)
VS (≥25) viscous (viscosity≥25 mPa.s at TU) and/or solidifying substance
1VnS (≤60) non viscous (viscosity≤60 mPa.s at TU) and non solidifying substance (WSA)
1VnS (≤25) non viscous (viscosity≤25 mPa.s at TU) and non solidifying substance

For the above definitions see also section 5.2 of the present bulletin

EXEMPTIONS FROM COMPULSORINESS OF CARGO TANK PREWASH	TABLE 7B

After unloading of Cat. B or C noxious liquid substances the ship may be exempted from the carrying out of a cargo tank prewash (see Table 7A) in the following cases:

1) the ship is certified in compliance with Reg. 5A(7): ships 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 drydocking, according to what indicated under point 2 of Table 6;

2) an exemption may be granted, at the request of the ship's master, by the Government of the State-Party receiving the cargo, where it is satisfied that:

   (i) the unloaded tank is to be reloaded with the same substance or another substance compatible with the previous one and the tank will not be washed or ballasted prior to loading; or

   (ii) the unloaded tank is neither washed nor ballasted at sea and the tank is prewashed in accordance to a procedure approved by the Administration and based on standards developed by IMO and the effluent from the tank washing operation is 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 is adequate to 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 IMO.

What above in compliance with Regulations 8(2)(b) for Cat. A substances, 8(5)(b) for Cat. B and C substances outside Special Areas, 8(6)(c) for Cat. B substances within Special Areas and 8(7)(c) for Cat. C substances within Special Areas.

In addition, Reg. 8(1)(c) establishes that the exemptions under the present point 2) may be granted by a State-Party to the Convention to ships engaged only in voyages to ports or terminals under the jurisdiction of other States-Parties.

DISCHARGE, FROM CARGO TANKS, OF WASHINGS OR BALLAST WATER CONTAINING RESIDUES OF NOXIOUS LIQUID SUBSTANCES

TABLE 8A

Washings or ballast water introduced into cargo tanks which:

- (i) have contained substances, under column 1, unloaded in ports under column 2, and
- (ii) have been, or not, subsequently prewashed, in port or at sea, as per column 3 or 4, with discharge of washings to a reception facility, as per column 5, or retention of the residues on board, as per column 6

may be discharged into the sea in the area under column 7 provided that the discharge is made:

a) below the waterline with rate Q≤5DL (para 3.5.1 and 8.6.1 of the Standards);

b) with ship's speed of at least 7 knots for self-propelled ships; 4 knots for non self-propelled ships;

c) at a distance from nearest land not less than 12 miles;

d) in water that is not less than 25 metres deep.

Any water subsequently introduced into tank may be freely discharged into the sea.

Ship	1		2	3	4	5	6	7
	Substance		Port of unloading of the ship (a)	Prewash (e)		Discharge of waters to reception facilities	Retention of the residues on board	Area of discharge of waters (a)
	Cat. (b)	Characteristics (a)		in port	at sea			
Ships constructed after 1.07.1986 (*)	A		OSA or WSA	X		X		OSA or WSA
	B	VS	OSA	X		X (d)		OSA or WSA
		1VnS	OSA					OSA
		1VnS	WSA				X	OSA
		VS or 1VnS	WSA	X		X (d)		WSA
	C	VS (≥60)	OSA	X		X (d)		OSA
		1VnS (<60)	OSA					OSA
		1VnS (<60)	WSA				X	OSA
		VS (≥25)	WSA	X		X (d)		WSA
		1VnS (<25)	WSA					WSA
Ships constructed before 1.07.1986 (*)	A		OSA or WSA	X		X		OSA or WSA
	B	VS or 1VnS	OSA	X		X (d)		OSA or WSA
		1VnS	OSA or WSA		X		X (c)	OSA
		VS or 1VnS	WSA	X		X (d)		WSA
	C	VS (≥60)	OSA	X		X (d)		OSA
		1VnS (<60)	OSA					OSA
		1VnS (<60)	WSA				X	OSA
		VS (≥25) or 1VnS (<25)	WSA	X		X (d)		WSA

(*) To ships constructed before 1.07.1986 the same conditions indicated for ships constructed after that date may be applied provided that the "stripping quantity" does not exceed 0,3 m³ for Cat. B substances or 0,9 m³ for Cat. C substances

See other notes on the rear

NOTES TO TABLE 8A

(a) The meaning of the symbols in these columns is the following (see also section 5.2 of the present bulletin)

OSA: Outside Special Areas

WSA: Within Special Areas

If: TU: temperature of the substance at the time of unloading;
MP: melting point of the substance
Solidifying: a substance with TU $\leq$ (MP + 5) °C for substances with MP $\leq$ 15°C or with TU $\leq$ (MP + 10) °C for substances with MP $\geq$ 15°C

one has:

- Cat. B VS — viscous (viscosity $\geq$ 25 mPa.s at TU) and/or solidifying substance
  lVnS — non viscous and non solidifying substance
- Cat. C VS ($\geq$ 60) — viscous (viscosity $\geq$ 60 mPa.s at TU) and/or solidifying substance
  VS ($\geq$ 25) — viscous (viscosity $\geq$ 25 mPa.s at TU) and/or solidifying substance
  lVnS ($\leq$ 60) — non viscous (viscosity $\leq$ 60 mPa.s at TU) and non solidifying substance
  lVnS ($\leq$ 25) — non viscous (viscosity $\leq$ 25 mPa.s at TU) and non solidifying substance.

(b) For Cat. D substances there is required that the concentration of the substance in sea water does not exceed one part of substance for each ten water parts and the compliance with distance from nearest land (12 miles) and with water depth (25 m).

(c) Retention on board with transfer to slop tanks. For discharge from slop tanks see Table 8B.

(d) Where, after prewash in port (in accordance to Appendix B to the Standards) and discharge of the effluent resulting therefrom to a reception facility, the tank has been subsequently washed with at least one cycle of cleaning machine, whilst for the discharge into the sea of effluent from such additional washing all specified conditions (below waterline, ship's speed and distance from nearest land, water depth) apply, any ballast water subsequently introduced into the tank 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 not less than 25 metres deep (see para. 5.7.2, 6.7.2, 10.8.2 and 11.7.2 of the Standards).

(e) If provided for by the P&A Manual, the residues of substances having a vapour pressure exceeding 5.10^3 Pa at 20°C may be removed by ventilation (in accordance to Appendix C to the Standards).
Any water subsequently introduced into the tanks may be considered as clean and may be freely discharged into the sea.

DISCHARGE FROM SLOP TANKS OF WATERS CONTAINING RESIDUES OF NOXIOUS LIQUID SUBSTANCES	TABLE 8B

The hereinafter stated conditions apply:

1) slops containing residues of Cat. A substances should always be discharged to reception facilities;

2) slops containing only residues of Cat. D substances may be discharged into the sea under the same conditions indicated under note (b) to Table 8A for cargo tanks;

3) slops containing residues of Cat. B and/or Cat. C substances (with or without residues of Cat. D substances) should be discharged to reception facilities, except for the cases hereinafter indicated:

(i) ships constructed after 1.07.1986 (*)

- slops containing residues of Cat. B 1VnS substances and/or Cat. C 1VnS (≤6D) substances (with or without residues of Cat. D substances) may be discharged outside Special Areas;
- slops containing only residues of Cat. C 1VnS (≤25) substances (with or without residues of Cat. D substances) may be discharged within Special Areas;

(ii) ships constructed before 1.07.1986(*)

- slops containing residues of Cat. B 1VnS substances and/or residues of Cat. C 1VnS (≤25) substances may be discharged outside Special Areas.

The above mentioned discharges are to be effected in compliance with the conditions specified in Table 8A relating to outlet location, ship's speed, distance from nearest land and water depth.
In addition the discharges under (ii) are to be effected at reduced rates according to the provisions of sections 1D.5 and 1D.6 of the Standards and the discharge is to be recorded according to the provisions of para. 1D.5.5 of same Standards.

(*) To ships constructed before 1.07.1986 the same conditions indicated for ships constructed after that date may be applied provided that the "stripping quantity" does not exceed 0,3 m^3 for Cat. B substances and 0,9 m^3 for Cat. C substances.

CERTIFICATIONS REQUIRED FOR THE DIFFERENT SHIP TYPES — **TABLE 9**

Chemical Tankers	Constructed on or after 1.07.1986 (see also Table 4A)	ICOF (1)	P&A Manual (approved by R.I.NA. for Italian ships)	Cargo Record Book
	Constructed before 1.07.1986 (see also Table 4B)	COF (1)		
Oil Tankers	Carriage of oil-like substances (see also Table 4C)	IOPP (2)	-	Oil Record Book provided for by Annex I
	Carriage of Cat. D substances (see also Table 4C)	IPPC (3)	P & A Manual (approved by R.I.NA. for Italian ships)	Cargo Record Book
Gas Carriers	Carriage of Annex II substances listed also in the Gas Codes (see also Table 4D)	COF (IGC or GC) + IPPC (4)		
	Carriage of Cat. D substances (see also Table 4D)	IPPC (3)		
Cargo Ships	Carriage of Cat. D substances presenting only pollution hazards (see also Table 4E)	IPPC (4)		

Certificates (issued by R.I.NA. for Italian ships)

ICOF	International Bulk Chemical Code Certificate of Fitness
COF	Bulk Chemical Code Certificate of Fitness
COF (IGC or GC)	International Gas Carrier Code or Gas Carrier Code Certificate of Fitness
IPPC	International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk.

(1) The list of products the ship may carry is to include Cat. D noxious liquid substances. They are to be identified as "Chapter 18-Category D" or "Chapter VII-Category D", for IBC Code or for BCH Code, respectively.

(2) On the certificate a notation is to be made to the effect that the ship may carry oil-like substances according to Reg. 14 of Annex II. The notation is to include the list of oil-like substances the ship is allowed to carry.

(3) Cat. D substances allowed to be carried are to be listed in the IPPC with the relating carriage conditions (tank No., etc.).

(4) Annex II substances allowed to be carried are to be listed in the IPPC with the relating carriage conditions (tank No., etc.)

ENCLOSURES

Enclosure 1 - IMO Interpretation of Reg. 3(4) of Annex II "Categorization of Substances" and "Guidelines for the Provisional Assessment of Liquid Substances Offered to Be Carried in Bulk"

2 - Provisional Pollution Category and Minimum Carriage Requirements for New Substances to be Introduced into Chapters 17 and 18 of the IBC Code and Chapters VI and VII of the BCH Code.

3 - Oil-like substances - Identification criteria

4 - List of substances previously belonging to Chapter 18 of the IBC Code (or Chapter VII of the BCH Code) transferred to Chapter 17 of the IBC Code (or Chapter VI of the BCH Code) due to their pollution hazard.

5 - List of substances already belonging to Chapter 17 of the IBC Code (or to Chapter VI of the BCH Code) for the carriage of which more stringent requirements in connection with ship type or additional arrangements have been introduced

6 - Factors influencing residues in tank

7 - Considerations on discharge outlets and relating piping

IMO INTERPRETATION OF REG. 3(4) OF ANNEX II "CATEGORIZATION OF SUBSTANCES" AND "GUIDELINES FOR THE PROVISIONAL ASSESSMENT OF LIQUID SUBSTANCES OFFERED TO BE CARRIED IN BULK"

UNIFIED INTERPRETATIONS OF THE PROVISIONS OF ANNEX II OF MARPOL 73/78

2A CATEGORIZATION OF SUBSTANCES

Regulation 3(4) 2A.1 When a substance which is not included in appendices 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

---

* 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 MSC at its forty-second session (Annex 3 to the 1985 edition of the BCH Code, which are also included in 1986 editions of the BCH and IBC Codes.)

** The enquiry should be addressed to:

The Director
Marine Environment Division
The International Maritime Organization
4 Albert Embankment
LONDON SE1 7SR

Tel. No: (01) 735 7611
Tlx. No: 23588
Telefax No: London 587 3210

and include enquirer's mailing address, telex and telefax numbers, the latter, if available, would facilitate a quick reply.

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 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 categories A, B, C or D, amendment sheets to the ship's Certificate of Fitness and to the Ship's Procedures and Arrangements (P and A) Manual must 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 must be incorporated in formal amendment sheets to the ship's certificate of Fitness and P and A Manual at the ship's first required survey.

ANNEX

GUIDELINES FOR THE PROVISIONAL ASSESSMENT OF LIQUID SUBSTANCES OFFERED TO BE CARRIED IN BULK

In provisionally assessing a liquid substance offered to be carried in bulk which has neither been included in appendix II or III of MARPOL 73/78 nor provisionally assessed by the Organization, the following information provides guidance in so doing.

1 Relevant Guidelines, interpretations thereto and other information are identified below or set out in the attached appendices, as follows:

.1 abbreviated legend to the GESAMP Hazard Profiles (BCH/Circ.16 and its revisions);

.2 guidelines for the Categorization of Noxious Liquid Substances (MARPOL 73/78, Annex II, appendix 1);

.3 interpretation of the Guidelines for the Categorization of Noxious Liquid Substances (appendix 1); and

.4 criteria for Establishing Ship Type Requirements from the Marine Pollution Point of View (appendix 2).

2 Adequate marine toxicity data supplied

2.1 A provisional pollution hazard profile should be derived, using the criteria developed by GESAMP (see abbreviated legend referred to in 1.1 above). From this provisional profile the pollution category can be derived in accordance with MARPOL 73/78 Annex II, appendix 1 and its interpretations (see 1.2 and 1.3 above).

2.2 The ship type, in so far as pollution hazards are concerned, should be derived from the agreed rationale (see 1.4 above).

3 Insufficient marine toxicity data supplied

3.1 In the case of a single substance, the competent authority should make an assessment by comparison with substances which are chemically similar and for which a GESAMP profile exists.* In many cases such a comparison can easily be made and will enable a provisional pollution profile to be derived. There may, however, be cases where there is no substance of sufficient chemical similarity which can be used for comparison. In others there may be a choice of ratings from several similar substances. Where there is no substance with sufficient chemical similarity to easily make comparison or choice of rating, the most severe proposed rating of those being considered should be used in deriving the provisional pollution profile.

3.2 Having derived a provisional pollution profile, the pollution category and ship type should be determined as described in paragraph 2 above.

4 Calculation of pollution categories of mixtures

4.1 For each component multiply its percentage concentration in the mixture by the factor (see table 1) appropriate to its polluting properties.

Add the multiples so obtained to form the sum, S.

Enter table 2 with the value of S and read off the calculated pollution category.

---

* The most up-to-date compilation is found in the "Composite List of Hazard Profiles of Substances Carried by Ship, 1985" under cover of BCH/Circ.16 of 24 January 1986. As the work of hazard evaluation progresses, the Composite List is revised and issued, normally once a year, under cover of a BCH circular.

Table 1

Assigned pollution category	Factor
A	1000
B	100
C	10
D	1
Appendix III	0
Mineral oil used in lube oil additives	10

Table 2*

Sum of multiples (S)	Calculated pollution Category of mixture
10000	A
1000 - 10000	B
100 - 1000	C
10 - 100	D
10	Substance of appendix III to Annex II

* Mixtures containing different pollution categories

If a mixture contains 10% or more of a substance for which the highest pollution category in that mixture is assigned, the mixture should be assigned to that category. If less than 10%, the next lower category may be assigned. However, this does not apply to a mixture containing 1% or more of a category A substance which is known to be bioaccumulated to a significant extent and to produce a hazard to aquatic life or human health as expressed by an entry of "+" in column A of the hazard profiles developed by GESAMP or substances highly toxic to aquatic life as designated by the Organization.

5 Calculation of ship type for Annex II mixtures

For each component multiply its percentage concentration in the mixture by the factor assigned to its ship type in table 3.

Add the multiplies so obtained to form the sum, S.

Enter table 4 with the value of S and read off the calculated ship type.

Table 3

Component Ship type	Factor
Type 1	100
Type 2	10
Type 3	1
Other	0

Table 4*

Sum of multiples (S)	Calculated ship Type (pollution) for mixture
1000	1
100 - 1000	2
10 - 100	3
10	-

* If the mixture contains 10% or more of the substances for which the highest ship type is assigned, the ship type so assigned should prevail and if it is less than 10%, the next lower ship type may be assigned. If the pollution category derived by the calculation specified in section 4 above is category C or higher, at least ship type 3 is assigned.

APPENDIX 1

INTERPRETATION OF THE GUIDELINES FOR THE CATEGORIZATION OF NOXIOUS LIQUID SUBSTANCES (MARPOL 73/78, ANNEX II, APPENDIX I)

1 Category A

The expression at the end of this paragraph 2 "when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance" implies either that:

.1 substances are bioaccumulated and liable to produce tainting of seafood (as expressed by a hazard rating "T" in column A); or that

.2 substances are bioaccumulated with attendant risk to aquatic organisms or human health, however, with short retention of the order of one week or less (as expressed by a hazard rating "Z" in column A) and are highly objectionable with regard to the reduction of amenities (as expressed by a hazard rating "XXX" in column E).

2 Category B

The expression at the end of this paragraph "when particular weight is given to additional factors in the hazard profile or to special characteristics of the substances." implies that:

.1 The substance is highly objectionable with regard to the reduction of amenities (as expressed by a hazard rating "XXX" in column E) subject to the provisio that the substance is non-volatile (vapour pressure 1 mmHg at 20°C) and insoluble (solubility 2g/100ml at 20°C); otherwise it may be rated as category C.

3 Category C

The expression at the end of this paragraph "when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance" implies that:

.1 The substance is moderately hazardous or highly hazardous to human health, with an LD_{50} of less than 50 mg/kg (as expressed by hazard ratings "3" and "4" in column C)* and is moderately objectionable with regard to the reduction of amenities (as expressed by a hazard rating "XX" in column E)*.

4 Explanatory table and notes

4.1 Explanatory table

Hazard Profile				Annex II Pollution category
A	B	C	E	
+	-	-	-	category A
-	4	-	-	
T	3	-	-	
Z	3	-	XXX	
T	-	-	-	category B
Z	-	-	-	
-	3	-	-	
-	2	-	XXX*	
-	2	-	-	category C
-	1	4	XX	
-	1	3	XX	
-	1	-	-	category D
-	-	4	-	
-	-	3	X	
-	-	-	XXX	
-	-	-	XX	
-	D/BOD	-	-	

* If the substance is non-volatile and insoluble (vapour pressure 1 mm Hg at 20°C and solubility 2g/100 ml at 20°C); otherwise it may be rated as category C.

4.2 Explanatory notes

4.2.1 The hazard profiles indicated in columns A, B, C and E are taken from the evaluations carried out by the IMO/FAO/UNESCO/WMO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP).

Column A - Bioaccumulation
Column B - Damage to living resources
Column C - Hazard to human health (oral intake)
Column E - Reduction of amenities

4.2.2 The column D rating by GESAMP has been dispensed with for this categorization as that rating relates to hazard to human health (skin contact and inhalation) which has no direct bearing on aquatic pollution.

4.2.3 To establish whether a substance is a category A, B, C or D pollutant it is necessary to relate the GESAMP hazard profile with the table shown above.

4.2.4 For a substance to qualify in any category it is necessary to satisfy all the requirements in any one row at one and the same time.

4.2.5 To establish the individual substance categorization the table should be read horizontally so that, for example, a rating "T" in column A and a "3" in column B results in categorization "A"; whereas a single rating of "T" or "3" results in categorization "B".

APPENDIX 2

CRITERIA FOR ESTABLISHING SHIP TYPE REQUIREMENTS FROM THE MARINE POLLUTION POINT OF VIEW

The allocation of ship type requirements from the marine pollution point of view to products covered by the Bulk Chemical Code and the International Bulk Chemical Code shall be based on the following principles which apply the hazard profiles developed by GESAMP as defined in GESAMP Reports and Studies No.17 (1982)*.

1 TYPE I SHIPS

1.1 Substances which are bioaccumulated to a significant extent and are known to produce a hazard to aquatic life or human health (+ in column A) and which are highly toxic to living resources (4 in column B); or

1.2 Substances which are bioaccumulated to a significant extent and are known to produce a hazard to aquatic life or human health (+ in column A) and which cause severe reduction of amenities (XXX in column E); or

1.3 Substances which are liable to cause tainting of seafood (T in column A) and which are highly toxic to living resources (4 in column B).

2 TYPE II SHIPS

2.1 Substances which are bioaccumulated to a significant extent and are known to produce a hazard to aquatic life or human health (+ in column A) except those in type I above; or

2.2 Substances which are bioaccumulated with attendant risk to aquatic organisms or human health, however, with short retention of the order of one week or less (Z in column A) and which are highly or moderately toxic to living resources (4 or 3 in column B); or

---

* The higher of the ship types derived from safety and pollution hazard evaluation prevails.

2.3 Substances which are bioaccumulated with attendant risk to aquatic organisms or human health, but with short retention of the order of one week or less (Z in column A) and which cause severe reduction of amenities (XXX in column E).

2.4 Substances which are liable to produce tainting of seafood (T in column A) except those in type I above; or

2.5 Substances which are highly toxic to living resources (4 in column B).

2.6 Substances which are moderately toxic to living resources (3 in column B) and which cause severe reduction of amenities (XXX in column E); or

3 TYPE III SHIPS

All substances which do not fall under the criteria for ship types I and II above, but which have been allocated with pollution categories A, B and C in accordance with appendix I to Annex II of MARPOL 73/78.

Note 1

GESAMP hazard profiles columns A, B and E are taken into account as relevant to discharges or spillages into the sea. Columns C and D of the GESAMP hazard profiles, relating to the hazard to human health, are not relevant to this application.

Note 2

For ease of interpretation the criteria detailed above are shown in tabular form below. Those products whose hazard profiles exhibit the complete spectrum required by any one horizontal line in the table should be restricted to carriage in the ship type prescribed (or in ships offering even better protection).

Note 3

If a ship type assigned in accordance with the above rationale conflicts with that assigned for safety reasons, the higher of the two shall apply.

RATIONALE FOR THE ALLOCATION OF SHIP TYPE
FROM THE MARINE POLLUTION POINT OF VIEW

Ship type \ Column	Bioaccumulation and tainting A	Damage to living resources B	Reduction of amenities E
1	+	4	XXX
	+		
	T	4	
2	+		XXX
	Z	4	
	Z	3	
	Z		
	T		
	0	4	
	0	3	XXX
3	All other substances falling under pollution categories A, B and C.		

Substances with strong tainting properties as identified by the Sub-Committee at its thirteenth session. These are as follows:

Camphor oil
Carbolic oil
Creosote (wood tar)
Cresols (mixed isomers)
Dichloroethyl ether
Dichlorophenols
Ethyl acrylate
Naphthalene
alpha-methyl naphthalene
Naphthenic acids

Note: All substances assigned by GESAMP with "T" ratings will be considered for inclusion when more information (e.g. results of tainting tests) become available.

***

PROVISIONAL POLLUTION CATEGORY AND MINIMUM CARRIAGE REQUIREMENTS FOR NEW SUBSTANCES TO BE INTRODUCED INTO CHAPTERS 17 AND 18 OF THE IBC CODE AND CHAPTERS VI AND VII OF THE BCH CODE

Product Name	UN Number	Pollution Category	Hazards	Ship Type	Tank Type	Tank Vents	Tank Environmental Control	Electrical Equipment: Class	Electrical Equipment: Group	Electrical Equipment: Flashpoint 60°C	Gauging	Vapour Detection	Fire Protection	Materials of Construction	Respiratory and Eye Protection	Special Requirements (see Chapter 15)
a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Anthracene oil (coal tar fraction)		[A]	P	2	2G	Open	No			Yes	O	No	A	No	No	15.19.6
Butyl benzenes	2709	[C]	P	3	2G	Cont.	No			No	R	F	A	No	No	15.19.6
Butyl heptyl ketone		[C]	P	3	2G	Open	No			Yes	O	No	A	No	No	
Calcium bromide/Zinc bromide mixtures solution		[A]	P	2	2G	Open	No		NF		O	No	A	No	No	15.19.6
4-Chloro-2 methyl-phenoxyacetin acid, dimethylamine salt solution		[A]	P	3	2G	Open	No		NF		O	No	No	No	No	
p-Dichlorobenzene (molten)	1592	[B]	S/P	2	2G	Cont.	No			Yes	R	T	B,D	N5	No	15.19.6
Diphenylol propane-epichlorohydrin resins		[B]	P	3	2G	Open	No			Yes	O	No	B	No	No	
Dodecylamine/Tetra-decylamine mixture		[C]	S/P	3	2G	Cont.	No			Yes	R	T	A,D	N2	No	

1 - Entries in Chapter 17 of the IBC Code

As the substances are evaluated by GESAMP and finally categorized, they are circulated as future amendments to the IBC and BCH Codes under cover of MSC/MEPC Circulars and these substances will be deleted from this list. Also as the provisional category and minimum carriage requirements are established for new substances they will be added to this list.

a	b	c	d	e	f	g	h	i'	i"	i"'	j	k	l	m	n	o
Ethyl hexyl phthalate		[C]	P	3	2G	Open	No			Yes	O	No	A	No	No	
Isobutyl isobutyrate	2528	[B]	P	3	2G	Cont.	No			No	R	F	A	No	No	15.19.6
Magnesium sulphonate		[C]	P	3	2G	Open	No			Yes	O	No	A	No	No	
3-Methylpyridine	2313	[B]	S/P	2	2G	Cont.	No			No	C	F	A,C	N4	No	15.2.3, 15.19
Octyl nitrates (all isomers)		[B]	S/P	3	2G	Open	No			Yes	O	No	B	No	No	15.XX,* 16.6
Pine oil	1272	[A]	P	3	2G	Open	No			Yes	O	No	A	No	No	
Tetradecylbenzene		[C]	P	3	2G	Open	No			Yes	O	No	A	No	No	
Undecylbenzene		[C]	P	3	2G	Open	No			Yes	O	No	A	No	No	

* Proposed IBC Code Special Requirement

15.XX Octyl nitrates, all isomers

15.XX.1

The carriage temperature of the cargo should be maintained below 100°C to prevent the occurrence of a self-sustaining exothermic decomposition reaction.

15.XX.2

The cargo may not be carried in independent pressure vessels permanently affixed to the vessels deck unless:

.1 the tanks are sufficiently insulated from fire; and

.2 the vessel has a water deluge system for the tanks such that the cargo temperature is maintained below 100°C and the temperature rise in the tanks does not exceed 1.5°C/hour for a fire of 650°C (1200°F).

Product Name	UN Number	Pollution Category	Hazards	Ship Type	Tank Type	Tank Vents	Tank Environmental Control	Electrical Requirements	Gauging	Vapour Detection	Fire Protection	Special Requirements (see Chapter VI)
a	b	c	d	e	f	g	h	i	j	k	l	m
Anthracene oil (coal tar fraction)		[A]	P	2	2G	Open	No	St	O	No	A	4.14.1
Butyl benzenes		[C]	P	3	2G	Cont.	No	SP	R	F	A	4.14.1
Butyl heptyl ketone		[C]	P	3	2G	Open	No	St	O	No	A	
Calcium bromide/Zinc bromide mixtures solution		[A]	P	2	2G	Open	No	St	O	No	A	4.14.1
4-chloro-2-methyl-phenoxyacetic acid, dimethylamine salt solution		[A]	P	3	2G	Open	No	St	No	No	No	
p-Dichlorobenzene (molten)	1592	[B]	S/P	2	2G	Cont.	No	St	R	T	B,D	4.12.5
Diphenylol propane-epichlorohydrin resins		[B]	P	3	3G	Open	No	St	O	No	B	
Dodecylamine/Tetra-decylamine mixture		[C]	S/P	3	2G	Cont.	No	St	R	T	A,D	4.12.2
Ethyl hexyl phthalate		[C]	P	3	2G	Open	No	St	O	No	A	
Isobutyl isobutyrate	2528	[B]	P	3	2G	Cont.	No	SP	R	F	A	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Magnesium sulphonate		[C]	P	3	2G	Open	No	St	O	No	A	
3-Methylpyridine	2313	[B]	S/P	2	2G	Cont.	No	SP	C	F	A,C	4.9.3, 4.12.4, 4.14
Octyl nitrates (all isomers)		[B]	S/P	3	2G	Open	No	St	O	No	B	4.XX*
Pine oil	1272	[A]	P	3	2G	Open	No	St	O	No	A	
Tetradecylbenzene		[C]	P	3	2G	Open	No	St	O	No	A	
Undecylbenzene		[C]	P	3	2G	Open	No	St	O	No	A	

* Proposed Bulk Chemical Code Special Requirement

4.XX Octyl nitrates, all isomers

4.XX.1

The carriage temperature of the cargo should be maintained below 100°C to prevent the occurrence of a self-sustaining exothermic decomposition reaction.

4.XX.2

The cargo may not be carried in independent pressure vessel's permanently affixed to the vessels deck unless:

.1 the tanks are sufficiently insulated from fire; and

.2 the vessel has a water deluge system for the tanks such that the cargo temperature is maintained below 100°C and the temperature rise in the tanks does not exceed 1.5°C/hour for a fire of 650°C (1200°F).

3. Entries in IBC Code Chapter 18//BCH Code Chapter VII

Product Name	Pollution Category
Ammonium hydrogen phosphate	[III]*
Benzenetricarboxylic acid, trioctyl ester	[D]
Calcium carbonate slurry	[III]
Coconut oil fatty acid	[D]
Di-n-Hexyl adipate	[III]
Dimethyl succinate	[D]
Edible oils including:	[D]
Babassu	
Beechnut	
Cocoa butter	
Coconut oil, esterefied	
Hazelnut	
Nutmeg butter	
Poppy	
Peel oil (oranges and lemons)	
Raisin seed	
Salad	
Soybean	
Walnut	
Ethylene glycol dibutyl ether	[D]
Ethylene, propylene copolymer (in liquid mixtures)	[III]
Glycol triacetate	[III]
iso-Heptane	[III]
1,6-Hexanediol	[III]
Kaolin clay slurry	[III]
Kaolin slurry	[III]
Methyl acetoacetate	[D]
Miscellaneous oils, including:	[D]
Lanolin	
Neatsfoot	
Oiticica	
Perilla	
Pilchard	
Whale	

---

* Substances identified to be included in Appendix III of Annex II.

Product Name	Pollution Category
Nonyl methacrylate monomer	[D]
Palmnut oil fatty acid	[D]
Petrolatum	[D]
Polyisobutylene	[III]
Polypropylene	[III]
Potassium chloride	[III]
Silica slurry	[III]
Tridecane	[D]
Waxes	[D]

4 - SUBSTANCES KNOWN TO BE MOVED IN BULK BUT EVALUATION OF SAFETY OR ENVIRONMENTAL HAZARDS NOT YET COMPLETED

Product Name	Pollution Category
Acetyl tributyl citrate	
Acrylic copolymer in ethyl acetate aqueous solution	
Alkenyl succinate, potassium salt solution	
Alkenylsuccinic acid	
Alkenylsuccinic anhydride	
Alkyl paint resins	
Alkyl phosphorous acid ester	
Amyl tallate	
Aromasol H	
Butyl octyl phthalate	
C-Streams containing 15% or more Isoprene	
Calcium alkylphenate	
Calcium amino nonyl phenolate	
Calcium carboxylate	
Calcium nitrate/ Magnesium nitrate/ Ammonium nitrate/ Potassium chloride Mixture solution	
Calcium Sulphonate, Calcium carbonate, Hydrocarbon solvents mixture (low oil saci feed)	
Clairsol 250	
Cumarone	
Cyclohexane oxidation product acid water, 50% aqueous solution	
Cyclohexanol acetate	
1,3 Cyclopentadiene, molten	

Product Name	Pollution Category
DA feed - mixture of benzene and toluene	
Dehexanister	
Detergent Alkylate	
Di-(octylphenyl)amine	
Dibutyl maleate	
Diethylene maleate	
Dimethyl adipate	
N,N Dimethylaniline styrenic solution	
Dimethyl glutarate	
Dimethyl polysiloxane	
Dimethylcyclicsiloxane hydrolyzate (70% or less)	
2,2-Dimethyloctanoic acid	
Dipropylene glycol dibenzoate	
Dodecyl mercaptan	
Drilling mud	
Dutrex 729 HP	
Escaids	
Ether chloro-cyclopentadiene	
Ethyl chlorothioformate	
Ethyl hexyl tallate	
2-Ethyl-6 Methyl-N(1-Methyl-2-Methoxyethyl) Aniline (Herbicide)	
Ethyleneimine	B
Eucalyptus oil	
Exsol	
Exsol heptane	
Fatty acid amides	
Halpasol	
Heartcut alxylate	
Heartcut distillates	
Heavy alkylate	
Herbicide (C_{15}-H_{22}-NO_2-C_1)	
Hexamethylene tetramine solution	III
C_5 Hydrocarbons fraction (Residue from naphtha cracking)	

Product Name	Pollution Category
2-Hydroxy-4-(Methylithio) Butanol acid	
Isodecyldiphenyl phosphate	
Isopar G/L	
Isoparaffin hydrocarbon oils (IP solvents)	
KA-Oil (mix of cyclohexanol and cyclohexanone)	
Ketrol	
Kononyl Neu	
Linevol phthalate	
Linevol, synthetic primary fatty alcohol	
Liquid isocyanates having boiling points lower than 300°C and flashpoints higher than 61°C, and their solutions	
Lube oil additives	
Magnesium nonyl phenol sulphide	
Methyl bromide	B
Methyl butenol	
Methyl butynol	
Methyl carbonate	
Methyl cyclopentadiene dimer	
Methyl formal (Dimethyl formal)	
MIBK, MEK and Ethyl acetate mixture (ENJ 1013 Exxon)	
n-Octyl chloride	
Naphthalene sulphonic acid-formaldehyde co-polymer, sodium salt solution	
Neodene	
Neodol	
Niax Polyols	
Norpar 12	
Octadecenoamide (Oleamide)	
Octyl decyl adipate	
Octyl epoxytallate	
Octyl nitrates (mixed)	

Product Name	Pollution Category
Oils:	
Croton	
Mustard Seed	
Tucum	
Resin	
Resinous petroleum	
Soapstock	
Spray	
Tanner's	
Wood	
Organic amine 70 (mixture of high molecular weight alcohol amines)	
Palatinol Z	
Paradynes	
Pegasol	
Phenethyl cumene	
Phosphosulphized bicyclic terpene	
Poly-isopropyl-amino-alanate in ethanic solution	
Polyalkenyl succinic anhydride amine	
Polyamine, amide mixture	
Polystyrene dialkyl maleate	
Polyvinylbenzyl trimethyl ammonium chloride	
Prestol 140E	
Pyrolocondensate	
Pyrolosis gasoline (stream cracked naphtha)	
Raffinate	
Shellsols - Aliphatic solvent naphtha	
Sodium acetate, glycol solutions	
Sodium dimethyl naphthalene sulphonate solution	
Sodium naphthalene sulphonate solution 40% or less	
Sodium sulphonate	

Sodium-N-Methyldithiocarbonate solution 33% or less

Softanols (Detergent alcohols)

Solvesso

Somil SH - High boiling point aromatic oils

Sulphur chloride (B)

Synthetic resin, unsaturated hydrocarbons C-20 to C-60 (CTLA polymer-Exxon)

Tallow nitrile

Tergitols

Tetramer D

Texanol

Triethylene glycol diethyl butyrate

Triisooctyl trimellitate

Trimethyl benzene, Xylene, para-Ethyl toluene mixture

Trimethyl phosphite

Varanol

Varsol

Vinyl acetate, fumarate copolymer

Vinylcyclohexene

***

OIL-LIKE SUBSTANCES - IDENTIFICATION CRITERIA

The following criteria define an oil-like Category C or D noxious liquid substance:

1) the mass density (volumic mass) is less than 1.0 kg/l at 20°C;

2) the solubility of the substance in sea water 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 Reg. 15 of Annex I of MARPOL 73/78(*);

5) in the case of Category C substances, the requirement relating to the ship type, as specified in the Bulk Chemical Code or in the International Bulk Chemical Code is type 3;

6) the substance is not subject to the Bulk Chemical Code or to the International Bulk Chemical Code for safety reasons as indicated under Chapters VI and 17 of said Codes.

(*) In approving an oil discharge monitoring and control system for the purpose of the present 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 of Oily-Water Separating Equipment and Oil Content Meters" adopted by IMO by Resolution A.393(X), as amended by Resolution MEPC 24(22), Annex 2, or the "Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers", Resolution A.586(14) as amended by Resolution MEPC 24(22) Annex 1.
If it is necessary to adjust the monitor when changing from oil products to oil-like noxious liquid substances, information on the adjustment should be provided and special operating procedures, ensuring that the 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 on the Oil Record Book.

SUBSTANCES PREVIOUSLY BELONGING TO CHAPTER 18 OF THE IBC CODE (OR CHAPTER VII OF THE BCH CODE) TRANSFERRED TO CHAPTER 17 OF THE IBC CODE (OR CHAPTER VI OF THE BCH CODE) DUE TO THEIR POLLUTION HAZARD

SUBSTANCE	CATEGORY	HAZARD (*)	SHIP TYPE
n-Amyl acetate	C	P	3
sec-Amyl acetate	C	P	3
Amyl acetate, commercial	C	P	3
Benzyl alcohol	C	P	3
n-Butyl acetate	C	P	3
Butyl benzyl phthalate	A	P	2
Cyclohexane	C	P	3
Cyclohexanol	C	P	3
p-Cymene	C	P	3
Decyl alcohol (all isomers)	B	P	3
Dibutyl phthalate	A	P	2
Diethylbenzene	C	P	3
Diethylene glycol methyl ether	C	P	3
Diisobutylene	B	P	3
Diisobutyl phthalate	B	P	3
Dipentene	C	P	3
Diphenyl ether	A	P	3
Dodecyl alcohol	B	P	3
Dodecyl benzene	C	P	3
Dodecyl phenol	A	P	1
2-Ethoxyethyl acetate	C	P	3
Ethylbenzene	C	P	3
Furfuryl alcohol	C	P	3
Heptanol (all isomers) (q)	C	P	3
Heptene (mixed isomers)	C	P	3
1-Hexene	C	P	3
Isoamyl acetate	C	P	3
Isobutyl acetate	C	P	3
Methylamyl acetate	(C)	P	3
Methylamyl alcohol	(C)	P	3
Methyl amyl ketone	(C)	P	3
2-Methyl-1-pentene	C	P	3
N-Methyl-2-pyrrolidone	B	P	3
Nonyl alcohol	C	P	3
Nonylphenol	A	P	2
Octanol (all isomers)	C	P	3

SUBSTANCE	CATEGORY	HAZARD (*)	SHIP TYPE
n-Pentane	C	P	3
Pentene (all isomers)	C	P	3
Perchloroethylene	B	S/P	3
Pinene	A	P	3
Propylene trimer	B	P	3
Tall oil, crude and distilled	A	P	3
Tetrahydronaphthalene	C	P	3
Toluene	C	P	3
Tributyl phosphate	B	P	3
1,1,1-Trichloroethane	B	P	3
Triethylbenzene	A	P	2
1,2,4-Trimethylbenzene	B	P	3
Turpentine	B	P	3
White spirit,low (15-20%) aromatic	(B)	P	2
Xylene	C	P	3

(*) P indicates substances presenting only pollution hazards

S indicates substances presenting only safety hazards

P/S indicates substances presenting both pollution and safety hazards

LIST OF SUBSTANCES ALREADY BELONGING TO CHAPTER 17 OF THE IBC CODE (OR TO CHAPTER VI OF THE BCH CODE) FOR THE CARRIAGE OF WHICH MORE STRINGENT REQUIREMENTS IN CONNECTION WITH SHIP TYPE OR ADDITIONAL ARRANGEMENTS HAVE BEEN INTRODUCED

1) **From ship type 2 to ship type 1**

1. Tricresyl phosphate (containing 1% or more ortho-isomers)

2) **From ship type 3 to ship type 2**

1. Camphor oil
2. Chlorobenzene (*)
3. p-Chlorotoluene (*)
4. Chlorotoluene (mixed isomers)
5. Creosote (wood)
6. Cresols (mixed isomers) (*)
7. Decyl acrylate (*)
8. o-Dichlorobenzene (*)
9. 2,4-Dichlorophenol
10. Isophorone diisocyanate
11. alpha-Methylstyrene (*)
12. Naphthalene (molten) (*)
13. Pentachloroethane (*)
14. 1,2,4-Trichlorobenzene

For substances marked with (*) in the above list and for vinyl toluene, the requirement for tank high level alarm has been introduced.

FACTORS INFLUENCING RESIDUES IN TANKS

Up to now, about ten water tests have been carried out on ships having different structural arrangements (tanks with double bottom with or without deep well for pump suction; tanks with single bottom) and different arrangements of the cargo and stripping system (tanks fitted with single centrifugal type deep well pumps; tanks with common cargo pumps, of the positive-displacement or centrifugal type, fitted in a pump room both for unloading or stripping purpose; tanks with pumps and lines dedicated to stripping and fitted in addition to the cargo system).

On the basis of the experience gained by the above mentioned tests, the following may be pointed out:

1) Stripping quantity of ships with cargo pump room

These are ships with common pumps, for the different tanks, fitted in pump rooms aft of cargo tanks and/or afore of them.
In these ships, the suitable location of the suction points and the employ of positive-displacement pumps allow it to almost completely eliminate the residue in tank in the vicinity of the suction point.
It is obviously important that the height of the suction inlets above the tank bottom be reduced to a minimum and that they be located in the after part of the tank, close to the aft bulkhead.
The choice of trim and list angles to be adopted during the test is therefore to be made with the utmost care taking account of what will be the actual trim and list of the ship during unloading and stripping. The trim and list chosen for the water test are, in other words, to be the minimum favourable trim and list indicated in the Manual.
The tests, which have presented a good agreement with the theoretical calculations, have shown that the residue in tank increases in a very remarkable way when the trim is less than about 1,5°.
The suction piping of the pumps turn out to be almost completely stripped, when they are draining towards the pumps.
In the case of pump rooms located afore of the relating cargo tanks, the suction piping, which is led longitudinally through the tanks, if not draining towards the pump, remains full to a remarkable extent, giving rise to remarkable residues. In some ships, besides, the installation of piping in pump room is such that certain piping sections, fitted below pump suction, cannot be drained.
For what delivery piping is concerned, which generally represents the major cause of residues in tank, it has been noted that positive-displacement pumps are able to reduce its residue content because they displace the liquid also when they are not primed.

2) Stripping quantity of ships with deep well pumps

These are generally ships with one centrifugal deep well pump for each cargo tank with relating delivery piping which may be connected to the loading/unloading manifolds.
A well is generally fitted in each tank to facilitate pump suction. In some ships these wells have been found very often of larger size than necessary and give rise to remarkable residues in tank because the pumps are able to strip them only partially.
Contrary to the positive-displacement pumps of the preceding point, the centrifugal deep well pumps have highlighted that they are not able to empty the relating delivery piping which, specially due to their extent in length, give rise to unacceptable residue amounts.
In order to obviate what above, an adopted solution has been to connect a small size stripping line which directly connects the pump delivery to the loading/unloading manifolds downstreams of the valves of the manifolds themselves.
After the normal unloading is ultimated and the delivery manifolds of the pumps and relating manifolds are emptied into the tanks, the so drained liquid is transferred to shore through the above mentioned stripping line.

3) Residues on walls

For tanks of existing ships fitted with stripping systems which do not comply with the efficiency requirements of Regulations 5A2(a) or 5A4(a) (stripping quantity 0,3 m^3 for Cat. B substances and 0,9 m^3 for Cat. C substances) it is necessary to calculate the residue amount which remains on tank surfaces by the formula under Appendix C of the Standards and check that the total resulting amounts (stripping quantity + residue on walls) is not greater than 1 m^3 or 3 m^3 for Cat. B or Cat. C substances, respectively.
The calculation carried out for tanks of chemical carriers flying the Italian flag, apart from some special cases, has yielded amounts of residues on surfaces comprised between 100 and 600 litres. The lower value is relating to cargo tanks having a capacity of about 200-250 m^3; the higher value for tanks having a capacity of about 1000 m^3. A reasonable margin remains, in respect to the limit value of 1 m^3, at disposal of the "stripping quantity".

CONSIDERATIONS ON DISCHARGE OUTLETS AND RELATING PIPING

As regards the arrangement of the underwater discharge (Reg. 5(2), 5(3), 5(4), 5(8) and 5(9) of Annex II and Chapters 3, 7, 8 and 12 of the Standards) with the relating piping, the following considerations can be made:

1) Ships with deep well pumps for each cargo tank

For these ships, taking into account that:

(i) they are fitted with a cofferdam between machinery space and cargo tanks;

(ii) to avoid re-intakes of water-residue mixtures by sea water intakes relating to propulsion machinery and other systems, the optimum position of the discharge outlet is as near as possible to the machinery space, with the maximum possible vertical distance from the above mentioned sea water intakes;

(iii) the diameter required for said outlet decreases, other conditions being equal, with the increase of the distance from the forward perpendicular;

the discharge outlet may be fitted in said cofferdam, at the greatest possible height with respect to machinery space sea water intakes, below the minimum waterline foreseen for ship in ballast.
The discharge line, starting from the area of the loading/unloading manifolds, may be led through the main deck and penetrate it in way of the cofferdam, without passing through the cargo tanks.
The connection of said line with the manifolds may be effected by suitable spool pieces.
As regards the part of the discharge line inside the cofferdam, the Load Line Convention requirements (Reg. 22) shall have to be complied with.
Pursuant to this Regulation, on the ship's shell a non-return valve shall be fitted with a positive means of closing it from a position above the freeboard deck (since the space is not normally entered by personnel).
This valve may be omitted if the piping is of heavy scantling and in this case the piping joints are to be of the welded type.
In any case suitable means for the ventilation of the space is to be provided in accordance with the requirements of the Chemical Codes.

2) Ships with pump rooms

Also for these ships the considerations under (i), (ii) and (iii) of the preceding point apply.
The discharge manifold may be derived from the pump delivery, directly in the pump rooms, fitting suitable stop valves on ship's shell and in way of the branching point on the pump delivery.
In the case of pump rooms which are not adjacent to the machinery space, the problem of possible re-intake of polluted water into machinery space sea water intakes shall be duly considered.
As regards the materials, what specified under the preceding point 1) applies.

ELENCO ULTIMI BOLLETTINI TECNICI

BT 68 - Febbraio 1980 / Bianconi
Studio sui separatori filtro per acque oleose di sentina e su misuratori di contenuto oleoso nelle acque di scarico dalle navi

BT 69 - Febbraio 1980 / Caretti
Un archivio di coefficienti idrodinamici di pressione e di forza per cilindri oscillanti in superficie libera
A file of hydrodynamic pressure and force coefficients for cylinders oscillating in a free surface

BT 70 - Luglio 1980 / Campaiola, Garassino, Marchesi, Valentin
Un algoritmo per il calcolo delle superfici lavate delle navi petroliere (COW)
An algorithm for washed surfaces computation in tankers (Crude Oil Washing)

BT 71 - Ottobre 1980 / Spinelli
Convenzione MARPOL '73, come emendata dal protocollo 78
- Interpretazione della normativa-controlli RINA per il rilascio di dichiarazioni di corrispondenza alle norme della convenzione

BT 72 - Dicembre 1980 / Pittaluga
I carichi d'onda di progetto e la loro correlazione
Design wave loads and their correlation

BT 73 - Dicembre 1980 / Caretti
Confronto teorico-sperimentale degli operatori di risposta della pressione d'onda sulla carena
A comparison between theoretical and experimental response amplitude operators on hulls

BT 74 - Febbraio 1981 / Pittaluga, Ziliotto
Una procedura per la valutazione della robustezza trasversale delle navi per il trasporto di merci alla rinfusa
A procedure for the transverse strength assessment of large bulk carrier ships

BT 75 - Novembre 1981 / Ferro
Metodi e problemi nell'analisi dell'affidabilita' delle strutture navali
Methods and problems in reliability analysis of ship structures

BT 76 - Dicembre 1981 / Bisagno, Marchesi, Valentin
GIPSY - Un post-processor per l'analisi ad elementi finiti
GIPSY - A post-processor for finite element analysis

BT 77 - Gennaio 1982 / Ferro
Applicabilita' delle tecniche affidabilistiche alla progettazione navale
Applicability of reliability concept to ship design

BT 78 - Febbraio 1982 / Selvaggi
Problemi di progettazione per navi adibite al trasporto di gas liquefatti a bassa temperatura
Design problems for ships carryng low temperature liquefied gases

BT 79 - Aprile 1982 / Spinelli
Convenzione MARPOL 1973, come emendata dal protocollo 1978
- interpretazione della normativa controlli RINA per il rilascio di dichiarazioni di corrispondenza alle norme della convenzione (seconda edizione)

BT 80 - Maggio 1982 / Ferro, Ziliotto
Applicazione di una procedura diretta per il calcolo dei carichi d'onda per le analisi di robustezza trasversale
Application of a direct procedure to the assessment of wave loads for the transverse strength analysis of ships

BT 81 - Aprile 1983 / Micillo
Applicazione dei procedimenti speciali di saldatura nelle costruzioni navali

BT 82 - Novembre 1983 / Marchesi, Ziliotto
Comportamento post-critico di pannelli nervati-1confronti tra risultati numerici e prove sperimentali

BT 83 - Dicembre 1983 / Alimento
I materiali per la costruzione degli scafi
- Note sulle caratteristiche e prove dei materiali secondo la normativa del RINA
Materials for hull structures
- Review of the properties and tests of the materials accordingly with RINA requirements

BT 84 - Gennaio 1984 / Ferro
Advances in the calculation of the maxima of ship responses
Paper presented at the Euromech Colloquium 155, reliability theory of structural engineering systems, June 15-17, 1982, Engineering Academy of Denmark - reprinted from Dialog 6-82

BT 85 - Gennaio 1984 / Ferro, Cervetto
Reliability of marine structures under dynamic loadings
Paper presented at the International Workshop on stochastic methods in structural mechanics, June 9-12, 1983, University of Pavia - reprinted from the proceedings.

BT 86 - Gennaio 1984 / Robino, Ziliotto
Wave torsional moments in ships with large hatch openings
Paper presented at the VI Italian - Polish seminar - Genoa, November 1983.

BT 87 - Marzo 1984 / Spinelli
Convenzione MARPOL 73, come emendata dal protocollo 78
- Interpretazione della normativa controlli RINA per il rilascio di dichiarazioni di corrispondenza alle norme della convenzione (terza edizione)

BT 88 - Maggio 1984 / Pasini
La saldatura subacquea - Stato dell'arte

BT 89 - Giugno 1984 / Ferro
Stochastic models for low-frequency, springing and impact loads on ships

BT 90 - Gennaio 1985 / Pittaluga, Bisagno
Moderne tecniche di analisi del comportamento in mare

BT 91 - Gennaio 1985 / Cazzulo, Ziliotto
Applicazione della meccanica della frattura nelle verifiche a fatica

BT 92 - Gennaio 1985 / Ferro, Merega
Prospettive della progettazione affidabilistica delle strutture marine

BT 93 - Gennaio 1985 / Marchesi, Ziliotto
Analisi di un'avaria di una portarinfuse

BT 94 - Maggio 1985 / Cazzulo
Panoramica sui fondamenti teorici delle meccanica della frattura

BT 95 - Luglio 1985 / Cervetto, Ferro
Affidabilita' e ridondanza nelle fondazioni offshore
System reliability of offshore foundations

BT 96 - Aprile 1986 / Alimento
Mezzi di salvataggio - Le nuove norme della convenzione SOLAS 1974 (83)

BT 97 - Settembre 1986 / Pittaluga
Similarities and differences in thin-walled beams theories

BT 98 - Novembre 1986 / Pittaluga, Dogliani
Second order non-linear effects in marine systems

BT 99 - Dicembre 1986 / Pattofatto
L'Annesso II alla MARPOL 73/78 e connessa normativa

ELENCO ULTIMI REPORTS

RP 204 - Gennaio 1980 / Fanciulli, Ziliotto
Definizioni di una procedura per il calcolo delle selle e degli anelli di rinforzo di serbatoi cilindrici e bilobati

RP 205 (*) - Febbraio 1980 / Fanciulli, Tedeschi, Ziliotto
Determinazione dello stato di sollecitazione mediante la tecnica degli elementi finiti e rilievi sperimentali in corrispondenza della traversa bassa entro la cisterna della m/n hydrus

RP 206 - Settembre 1980 / Ferro, Ziliotto
Descrizione semplificata delle pressioni d'onda sulle sezioni trasversali di carena

RP 207 - Settembre 1980 / Fanciulli, Ziliotto
Alcune considerazioni sull'analisi delle sollecitazioni in serbatoi cilindrici orizzontali sostenuti da selle

RP 208 - Ottobre 1980 / Ferro
Affidabilita' strutturale: stato delle conoscenze e prospettive delle ricerche

RP 209 - Ottobre 1980 / Ferro
Sulle caratteristiche statistiche del carico ultimo di pannelli nervati

RP 210 - Ottobre 1980 / Ferro, Pittaluga
Metodo semplificato per le previsioni a lungo termine dei carichi di sloshing

RP 211 - Agosto 1981 / Pittaluga, Sciacca, Ziliotto
Alcune note sulle vibrazioni flessionali degli alberi porta elica

RP 212 - Agosto 1981 / Ferro, Pittaluga
Influenza delle previsioni metereologiche sul calcolo della risposta delle navi

RP 213 - Dicembre 1981 / Ferro
Influenza della larghezza di banda sulla distribuzione dei picchi in un processo stocastico stazionario

RP 214 (*) - Marzo 1982 / Alberti, Robino, Ziliotto
Analisi del comportamento strutturale di navi portacontenitori soggette a torsione

RP 215 - Giugno 1982 / Caretti
Non-linear, frequency domain analysis of motions and loads of ships in irregular waves

RP 216 - Aprile 1983 / Cazzulo
Un programma di verifica globale delle temperature dello scafo

RP 217 - Agosto 1983 / Albert, Berrino
Verifica sperimentale di un metodo di calcolo del comportamento delle chiatte in mare

RP 218 (*) - Marzo 1984 / Ferro
Foundamentals of a procedure for reliability analysis of jacket structures

RP 219 - Dicembre 1984 / Cazzulo
Recenti aspetti della teoria delle travi a parete sottile

RP 220 - Febbraio 1985 / Ferro, Caretti
Metodi per l'analisi del comportamento non-lineare delle navi in mare confuso

RP 221 - Maggio 1985 / Casciati, Ferro
Reliability based code formats for marine crankshafts

DIRETTORE RESPONSABILE
CARLO CASTELLI
CENTRO STAMPA R.I.NA.

EDITORE R.I.NA
VIA CORSICA 12
TEL 53851

AUTORIZZAZIONE
TRIBUNALE DI GENOVA
N° 27/73 del 10 aprile 1973