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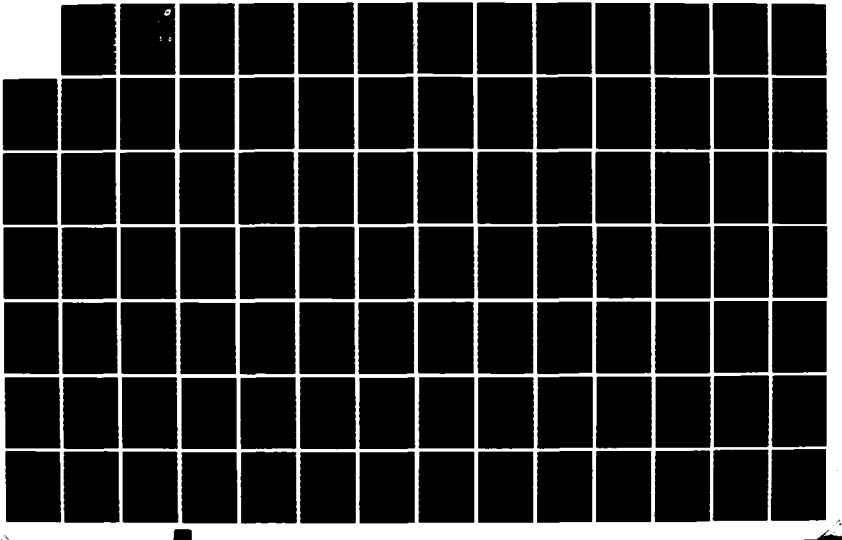

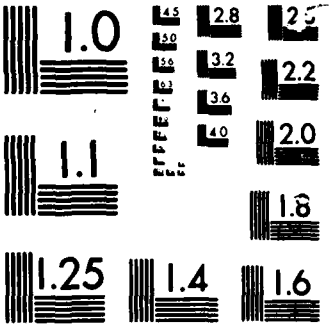

MICROCOPY CHART

U.S. Department of Transportation

United States Coast Guard

COMMANDANT'S INTERNATIONAL TECHNICAL SERIES

VOLUME IX

INTERNATIONAL REGULATIONS ON THE PREVENTION OF POLLUTION FROM SHIPS CARRYING HAZARDOUS CHEMICALS IN BULK

PREPARED FOR:
UNITED STATES COAST GUARD
OFFICE OF MERCHANT MARINE SAFETY
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16. Abstract

Annex II of the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL) was developed to minimize accidental and operational pollution from ships carrying noxious liquid substances in bulk. Accidental pollution could result from a collision, a grounding or an overflow of a cargo tank. Operational pollution results from the disposal of cargo tank washings. Major amendments were made to the original Annex II by the International Maritime Organization (IMO). The United States and other States party to MARPOL will implement Annex II, as amended, on April 7, 1987. Implementation will affect seagoing ships transporting noxious liquid substances in bulk and bulk liquid terminals which transfer noxious liquid substances to and from such ships.

The attached documents contain internationally agreed requirements, interpretations and guidelines necessary for the implementation of Annex II. The documents attached include:

(1) MARPOL Annex II as amended by amendments adopted by the twenty-second session of the IMO Marine Environment Protection Committee;
(2) Unified Interpretations of Annex II;
(3) Standards for the Procedures and Arrangements for the Discharge of Noxious Liquid Substances;
(4) Amendments to the Bulk Chemical Code and the International Bulk Chemical Code to include marine pollution concerns;
(5) Guidelines on the Provision of Adequate Reception Facilities in Ports, Part II (Noxious Liquid Substances).

The contents of these documents are being placed in regulations. The purpose of this document is to give members of the interested public advance notification of impending regulations.

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ANNEX II
THE PROTOCOL OF 1978 RELATING
TO THE INTERNATIONAL CONVENTION FOR THE PREVENTION
OF POLLUTION FROM SHIPS, 1973

REGULATIONS FOR THE CONTROL OF POLLUTION BY
NOXIOUS LIQUID SUBSTANCES IN BULK

Regulation 1

Definitions

For the Purposes of this Annex:

(1) "Chemical tanker" means a ship constructed or adapted primarily to carry a cargo of noxious liquid substances in bulk and includes an "oil tanker" as defined in Annex I of the present Convention when carrying a cargo or part cargo of noxious liquid substances in bulk.

(2) "Clean Ballast" means ballast carried in a tank which, since it was last used to carry a cargo containing a substance in Category A, B, C or D has been thoroughly cleaned and the residues resulting therefrom have been discharged and the tank emptied in accordance with the appropriate requirements of this Annex.

(3) "Segregated ballast" means ballast water introduced into a tank permanently allocated to the carriage of ballast or to the carriage of ballast or cargoes other than oil or noxious liquid substances as variously defined in the Annexes of the present Convention, and which is completely separated from the cargo and oil fuel system.

(4) "Nearest land" is as defined in Regulation 1(9) of Annex I of the present Convention.

(5) "Liquid substances" are those having a vapor pressure not exceeding 2.8 kp/cm^2 at a temperature of 37.8 degrees C.

(6) "Noxious liquid substance" means any substance designated in Appendix II to this Annex or provisionally assessed under the provisions of Regulation 3(4) as falling into Category A, B, C or D.

(7) "Special area" means a sea area where for recognized technical reasons in relation to its oceanographic and ecological condition and to its peculiar transportation traffic the adoption of special mandatory methods for the prevention of sea pollution by noxious liquid substances is required.

Special areas shall be:

(a) The Baltic Sea Area, and

(b) The Black Sea Area.

(8) "Baltic Sea Area" is as defined in Regulation 10(1)(b) of Annex I of the present Convention.

(9) "Black Sea Area" is as defined in Regulation 10(1)(c) of Annex I of the present Convention.

(10) "International Bulk Chemical Code" means the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC 19(22), as may be amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of Article 16 of the present Convention concerning amendment procedures applicable to an Appendix to an Annex.

(11) "Bulk Chemical Code" means the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by the Marine Environment Protection Committee of the Organization by resolution MEPC 20(22), as may be amended by the Organization, provided that such amendments are adopted and brought into force in accordance with the provisions of Article 16 of the present Convention concerning amendment Procedures applicable to an Appendix to an Annex.

(12) "Ship constructed" means a ship the keel of which is laid or which is at a similar stage of construction. A ship converted to a chemical tanker, irrespective of the date of construction, shall be treated as a chemical tanker constructed on the date on which such conversion commenced. This conversion provision shall not apply to the modification of a ship which complies with all of the following conditions:

(a) the ship is constructed before 1 July 1986; and

(b) the ship is certified under the Bulk Chemical Code to carry only those products identified by the Code as substances with pollution hazards only.

(13) "Similar stage of construction" means the stage at which:

(a) construction identifiable with a specific ship begins; and

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

Regulation 2

Application

(1) Unless expressly provided otherwise the provisions of this Annex shall apply to all ships carrying noxious liquid substances in bulk.

(2) Where a cargo subject to the provisions of Annex I of the present Convention is carried in a cargo space of a chemical tanker, the appropriate requirements of Annex I of the present Convention shall also apply.

(3) Regulation 13 of this Annex shall apply only to ships carrying substances which are categorized for discharge control purposes in Category A, B or C.

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

(5) The Administration may allow any fitting, material, appliance or apparatus to be fitted in a ship as an alternative to that required by this Annex if such fitting, material, appliance or apparatus is at least as effective as that required by this Annex. This authority of the Administration shall not extend to the substitution of operational methods to effect the control of discharge of noxious liquid substances as equivalent to those design and construction features which are prescribed by Regulations in this Annex.

(6) The Administration which allows a fitting, material, appliance or apparatus as alternative to that required by this Annex, under paragraph (5) of this Regulation, shall communicate to the Organization for circulation to the Parties to the Convention, particulars thereof, for their information and appropriate action, if any.

Regulation 3

Categorization and Listing of Noxious Liquid Substances

(1) For the purpose of the Regulations of this Annex, noxious liquid substances shall be divided into four categories as follows:

(a) Category A - Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a major hazard to either marine resources or human health or cause serious harm to amenities or other legitimate uses of the sea and therefore justify the application of stringent anti-pollution measures.

(b) Category B - Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify the application of special anti-pollution measures.

(c) Category C - Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a minor hazard to either marine resources or human health or cause minor harm to amenities or other legitimate uses of the sea and therefore require special operational conditions.

(d) Category D - Noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a recognizable hazard to either marine resources or human health or cause minimal harm to amenities or other legitimate uses of the sea and therefore require some attention in operational conditions.

(2) Guidelines for use in the categorization of noxious liquid substances are given in Appendix I to this Annex.

(3) The list of noxious liquid substances carried in bulk and presently categorized which are subject to the provisions of this Annex is set out in Appendix II to this Annex.

(4) Where it is proposed to carry a liquid substance in bulk which has not been categorized under paragraph (1) of this Regulation or evaluated as referred to in Regulation 4(1) of this Annex, the Governments of Parties to the Convention involved in the proposed operation shall establish and agree on a provisional assessment for the proposed operation on the basis of the guidelines referred to in paragraph (2) of this Regulation. Until full agreement between the Governments involved has been reached, the substance shall be carried under the most severe conditions proposed. As soon as possible, but not later than ninety days after its first carriage, the Administration concerned shall notify the Organization and provide details of the substance and the provisional assessment for prompt circulation to all Parties for their information and consideration. The government of each Party shall have a period of ninety days in which to forward its comments to the Organization, with a view to the assessment of the substance.

Regulation 4

Other Liquid Substances

(1) The substances listed in Appendix III to this Annex have been evaluated and found to fall outside the Categories A, B, C and D, as defined in Regulation 3(1) of this Annex because they are presently considered to present no harm to human health, marine resources, amenities or other legitimate uses of the sea, when discharged into the sea from tank cleaning or deballasting operations.

(2) The discharge of bilge or ballast water or other residues or mixtures containing only substances listed in Appendix III to this Annex shall not be subject to any requirement of this Annex.

(3) The discharge into the sea of clean ballast or segregated ballast shall not be subject to any requirement of this Annex.

Regulation 5

Discharge of Noxious Liquid Substances

Categories A, B and C Substances outside Special Areas and Category D Substances in all Areas

Subject to the provisions of Regulation 6 of this Annex,

(1) The discharge into the sea of substances in Category A as defined in Regulation 3(1)(a) of this Annex or of those provisionally assessed as such or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited. If tanks containing such substances or mixtures are to be washed, the resulting residues shall be discharged to a reception facility until the concentration of the substance in the effluent to such facility is at or below the residual concentration prescribed for that substance in column III of Appendix II to this Annex and until the tank is empty. Any water subsequently added to the tank may be discharged into the sea when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

(2) The discharge into the sea of substances in Category B as defined in Regulation 3(1)(b) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at last 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;

(c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in sub-paragraph (b) of this paragraph, which shall in no case exceed the greater of 1 cubic metre of 1/3,000 of the tank capacity in cubic metres;

(d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

(3) The discharge into the sea of substances in Category C as defined in Regulation 3(1)(c) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 10 parts per million;

(c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in sub-paragraph (b) of this paragraph, which shall in no case exceed the greater of 3 cubic metres or 1/1,000 of the tank capacity in cubic metres;

(d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

(4) The discharge into the sea of substances in Category D as defined in Regulation 3(1)(d) of this Annex, or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) such mixtures are of a concentration not greater than one part of the substance in ten parts of water; and

(c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land.

(5) Ventilation procedures approved by the Administration may be used to remove cargo residues from a tank. Such procedures shall be based upon standards developed by the Organization. Any water subsequently introduced into the tank shall be regarded as clean and shall not be subject to paragraph (1), (2), (3) or (4) of this Regulation.

(6) The discharge into the sea of substances which have not been categorized, provisionally assessed, or evaluated as referred to in Regulation 4(1) of this Annex, or of ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited.

Categories A, B and C Substances within Special Areas

Subject to the provisions of Regulation 6 of this Annex,

(7) The discharge into the sea of substances in Category A as defined in Regulation 3(1)(a) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited. If tanks containing such substances or mixtures are to be washed the resulting residues shall be discharged to a reception facility which the States bordering the special area shall provide in accordance with Regulation 7 of this Annex, until the concentration of the substance in the effluent to such facility is at or below the residual concentration prescribed for that substance in column IV of Appendix II to this Annex and until the tank is empty. Any water subsequently added to the tank may be discharged into the sea when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(c) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

(8) The discharge into the sea of substances in Category B as defined in Regulation 3(1)(b) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all of the following conditions are satisfied:

(a) the tank has been prewashed in accordance with the procedure approved by the Administration and based on standards developed by the Organization and the resulting tank washings have been discharged to a reception facility.

(b) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(c) the procedures and arrangements for discharge and washings are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;

(d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water not less than 25 metres.

(9) The discharge into the sea of substances in Category C as defined in Regulation 3(1)(c) of this Annex or of those provisionally assessed as such, or ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited except when all the following conditions are satisfied:

(a) the ship is proceeding en route at a speed of at least 7 knots in the case of self-propelled ships or at least 4 knots in the case of ships which are not self-propelled;

(b) the procedures and arrangements for discharge are approved by the Administration. Such procedures and arrangements shall be based upon standards developed by the Organization and shall ensure that the concentration and rate of discharge of the effluent is such that the concentration of the substance in the wake astern of the ship does not exceed 1 part per million;

(c) the maximum quantity of cargo discharged from each tank and its associated piping system does not exceed the maximum quantity approved in accordance with the procedures referred to in sub-paragraph (b) of this paragraph which shall in not case exceed the greater of 1 cubic metre of 1/3,000 of the tank capacity in cubic metres;

(d) the discharge is made below the waterline, taking into account the location of the seawater intakes; and

(e) the discharge is made at a distance of not less than 12 nautical miles from the nearest land and in a depth of water of not less than 25 metres.

(10) Ventilation procedures approved by the Administration may be used to remove cargo residues from a tank. Such procedures shall be based upon standards developed by the Organization. Any water subsequently introduced into the tank shall be regarded as clean and shall not be subject to paragraph (7), (8) or (9) of this Regulation.

(11) The discharge into the sea of substances which have not been categorized, provisionally assessed or evaluated as referred to in Regulation 4(1) of this Annex, or of ballast water, tank washings, or other residues or mixtures containing such substances shall be prohibited.

(12) Nothing in this Regulation shall prohibit a ship from retaining on board the residues from a Category B or C cargo and discharging such residues into the sea outside a special area in accordance with paragraph (2) or (3) or this Regulation, respectively.

(13) (a) The Governments of Parties to the Convention, the coastlines which border on any given special area, shall collectively agree and establish a date by which time the requirement of Regulation 7(1) of this Annex will be fulfilled and from which the requirements of paragraphs (7), (8), (9) and (10) of this Regulation in respect of that area shall take effect and notify the Organization of the date so established at least six months in advance of that date. The Organization shall then promptly notify all Parties of that date.

(b) If the date of entry into force of the present Convention is earlier than the date established in accordance with sub-paragraph (a) of this paragraph, the requirements of paragraphs (1), (2) and (3) of this Regulation shall apply during the interim period.

Regulation 5A

Pumping, Piping and Unloading Arrangements

(1) Every ship constructed on or after 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 0.1 cubic metres in the tank's associated piping and in the immediate vicinity of that tank's suction point.

(2) (a) Subject to the provisions of sub-paragraph (b) of this paragraph, every ship constructed before 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 0.3 cubic metres in the tank's associated piping and in the immediate vicinity of that tank's suction point.

(b) Until 2 October 1994 ships referred to in sub-paragraph (a) of this paragraph if not in compliance with the requirements of that sub-paragraph shall, as a minimum, be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions and surface residue assessment, that each tank designated for the carriage of a Category B substance does not retain a quantity of residue in excess of 1 cubic metre or 1/3000 of the tank capacity in cubic metres, whichever is greater, in that tank and the associated piping.

(3) Every ship constructed on or after 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 0.3 cubic metres in the tank's associated piping and in the immediate vicinity of that tank's suction point.

(4) (a) Subject to the provisions of sub-paragraph (b) of this paragraph, every ship constructed before 1 July 1986 shall be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 0.9 cubic metres in the tank's associated piping and in the immediate vicinity of that tank's suction point.

(b) Until 2 October 1994 the ships referred to in sub-paragraph (a) of this paragraph if not in compliance with the requirements of that sub-paragraph shall as a minimum, be provided with pumping and piping arrangements to ensure, through testing under favorable pumping conditions and surface residue assessment, that each tank designated for the carriage of a Category C substance does not retain a quantity of residue in excess of 3 cubic metres or 1/1000 of the tank capacity in cubic metres, whichever is greater, in that tank and the associated piping.

(5) Pumping conditions referred to in paragraphs (1), (2), (3) and (4) of this Regulation shall be approved by the Administration and based on standards developed by the Organization. Pumping efficiency tests referred to in paragraphs (1), (2), (3) and (4) of this Regulation shall use water as the test medium and shall be approved by the Administration and based on standards developed by the Organization. The residues on cargo tank surfaces, referred to in paragraphs (2)(b) and (4)(b) of this Regulation shall be determined based on standards developed by the Organization.

(6) (a) Subject to the provision of sub-paragraph (b) of this paragraph, the provisions of paragraphs (2) and (4) of this Regulation need not apply to a ship constructed before 1 July 1986 which is engaged in restricted voyages as determined by the Administration between:

(i) ports or terminals within a State Party to the present Convention; or

(ii) ports or terminals of States Parties to the present Convention.

(b) The provisions of sub-paragraph (a) of this paragraph shall only apply to a ship constructed before 1 July 1986 if:

(i) each time a tank containing Category B or C substances or mixtures is to be washed or ballasted, the tank is washed in accordance with a pre-wash procedure approved by the Administration and based on Standards developed by the Organization and the tank washings are discharged to a reception facility;

(ii) subsequent washings or ballast water is discharged to a reception facility or at sea in accordance with other provisions of this Annex;

(iii) the adequacy of the reception facilities at the ports or terminals referred to above, for the purpose of this paragraph, is approved by the Governments of the States Parties to the present Convention within which such ports or terminals are situated;

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

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

(7) For a ship whose constructional and operational features are such that ballasting of cargo tanks is not required and cargo tank washing is only required for repair or dry-docking, the Administration may allow exemption from the provisions of paragraphs (1), (2), (3) and (4) of this Regulation, provided that all of the following conditions are complied with:

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

(b) any effluent from tank washings which may be carried out before a repair or drydocking is discharged to a reception facility, the adequacy of which is ascertained by the Administration;

(c) the Certificate required under this Annex indicates:

(i) that each cargo tank is certified for the carriage of only one named substance; and

(ii) the particulars of the exemption;

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

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

Regulation 6

Exceptions

Regulation 5 of this Annex shall not apply to:

(a) the discharge into the sea of noxious liquid substances or mixtures containing such substances necessary for the purpose of securing the safety of a ship or saving life at sea; or

(b) the discharge into the sea of noxious liquid substances or mixtures containing such substances resulting from damage to a ship or its equipment:

(i) provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimizing the discharge; and

(ii) except if the owner of the Master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or

(c) the discharge into the sea of noxious liquid substances or mixtures containing such substances, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution. Any such discharge shall be subject to the approval of any Government in whose jurisdiction it is contemplated the discharge will occur.

Regulation 7

Reception Facilities and Cargo Unloading Terminal Arrangements

(1) The Government of each Party to the Convention undertakes to ensure the provision of reception facilities according to the needs of ships using its ports, terminals or repair ports as follows:

(a) cargo loading and unloading ports and terminals shall have facilities adequate for reception without undue delay to ships of such residues and mixtures containing noxious liquid substances as would remain for disposal from ships carrying them as a consequence of the application of this Annex; and

(b) ship repair ports undertaking repairs to chemical tankers shall have facilities adequate for the reception of residues and mixtures containing noxious liquid substances.

(2) The Government of each Party shall determine the types of facilities provided for the purpose of paragraph (1) of this regulation at each cargo loading and unloading port, terminal and ship repair port in its territories and notify the Organization thereof.

(3) The Government of each Party to the Convention shall undertake to ensure that cargo unloading terminals shall provide arrangements to facilitate stripping of cargo tanks of ships unloading noxious liquid substances at these terminals. Cargo hoses and piping systems of the terminal, containing noxious liquid substances received from ships unloading these substances at the terminal, shall not be drained back to the ship.

(4) Each Party shall notify the Organization, for transmission to the Parties concerned, of any case where facilities required under paragraph (1) or arrangements required under paragraph (3) of this Regulation are alleged to be inadequate.

Regulation 8

Measures of Control

(1) (a) The Government of each Party to the Convention shall appoint or authorize surveyors for the purpose of implementing this Regulation. The surveyors shall execute control in accordance with control procedures developed by the Organization.

(b) The master of a ship carrying noxious liquid substances in bulk shall ensure that the provisions of Regulation 5 and this Regulation have been complied with and that the Cargo Record Book is completed in accordance with Regulation 9 of this Annex whenever operations as referred to in that Regulation take place.

(c) An exemption referred to in paragraph (2)(b), (5)(b), (6)(c) or (7)(c) of this Regulation may only be granted by the Government of the receiving Party to a ship engaged in voyages to ports or terminals under the jurisdiction of other States Parties to the Present Convention. When such an exemption has been granted, the appropriate entry made in the Cargo Record Book shall be endorsed by the surveyor referred to in sub-paragraph (a) of this paragraph.

Category A substances in all areas

(2) With respect to Category A substances, the following provisions shall apply in all areas:

(a) A tank which has been unloaded shall, subject to the provisions of sub-paragraph (b) of this paragraph, be washed in accordance with the requirements of paragraph (3) or (4) of this Regulation before the ship leaves the port of unloading.

(b) At the request of the ship's master, the Government of the receiving Party may exempt the ship from the requirements referred to in sub-paragraph (a) of this paragraph, where it is satisfied that:

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

(ii) the tank unloaded is neither washed nor ballasted at sea and the provisions of paragraph (3) or (4) of this Regulation are complied with at another port provided that it has been confirmed in writing that a reception facility at that port is available and is adequate for such a purpose; or

(iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

(3) If the tank is to be washed in accordance with sub-paragraph (2)(a) of this Regulation, the effluent from the tank washing operation shall be discharged to a reception facility at least until the concentration of the substance in the discharge, as indicated by analyses of samples of the effluent taken by the surveyor, has fallen to the residual concentration specified for that substance in Appendix II to this Annex. When the required residual concentration has been achieved, remaining tank washings shall continue to be discharged to the reception facility until the tank is empty. Appropriate entries of these operations shall be made in the Cargo Record Book and endorsed by the surveyor referred to under paragraph (1)(a) of this Regulation.

(4) Where the Government of the receiving party is satisfied that it is impracticable to measure the concentration of the substance in the effluent without causing undue delay to the ship, that Party may accept an alternative procedure as being equivalent to paragraph (3) of this Regulation provided that:

(a) The tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization; and

(b) The surveyor referred to under paragraph (1)(a) certifies in the Cargo Record Book that:

(i) the tank, its pump and piping systems have been emptied; and

(ii) the prewash has been carried out in accordance with the prewash procedure approved by the Administration for that tank and that substance; and

(iii) the tank washings resulting from such prewash have been discharged to a reception facility and the tank is empty.

Category B and C substances outside Special Areas

(5) With respect to Category B and C substances, the following provisions shall apply outside Special Areas:

(a) A tank which has been unloaded shall, subject to the provisions of sub-paragraph (b) of this paragraph, be prewashed before the ship leaves the port of unloading, whenever:

(i) the substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity exceeding the maximum quantity which may be discharged into the sea under Regulation 5(2) or (3) of this Annex in case of Category B or C substances respectively; or

(ii) the unloading is not carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under Regulation 5A(5) of this Annex, unless alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this Regulation, to remove the cargo residues from the ship to quantities specified in Regulation 5A of this Annex as applicable.

The prewash procedure used shall be approved by the Administration and based on standards developed by the Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.

(b) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of sub-paragraph (a) of this paragraph, where it is satisfied that:

(i) the tank unloaded is to be reloaded with the same substance or another substance compatible with the previous one and that the tank will not be washed nor ballasted prior to loading; or

(ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a reception facility at that port is available and adequate for such a purpose; or

(iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category B substances within Special Areas

(6) With respect to Category B substances, the following provisions shall apply within Special Areas:

(a) A tank which has been unloaded shall, subject to the provisions of sub-paragraph (b) and (c), be prewashed before the ship leaves the port of unloading. The prewash procedure used shall be approved by the Administration and based on standards developed by the Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.

(b) The requirements of sub-paragraph (a) of this paragraph do not apply when all the following conditions are satisfied:

(i) the Category B substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity not exceeding the maximum quantity which may be discharged into the sea outside Special Areas under Regulation 5(2) of this Annex, and the residues are retained on board for subsequent discharge into the sea outside the Special Area in compliance with Regulation 5(2) of this Annex; and

(ii) the unloading is carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under Regulation 5A(5) of this Annex, or failing to comply with the approved pumping conditions, alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this Regulation, to

remove the cargo residues from the ship to quantities specified in Regulation 5A of this Annex as applicable.

(c) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of sub-paragraph (a) of this paragraph, where it is satisfied that:

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

(ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a reception facility at that port is available and adequate for such a purpose; or

(iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category C substances within Special Areas

(7) With respect to Category C substances, the following provisions shall apply within Special Areas:

(a) A tank which has been unloaded shall, subject to the provisions of sub-paragraphs (b) and (c) of this paragraph, be prewashed before the ship leaves the port of unloading, whenever:

(i) the Category C substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity exceeding the maximum quantity which may be discharged into the sea under Regulation 5(9) of this Annex; or

(ii) the unloading is not carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under Regulation 5A(5) of this Annex, unless alternative measures are taken to the satisfaction of the surveyor referred to in Paragraph (1)(a) of this Regulation, to remove the cargo residues from the ship to quantities specified in Regulation 5A of this Annex as applicable.

The prewash procedure used shall be approved by the Administration and based on standards developed by the Organization and the resulting tank washings shall be discharged to a reception facility at the port of unloading.

(b) The requirements of sub-paragraph (a) of this paragraph do not apply when all the following conditions are satisfied:

(i) the Category C substance unloaded is identified in the standards developed by the Organization as resulting in a residue quantity not exceeding the maximum quantity which may be discharged into the sea outside Special Areas under Regulation 5(3) of this Annex, and the residues are retained on board for subsequent discharge into the sea outside the Special Area in compliance with Regulation 5(3) of this Annex; and

(ii) the unloading is carried out in accordance with the pumping conditions for the tank approved by the Administration and based on standards developed by the Organization as referred to under Regulation 5A(5) of this Annex, or failing to comply with the approved pumping conditions, alternative measures are taken to the satisfaction of the surveyor referred to in paragraph (1)(a) of this Regulation, to remove the cargo residues from the ship to quantities specified in Regulation 5A of this Annex as applicable.

(c) At the request of the ship's master, the Government of the receiving party may exempt the ship from the requirements of sub-paragraph (a) of this paragraph, where it is satisfied that:

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

(ii) the tank unloaded is neither washed nor ballasted at sea and the tank is prewashed in accordance with a procedure approved by the Administration and based on standards developed by the Organization and resulting tank washings are discharged to a reception facility at another port, provided that it has been confirmed in writing that a reception facility at that port is available and adequate for such a purpose; or

(iii) the cargo residues will be removed by a ventilation procedure approved by the Administration and based on standards developed by the Organization.

Category D substances in all areas

(8) With respect to Category D substances, a tank which has been unloaded shall either be washed and the resulting tank washings shall be discharged to a reception facility, or the remaining residues in the tank shall be diluted and discharged into the sea in accordance with Regulation 5(4) of this Annex.

Discharge from a slop tank

(9) Any residues retained on board in a slop tank, including those from cargo pump room bilges, which contain a Category A substance, or within a special area either a Category A or a Category B substance, shall be discharged to a reception facility in accordance with the provisions of Regulation 5(1), (7) or (8) of this Annex, whichever is applicable.

Regulation 9

Cargo Record Book

(1) Every ship to which this Annex applies shall be provided with a Cargo Record Book, whether as part of the ship's official log book or otherwise, in the form specified in Appendix IV to this Annex.

(2) The Cargo Record Book shall be completed, on a tank-to-tank basis, whenever any of the following operations with respect to a noxious liquid substance tank place in the ship:

(i) loading of cargo;
(ii) internal transfer of cargo,
(iii) unloading of cargo;
(iv) cleaning of cargo tanks;
(v) ballasting of cargo tanks;
(vi) discharge of ballast from cargo tanks;
(vii) disposal of residues to reception facilities; of residues
(viii) discharge into the sea or removal by ventilation, in accordance with Regulation 5 of this Annex.

(3) In the event of any discharge of the kind referred to in Article 8 of the present Convention and Regulation 6 of this Annex of any noxious liquid substance or mixture containing such substance, whether intentional or accidental, an entry shall be made in the Cargo Record Book stating the circumstances of, and reasons for, the discharge.

(4) When a surveyor appointed or authorized by the Government of the Party to the Convention to supervise any operations under this Annex has inspected a ship, then that surveyor shall make an appropriate entry in the Cargo Record Book.

(5) Each operation referred to in paragraphs (2) and (3) of this Regulation shall be fully recorded without delay in the Cargo Record Book so that all the entries in the Book appropriate to that operation are completed. Each entry shall be signed by the officer or officers in charge of the operation concerned and each page shall be signed by the Master of the ship. The entries in the Cargo Record Book shall be in the official language of the State whose flag the ship is entitled to fly, and, for ships holding an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or a Certificate referred to in Regulation 12A of this Annex in English or French. The entries in an official national language of the State whose flag the ship is entitled to fly shall prevail in case of a dispute or discrepancy.

(6) The Cargo Record Book shall be kept in such a place as to be readily available for inspection and, except in the case of unmanned ships under tow, shall be kept on board the ship. It shall be retained for a period of three years after the last entry has been made.

(7) The competent authority of the Government of a Party may inspect the Cargo Record Book on board any ship to which this Annex applies while the ship is in its port, and may make a copy of any entry in that book and may require the Master of the ship to certify that the copy is a true copy of such entry. Any copy so made which has been certified by the Master of the ship as a true copy of an entry in the ship's Cargo Record Book shall be made admissable in any judicial proceedings as evidence of the facts stated in the entry. The inspection of a Cargo Record Book and the taking of a certified copy by the competent authority under this paragraph shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

Regulation 10

Surveys

(1) Ships carrying noxious liquid substances in bulk shall be subject to the surveys specified below:

(a) An initial survey before the ship is put in service or before the Certificate required under Regulation 11 of this Annex is issued for the first time, and which shall include a complete survey of its structure, equipment, systems, fittings, arrangements and material in so far as the ship is covered by this Annex. This survey shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the applicable requirements of this Annex.

(b) Periodical surveys at intervals specified by the Administration, but not exceeding five years, and which shall be such as to ensure that the structure, equipment, systems, fittings, arrangements and material fully comply with the requirements of this Annex.

(c) A minimum of one intermediate survey during the period of validity of the Certificate and which shall be such as to ensure that the equipment and associated pump and piping systems fully comply with the applicable requirements of this Annex and are in good working order. In cases where only one such intermediate survey is carried out in any one Certificate validity period it shall be held not before six months prior to, nor later than six months after the half-way date of the Certificate's period of validity. Such intermediate surveys shall be endorsed on the Certificate issued under Regulation 11 of this Annex.

(d) An annual survey within 3 months before or after the day and the month of the date of issue of the Certificate and which shall include a general examination to ensure that the structure, fittings, arrangements and materials remain in all respects satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the Certificate issued under Regulation 11 of this Annex.

(2) (a) Surveys of ships as regards the enforcement of the provisions of this Annex shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

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

(i) require repairs to a ship; and

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

The Administration shall notify the Organization of the specific responsibilities and conditions of the authority delegated to the nominated surveyors or recognized organizations, for circulation to Parties to the present Convention for the information of their officers.

(c) When a nominated surveyor or recognized organization determines that the condition of the ship or its equipment does not correspond substantially with the particulars of the Certificate, or is such that the ship is not fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment, such surveyor or organization shall immediately ensure that corrective action is taken and shall in due course notify the Administration. If such corrective action is not taken the Certificate should be withdrawn and the Administration shall be notified immediately; and if the ship is in a port of another Party, the appropriate authorities of the port State shall also be notified immediately. When an officer of the Administration, a nominated surveyor or recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor, or organization any necessary

assistance to carry out their obligations under this Regulation. When applicable, the Government of the port State concerned shall take such steps as will ensure that the ship shall not sail until it can proceed to sea or leave the port for the purpose of proceeding to the nearest appropriate repair yard available without presenting an unreasonable threat of harm to the marine environment.

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

(3) (a) The condition of the ship and its equipment shall be maintained to conform with the provisions of the present Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting an unreasonable threat of harm to the marine environment.

(b) After any survey of the ship under paragraph (1) of this Regulation has been completed, no change shall be made in the structure, equipment, systems, fittings, arrangements or material covered by the survey, without the sanction of the Administration, except the direct replacement of such equipment and fittings.

(c) Whenever an accident occurs to a ship or a defect is discovered which substantially affects the integrity of the ship or the efficiency or completeness of its equipment covered by this Annex, the master or owner of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant Certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph (1) of this Regulation is necessary. If the ship is in a port of another Party, the master or owner shall also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization shall ascertain that such report has been made.

Regulation 11

Issue of Certificate

(1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued, after survey in accordance with the provisions of Regulation 10 of this Annex, to any ship carrying noxious liquid substances in bulk and which is engaged in voyages to ports or terminals under the jurisdiction of other Parties to the Convention.

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

(3) (a) The Government of a Party to the Convention may, at the request of the Administration, cause a ship to be surveyed and, if satisfied that the provisions of this Annex are complied with, shall issue or authorize the issue of an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk to the ship in accordance with this Annex.

(b) A copy of the Certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.

(c) A Certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as the Certificate issued under paragraph (1) of this Regulation.

(d) No International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued to a ship which is entitled to fly the flag of a State which is not a Party.

(4) The International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be drawn up in an official language of the issuing country in the form corresponding to the model given in Appendix V to this Annex. If the language used is neither English nor French, the text shall include a translation into one of these languages.

Regulation 12

Duration of Certificate

(1) An International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk shall be issued for a period specified by the Administration, which shall not exceed five years from the date of issue.

(2) A Certificate shall cease to be valid if significant alterations have taken place in the construction, equipment, systems, fittings, arrangements or material required without the sanction of the Administration, except the direct replacement of such equipment or fittings, or if intermediate or annual surveys as specified by the Administration under Regulation 10(1)(c) or (d) of this Annex are not carried out.

(3) A Certificate issued to a ship shall also cease to be valid upon transfer of the ship to the flag of another State. A new Certificate shall be issued only when the Government issuing the new Certificate is fully satisfied that the ship is in full compliance with the requirements of Regulation 10(3)(a) and (b) of this Annex. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Government of the Party whose flag the ship was formerly entitled to fly shall transmit as soon as possible to the Administration a copy of the Certificate

carried by the ship before the transfer and, if available, a copy of the relevant survey report.

Regulation 12A

Survey and Certification of Chemical Tankers

Notwithstanding the provisions of Regulations 10, 11 and 12 of this Annex, chemical tankers which have been surveyed and certified by States Parties to the present Convention in accordance with the provisions of the International Bulk Chemical Code or the Bulk Chemical Code, as applicable, shall be deemed to have complied with the provisions of the said Regulations, and the Certificate issued under that Code shall have the same force and receive the same recognition as the certificate issued under Regulation 11 of this Annex.

Regulation 13

Requirements for Minimizing Accidental Pollution

(1) The design, construction, equipment and operation of ships carrying noxious liquid substances of Category A, B or C in bulk, shall be such as minimize the uncontrolled discharge into the sea of such substances.

(2) Chemical tankers constructed on or after 1 July 1986 shall comply with the requirements of the International Bulk Chemical Code.

(3) Chemical tankers constructed before 1 July 1986 shall comply with the following requirements:

(a) The following chemical tankers shall comply with the requirements of the Bulk Chemical Code as applicable to ships referred to in 1.7.2 of that Code:

(i) ships for which the building contract is placed on or after 2 November 1973 and which are engaged on voyages to ports or terminals under the jurisdiction of other States Parties to the Convention; and

(ii) ships constructed on or after 1 July 1983 which are engaged solely on voyages between ports or terminals within the State the flag of which the ship is entitled to fly.

(b) The following chemical tankers shall comply with the requirements of the Bulk Chemical Code as applicable to ships referred to in 1.7.3 of that Code:

(i) ships for which the building contract is placed before 2 November 1973 and which are engaged on voyages to ports or terminals under the jurisdiction of other States Parties to the Convention; and

(ii) ships constructed before 1 July 1983 which are engaged on voyages between ports or terminals within the State the flag of which the ship is entitled to fly, except that for ships of less than 1,600 tons gross tonnage compliance with the Code in respect of construction and equipment shall take effect not later than 1 July 1994.

(4) In respect of ships other than chemical tankers carrying noxious liquid substances of Category A, B or C in bulk, the Administration shall establish appropriate measures based on the Guidelines developed by the Organization in order to ensure that the provisions of paragraph (1) of this Regulation are complied with.

Regulation 14

Carriage and Discharge of Oil-like Substances

Notwithstanding the provisions of other Regulations of this Annex, noxious liquid substances designated in Appendix II of this Annex as falling under Category C or D and identified by the Organization as oil-like substances under the criteria developed by the Organization, may be carried on an oil tanker as defined in Annex I of the Convention and discharged in accordance with the provisions of Annex I of the present Convention, provided that all of the following conditions are complied with:

(a) the ship complies with the provisions of Annex 1 of the present Convention as applicable to product carriers as defined in that Annex;

(b) the ship carries an International Oil Pollution Prevention Certificate and its Supplement B and the Certificate is endorsed to indicate that the ship may carry oil-like substances in conformity with this Regulation and the endorsement includes a list of oil-like substances the ship is allowed to carry;

(c) in the case of Category C substances the ship complies with the ship type 3 damage stability requirements of:

(i) the International Bulk Chemical Code in the case of a ship constructed on or after 1 July 1986; or

(ii) the Bulk Chemical Code, as applicable under Regulation 13 of this Annex, in the case of a ship constructed before 1 July 1986; and

(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.

Appendix I

GUIDELINES FOR THE CATEGORIZATION OF NOXIOUS LIQUID SUBSTANCES

Category A — Substances which are bioaccumulated and liable to produce a hazard to aquatic life or human health; or which are highly toxic to aquatic life (as expressed by a Hazard Rating 4, defined by a TLm less than 1 ppm); and additionally certain substances which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLm of 1 or more, but less than 10 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category B — Substances which are bioaccumulated with a short retention of the order of one week or less; or which are liable to produce tainting of the sea food; or which are moderately toxic to aquatic life (as expressed by a Hazard Rating 3, defined by a TLm of 1 ppm or more, but less than 10 ppm); and additionally certain substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLm of 10 ppm or more, but less than 100 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category C — Substances which are slightly toxic to aquatic life (as expressed by a Hazard Rating 2, defined by a TLm of 10 ppm or more, but less than 100 ppm); and additionally certain substances which are practically non-toxic to aquatic life (as expressed by a Hazard Rating 1, defined by a TLm of 100 ppm or more, but less than 1,000 ppm) when particular weight is given to additional factors in the hazard profile or to special characteristics of the substance.

Category D — Substances which are practically non-toxic to aquatic life (as expressed by a Hazard Rating 1, defined by a TLm of 100 ppm or more, but less than 1,000 ppm); or causing deposits blanketing the seafloor with a high biochemical oxygen demand (BOD); or highly hazardous to human health, with an LD_{50} of less than 5 mg/kg; or produce moderate reduction of amenities because of persistency, smell or poisonous or irritant characteristics, possibly interfering with use of beaches; or moderately hazardous to human health, with an LD_{50} of 5 mg/kg or more, but less than 50 mg/kg and produce slight reduction of amenities.

Other Liquid Substances (for the purposes of Regulation 4 of this Annex) Substances other than those categorized in Categories A, B, C and D above.

APPENDIX II

LIST OF NOXIOUS LIQUID SUBSTANCES CARRIED IN BULK

Existing list is replaced by the following:

Substance	UN Number	Pollution Category for operational discharge (Regulation 3 of Annex II)	Residual concentration (per cent by weight) (Regulation 5(1)) of Annex II)	Regulation 5(7) of Annex II)
		I	II	III Outside special areas	IV Within special areas
Acetaldenyde	1089	C		
Acetic acid	2789* 2790*	C		
Acetic annydride	1715	C		
Acetone cyanohydrin	1541	A	0.1	0.05
Acetophenone		D		
Acetyl chloride	1717	C		
Acrylamide solution (50% or less)	2074	D		
Acrylic acid	2218	D		
Acrylonitrile	1093	B		
Adiponitrile	2205	D		

Pollution Category in brackets indicates that the substance has been provisionally included in this list and that further data are necessary in order to complete the evaluation of its environmental hazards, particularly in relation to living resources. Until the hazard evaluation is completed the Pollution Category assigned shall be used.

* UN Number 2789 refers to more than 80% solution and 2790 between 10% and 80%

	I	II	III	IV
Alcohols, C_4, C_5, C_6 mixtures		D		
Alcohols, C_5, C_6 as individual alcohols		D		
Alcohols C_7, C_8, C_9 as individuals and mixtures		C		
Alcohols C_{10}, C_{11}, C_{12} as individuals and mixtures		B		
Alcohol ethoxylate (higher secondary)		D		
Alcohol (C_{13}/C_{15}) poly(3-11)ethoxylates		B		
Alkyl acrylate vinyl pyridine copolymer in toluene		(C)		
Alkylamine mixtures		C		
Alkyl (C_9-C_{17}) benzene mixtures (straight or branched chain)		D		
Alkyl benzene sulphonate (branched chain)		B		
Alkyl benzene sulphonate (straight chain)		C		
Alkyl benzene sulphonic acid	2584 2586	C		
Allyl alcohol	1098	B		
Allyl chloride	1100	B		
2-(2-Aminoethoxy)ethanol	3055	D		
Aminoethylethanolamine		(D)		
N-Aminoethylpiperazine	2815	D		
Ammonia aqueous (28% or less)	2672*	C		

	I	II	III	IV
Ammonium nitrate solution (93% or less)	2426	D		
Ammonium sulphate solution		D		
Ammonium sulphide solution (45% or less)	2683	B		
Amyl acetate, commercial	1104	C		
n-Amyl acetate	1104	C		
sec-Amyl acetate	1104	C		
n-Amyl alcohol	1105	D		
sec-Amyl alcohol	1105	D		
Amyl alcohol, primary	1105	D		
Aniline	1547	C		
Benzaldehyde		C		
Benzene and mixtures having 10% benzene or more	1114*	C		
Benzene sulphonyl chloride	2225	D		
Benzyl acetate		C		
Benzyl alcohol		C		
Benzyl chloride	1738	B		
Butene oligomer		D		
n-Butyl acetate	1123	C		
sec-Butyl acetate	1123	D		
n-Butyl acrylate	2348	D		
Butylamine (all isomers)	1125 (normal) 1214 (iso)	C		

* UN number 1114 applies to Benzene

	I	II	III	IV
Butyl benzyl phthalate		A	0.1	0.05
n-Butyl butyrate		(B)		
Butyl/Decyl/Cetyl/Eicosyl methacrylate mixture		D		
Butylene glycol		D		
1,2-Butylene oxide	3022	C		
n-Butyl ether	1149	C		
Butyl lactate		D		
Butyl methacrylate	2227	D		
n-Butyraldehyde	1129	B		
Butyric acid	2820	B		
gamma-Butyrolactone		D		
Calcium alkyl salicylate		D		
Calcium chloride solution		D		
Calcium hydroxide solution		D		
Calcium hypochlorite solution		B		
Calcium naphthenate in mineral oil		A	0.1	0.05
Camphor oil	1130	B		
Caprolactam		D		
Carbolic oil		A	0.1	0.05
Carbon disulphide	1131	A	0.01	0.005
Carbon tetrachloride	1846	B		

	I	II	III	IV
Cashew nut shell oil (untreated)		D		
Castor oil		D		
Chloroacetic acid	1750	C		
Chloroacetone	1695	C		
Chlorobenzene	1134	B		
Chloroform	1888	B		
1-Chloroheptane		A	0.1	0.05
Chlorohydrins, crude		(D)		
o-Chloronitrobenzene	1578	B		
2-Chloropropionic acid	2511	(C)		
3-Chloropropionic acid		(C)		
Chlorosulphonic acid	1754	C		
m-Chlorotoluene	2238	B		
o-Chlorotoluene	2238	A	0.1	0.05
p-Chlorotoluene	2238	B		
Chlorotoluene (mixed isomers)	2238	A	0.1	0.05
Choline chloride solution		D		
Citric acid		D		
Coal tar naphtha solvent		B		
Cobalt naphthenate in solvent naphtha		A	0.1	0.05
Coconut oil		D		
Coconut oil, fatty acid methyl ester		D		
Cod liver oil		D		

	I	II	III	IV
Corn oil		D		
Cotton seed oil		D		
Creosote (coal tar)		(C)		
Creosote (wood)		A	0.1	0.05
Cresol (mixed isomers)	2076	A	0.1	0.05
Cresyl diphenyl phosphate		A	0.1	0.05
Cresylic acid	2022	A	0.1	0.05
Crotonaldehyde	1143	B		
Cycloheptane	2241	D		
Cyclohexane	1145	C		
Cyclohexane/Cyclohexanol mixture		C		
Cyclohexanol		C		
Cyclohexanone	1915	D		
Cyclohexylamine	2357	C		
p-Cymene	2046	C		
Decanydronaphthalene	1147	(D)		
n-Decaldehyde		B		
Decane		(D)		
Decene		B		
Decyl acrylate		A	0.1	0.05
Decyl alcohol (all isomers)		B		
Diacetone alcohol	1148	D		

	I	II	III	IV
Dialkyl (C_7-C_9) phthalates		(D)		
Dialkyl (C_9-C_{13}) phthalates		D		
Dibenzyl ether		(C)		
Dibutylamine		C		
Dibutyl phthalate		A	0.1	0.05
m-Dichlorobenzene		B		
o-Dichlorobenzene	1591	B		
1,1-Dichloroethane	2362	B		
1,2-Dichloroethylene	1150	(D)		
Dichloroethyl ether	1916	B		
1,6-Dichlorohexane		B		
2,2-Dichloroisopropyl ether	2490	C		
Dichloromethane	1593	D		
2,4-Dichlorophenol	2021	A	0.1	0.05
2,4-Dichlorophenoxy-acetic acid		(A)	0.1	0.05
2,4-Dichlorophenoxy-acetic acid, diethanol-amine salt solution		(A)	0.1	0.05
2,4-Dichlorophenoxy-acetic acid, dimethyl-amine salt (70% or less) solution		(A)	0.1	0.05
2,4-Dichlorophenoxy-acetic acid, triiso-propanolamine salt solution		(A)	0.1	0.05
1,1-Dichloropropane		B		
1,2-Dichloropropane	1279	B		
1,3-Dichloropropane		B		

	I	II	III	IV
1,3-Dichloropropene	2047	B		
Dichloropropene/ Dichloropropane mixtures		B		
2,2-Dichloropropionic acid		D		
Dichloropropyl ether		(B)		
Diethylamine	1154	C		
Diethylaminoethanol	2686	C		
Diethylbenzene	2049	C		
Diethyl carbonate	2366	D		
Diethylene glycol dibutyl ether		D		
Diethylene glycol butyl ether acetate		(D)		
Diethylene glycol ethyl ether acetate		(D)		
Diethylene glycol methyl ether		C		
Diethylene glycol methyl ether acetate		(D)		
Diethylenetriamine	2079	(D)		
Di(2-ethylhexyl) adipate		D		
Di(2-ethylhexyl) phosphoric acid	1902	C		
Di(2-ethylhexyl) phthalate		D		
Diethyl malonate		C		
Diethyl phthalate		C		
Diethyl sulphate	1594	(B)		

	I	II	III	IV
Diglycidyl ether of Bisphenol A		B		
1,4-Dihydro-9,10-dihydroxy anthracene, disodium salt solution		D		
Diisobutylamine	2361	(C)		
Diisobutylene	2050	B		
Diisobutyl ketone	1157	D		
Diisobutyl phthalate		B		
Diisodecyl phthalate		D		
Diisononyl adipate		(D)		
Diisononyl phthalate		D		
Diisopropanolamine		C		
Diisopropylamine	1158	C		
Diisopropylbenzene (all isomers)		A	0.1	0.05
Diisopropyl naphthalene		D		
Dimethyl acetamide		(B)		
Dimethylamine solution (45% or less)	1160	C		
Dimethylamine solution (greater than 45% but not greater than 55%)	1160	C		
Dimethylamine solution (greater than 55% but not greater than 65%)	1160	C		
N,N-Dimethylcyclohexylamine	2264	C		
Dimethylethanolamine	2051	D		
Dimethylformamide	2265	D		

	I	II	III	IV
Dimethyl phthalate		C		
Dinitrotoluene (molten)	1600	B		
Dinonyl phthalate		D		
1,4-Dioxane	1165	D		
Dipentene	2052	C		
Diphenyl/Diphenyl oxide mixtures		A	0.1	0.05
Diphenyl ether		A	0.1	0.05
Diphenylmethane diisocyanate	2489	(B)		
Diphenyl oxide/Diphenyl phenyl ether mixture		A	0.1	0.05
Di-n-propylamine	2383	C		
Dipropylene glycol methyl ether		(D)		
Ditridecyl phthalate		D		
Diundecyl phthalate		D		
Divinyl acetylene		(D)		
Dodecane		(D)		
Dodecene (all isomers)		B		
Dodecyl alcohol		B		
Dodecylbenzene		C		
Dodecyl diphenyl oxide disulphonate solution		B		
Dodecylphenol		A	0.1	0.05
Epichloronydrin	2023	C		
Ethanolamine	2491	D		

	I	II	III	IV
2-Ethoxyethanol	1171	D		
2-Ethoxyethyl acetate	1172	C		
Ethyl acetate	1173	D		
Ethyl acetoacetate		(D)		
Ethyl acrylate	1917	B		
Ethylamine	1036	C		
Ethylamine solutions (72% or less)	2270	C		
Ethyl amyl ketone	2271	C		
Ethylbenzene	1175	C		
N-Ethylbutylamine		(C)		
Ethylcyclohexane		D		
N-Ethylcyclohexylamine		D		
Ethylene chloronydrin	1135	C		
Ethylene cyanohydrin		(D)		
Ethylenediamine	1604	C		
Ethylenediamine, tetraacetic acid, tetrasodium salt solution		D		
Ethylene dibromide	1605	B		
Ethylene dichloride	1184	B		
Ethylene glycol		D		
Ethylene glycol methyl butyl ether		D		
Ethylene glycol acetate		(D)		
Ethylene glycol butyl ether acetate		D		

	I	II	III	IV
Ethylene glycol methyl ether	1168	D		
Ethylene glycol methyl ether acetate	1189	D		
Ethylene glycol phenyl ether		D		
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture		D		
Ethylene oxide/Propylene oxide mixtures with an ethylene oxide content of not more than 30% by weight	2983	D		
2-Ethylhexanoic acid		D		
2-Ethylhexyl acrylate		D		
2-Ethylhexylamine	2276	B		
Ethylidene norbornene		B		
Ethyl lactate	1192	D		
Ethyl methacrylate	2277	(D)		
o-Ethyl phenol		(A)	0.1	0.05
2-Ethyl-3-propylacrolein		B		
Ethyltoluene		(B)		
Fatty alconols (C_{12}-C_{20})		B		
Ferric chloride solution	2582	C		
Ferric hydroxyethyl ethylenediamine triacetic acid, trisodium salt solution		D		
Fish oil		D		

	I	II	III	IV
Formaldehyde solutions (45% or less)	2209 1198	C		
Formamide		D		
Formic acid	1779	D		
Fumaric adduct of rosin, water dispersion		B		
Furfural	1199	C		
Furfuryl alconol	2874	C		
Glutaraldehyde solutions (50% or less)		D		
Glycidyl ester of C_{10} tryalkyl acetic acid		B		
Ground nut oil		D		
Heptanoic acid		(D)		
Heptanol (all isomers)		C		
Heptene (mixed isomers)		C		
Heptyl acetate		(B)		
Hexahydrocymene		(C)		
Hexamethylenediamine solution	1783	C		
Hexamethylenediamine adipate (50% in water)		D		
Hexamethyleneimine	2493	C		
1-Hexanol	2282	D		
1-Hexene	2370	C		
Hexyl acetate	1233	B		
Hydrochloric acid	1789	D		
Hydrogen peroxide solutions (over 60% but not over 70%)	2015	C		

	I	II	III	IV
Hydrogen peroxide solutions (over 8% but not over 60%)	2014 2984	C		
2-Hydroxyethyl acrylate		B		
N-(Hydroxyetnyl)ethylene diamine triacetic acid, trisodium salt solution		D		
Iron chloride, Copper chloride mixture		A	0.1	0.05
Isoamyl acetate	1104	C		
Isoamyl alcohol	1105	D		
Isobutyl acetate	1213	C		
Isobutyl acrylate	2527	D		
Isobutyl formate	2393	D		
Isobutyl formate/ Isobutanol mixtures		(C)		
Isobutyl methacrylate	2283	D		
Isobutyraldenyde	2045	C		
Isodecaldehyde		C		
Isodecyl acrylate		A	0.1	0.05
Isononanoic acid		D		
Isooctane	1262	(D)		
Isopentane	1265	D		
Isophorone		D		
Isophorone diamine	2289	D		
Isophorone diisocyanate	2290	B		
Isoprene	1218	C		
Isopropanolamine		C		

	I	II	III	IV
Isopropylamine	1221	C		
Isopropylbenzene	1918	B		
Isopropyl cyclohexane		D		
Isopropyl ether	1159	D		
Isovaleraldehyde	2058	C		
Lactic acid		D		
Lactonitrile solution (80% or less)		B		
Latex (ammonia inhibited)		D		
Linseed oil		D		
Maleic anhydride	2215	D		
Mercaptobenzothiazol, sodium salt solution		(B)		
Mesityl oxide	1229	D		
Methacrylic acid	2531	D		
Methacrylic resin in 1,2-Dichloroethane solution		(D)		
Methacrylonitrile		(B)		
Methanethiol		A	0.1	0.05
3-Methoxybutyl acetate	2708	D		
Methyl acrylate	1919	C		
Methylamine solutions (42% or less)	1235	C		
Methylamyl acetate	1233	(C)		
Methylamyl alcohol	2053	(C)		
Methyl amyl ketone	1110	(C)		
Methyl benzoate	2938	B		

	I	II	III	IV
Methyl tert-butyl ether	2398	D		
2-Methyl butyraldehyde		(C)		
4,4'-Methylene dianiline and its higher molecular weight polymers/ o-Dichlorobenzene mixtures		B		
Methylethanolamine		C		3
2-Methyl-6-ethylaniline		C		
Methyl ethyl ketone	1193	D		
2-Methyl-5-ethyl pyridine	2300	(B)		
Methyl formate	1243	D		
Methyl isobutyl ketone	1245	D		
Methyl methacrylate	1247	D		
alpha-Methylnaphthalene		A	0.1	0.05
beta-Methylnaphthalene		(A)	0.1	0.05
Methyl naphthalene		A	0.1	0.05
2-Methyl-1-pentene	2288	C		
Methylpropyl ketone	1249	D		
2-Methylpyridine	2313	B		
4-Methylpyridine	2313	B		
N-Methyl-2-pyrrolidone		B		
Methyl salicylate		(B)		
alpha-Methylstyrene	2303	A	0.1	0.05
Morpholine	2054	D		

	I	II	III	IV
Motor fuel anti-knock compounds	1649	A	0.1	0.05
Naphthalene (molten)	2304	A	0.1	0.05
Naphthenic acids		(A)	0.1	0.05
Neodecanoic acid		(B)		
Nitrating acid (mixture of sulphuric and nitric acids)	1796	(C)		
Nitric acid (less than 70%)	2031	C		
Nitric acid, (70% and over)	2031 2032	C		
Nitrilotriacetic acid, trisodium salt solution		D		
Nitrobenzene	1662	B		
Nitroethane	2842	(D)		
Nitromethane	1261	(D)		
o-Nitrophenol (molten)	1663	B		
1- or 2-Nitropropane	2608	D		
Nitropropane (60%)/ Nitroethane (40%) mixture	1993	D		
Nitrotoluenes	1664	C		
Nonane	1920	(D)		
Nonanoic acid		D		
Nonene		B		
Nonyl alcohol		C		
Nonylphenol		A	0.1	0.05

	I	II	III	IV
Nonylphenol poly(4-12) ethoxylates		B		
9,12-Octadecadienoic acid (Linoleic acid)		D		
9,12,15-Octadecatrienoic acid (Linolenic acid)		D		
Octane	1262	(D)		
Octanol (all isomers)		C		
Octene (all isomers)		B		
n-Octyl acetate		(D)		
Octyl decyl phthalate		D		
Olefins, straignt cnain, mixtures		B		
Olefins (C_6-C_8 mixtures)		B		
alpha-Olefins (C_6-C_{18} mixtures)		B		
Oleic acid		(D)		
Oleum	1831	C		
Olive oil		D		
Oxalic acid (10-25%)		D		
Palm nut oil		D		
Palm oil		D		
Palm oil, methyl ester		D		
Palm stearin		D		
n-Paraffins (C_{10}-C_{20})		(D)		
Paraldehyde	1264	C		
Pentachloroetnane	1669	B		

	I	II	III	IV
1,3-Pentadiene		C		
Pentaethylenehexamine/ Tetraethylenepentamine mixture		D		
n-Pentane	1265	C		
1-Pentanol	1105	D		
2-Pentanol	1105	(D)		
3-Pentanol	1105	(D)		
Pentene (all isomers)		C		
Perchloroethylene	1897	B		
Phenol	2312	B		
1-Phenyl-1-xylyl ethane		C		
Phosphoric acid	1805	D		
Phosphorus, yellow or white	2447	A	0.01	0.005
Phosphorus oxychloride	1810	D		
Phosphorus trichloride	1809	D		
Phthalic anhydride	2214	C		
Pinene	2368	A	0.1	0.05
Polyalkylene glycol butyl ether		(D)		
Polyethylene polyamines	2734 2735	(C)		
Polymethylene polyphenyl isocyanate	2206 2207	D		
Polypropylene glycols		D		
Potassium hydroxide solution	1814	C		
Potassium silicate solution		(D)		

	I	II	III	IV
n-Propanolamine		C		
beta-Propiolactone		D		
Propionaldenyde	1275	D		
Propionic acid	1848	D		
Propionic annydride	2496	C		
Propionitrile	2404	C		
n-Propyl acetate	1276	D		
n-Propyl alcohol	1274	D		
n-Propylamine	1277	C		
n-Propyl benzene	2364	(C)		
n-Propyl chloride	1278	B		
Propylene dimer		(C)		
Propylene glycol ethyl ether		(D)		
Propylene glycol methyl ether		(D)		
Propylene oxide	1280	D		
Propylene trimer	2057	B		
Pyridine	1282	B		
Rape seed oil		D		
Rice bran oil		D		
Rosin		A	0.1	0.05
Rosin soap (disproportionated) solution		B		
Safflower oil		D		
Sesame oil		D		

	I	II	III	IV
Silicon tetrachloride	1818	D		
Sodium aluminate solution	1819	C		
Sodium boronydride (15% or less)/Sodium nydroxide solution		C		
Sodium dichromate solution (70% or less)		B		
Sodium nydrogen sulpnite solution	2693	D		
Sodium nydrosulphide solution (45% or less)	2949	B		
Sodium nydrosulpnide/ Ammonium sulphide solution		B		
Sodium nydroxide solution	1824	D		
Sodium hypocnlorite solution (15% or less)	1791	B		
Sodium nitrite solution	1577	B		
Sodium silicate solution		D		
Sodium sulpnide solution	1849	B		
Sodium sulphite solution		(C)		
Soya bean oil		D		
Sperm oil		D		
Styrene monomer	2055	B		
Sulphuric acid	1830	C		
Sulphuric acid, spent	1832	C		
Sulphurous acid	1833	(C)		
Sunflower oil		D		

	I	II	III	IV
Tall oil, crude and distilled		A	0.1	0.05
Tall oil fatty acid (resin acids less than 20%)		(C)		
Tall oil soap (disproportionated) solution		B		
Tallow		D		
Tannic acid		C		
Tetrachloroethane	1702	B		
Tetraethylenepentamine	2320	D		
Tetrahydrofuran	2056	D		
Tetrahydronaphthalene		C		
1,2,3,5-Tetramethyl benzene		(C)		
Titanium tetrachloride	1838	D		
Toluene	1294	C		
Toluenediamine	1709	C		
Toluene diisocyanate	2078	C		
o-Toluidine	1708	C		
Tributyl phosphate		B		
1,2,4-Trichlorobenzene	2321	B		
1,1,1-Trichloroethane	2831	B		
1,1,2-Trichloroethane		B		
Trichloroethylene	1710	B		
1,2,3-Trichloropropane		B		
1,1,2-Trichloro-1,2,2-trifluoroethane		C		

	I	II	III	IV
Tricresyl phosphate (containing less than 1% ortho-isomer)		A	0.1	0.05
Tricresyl phosphate (containing 1% or more ortho-isomer)	2574*	A	0.1	0.05
Triethanolamine		D		
Triethylamine	1296	C		
Triethylbenzene		A	0.1	0.05
Triethylene glycol methyl ether		(D)		
Triethylenetetramine	2259	D		
Triethyl phosphate		D		
Triisopropanolamine		D		
Trimethylacetic acid		D		
Trimethylamine		C		
1,2,3-Trimethylbenzene		(B)		
1,2,4-Trimethylbenzene		B		
1,3,5-Trimethylbenzene	2325	(B)		
Trimethylhexamethylene diamine (2,2,4- and 2,4,4- isomers)	2327	D		
Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4- isomers)	2328	B		
Trimethylol propane polyethoxylate		D		

* UN number 2574 applies to Tricresyl phosphate containing more than 3% ortho-isomer.

	I	II	III	IV
2,2,4-Trimethyl-1,3-pentanediol-1-iso-butyrate		C		
Tripropylene glycol methyl ether		(D)		
Trixylyl phosphate		A	0.1	0.05
Tung oil		D		
Turpentine	1299	B		
Undecane	2330	(D)		
1-Undecene		B		
Undecyl alcohol		B		
Urea, Ammonium nitrate solution		D		
Urea, Ammonium phosphate solution		D		
Urea, Ammonium nitrate solution (containing aqua Ammonia)		C		
n-Valeraldenyde	2058	D		
Vinyl acetate	1301	C		
Vinyl ethyl ether	1302	C		
Vinylidene chloride	1303	B		
Vinyl neodecanoate		C		
Vinyl toluene	2618	A	0.1	0.05
White spirit, low (15-20%) aromatic	1300	(B)		
Xylene	1307	C		
Xylenol	2261	B		

APPENDIX III

LIST OF OTHER LIQUID SUBSTANCES

Existing list is replaced by the following:

Substance	UN Number
Acetone	1090
Acetonitrile	1648
Alcohols, C_1, C_2, C_3 as individuals and mixtures	
Alcohols, C_4	
Alcohols, C_{13} and above as individuals and mixtures	
Alum (15% solution)	
tert-Amyl alcohol	1105
n-Butyl alcohol	1120
sec-Butyl alcohol	1120
tert-Butyl alcohol	1120
Butyl stearate	
Calcium bromide solution	
Cetyl/Eicosyl methacrylate mixture	
Citric juice	
Dextrose solution	
Dibutyl sebacate	
Dicyclopentadiene	2048
Diethanolamine	
Diethylene glycol	
Diethylene glycol diethyl ether	
Diethylene glycol butyl ether	
Diethylene glycol ethyl ether	

Substance	UN Number
Diethylenetriamine pentaacetic acid, pentasodium salt solution	
Diethyl ether	1155
Diethyl ketone	1156
Dineptyl phthalate	
Dinexyl phthalate	
Diisooctyl phthalate	
Dioctyl phthalate	
Dipropylene glycol	
Dodecyl methacrylate	
Dodecyl/Pentadecyl methacrylate mixture	
Ethyl alcohol	1170
Ethylene carbonate	
Ethylene glycol butyl ether	2369
Ethylene glycol tert- butyl ether	
Ethylene-vinylacetate copolymer (emulsion)	
Glycerin	
Glycine sodium salt solution	
1-Heptadecene	
n-Heptane	1206
1-Hexadecene	
n-Hexane	1208
Hexylene glycol	
Isobutyl alcohol	1212
Isopropyl acetate	1220
Isopropyl alcohol	1219
Lard	

Substance	UN Number
Latex (carboxylated styrene/butadiene copolymer)	
Lignin sulphonic acid, salt (low COD) solution	
Magnesium chloride solution	
Magnesium hydroxide slurry	
3-Methoxy-1-butanol	
Methyl acetate	1231
Methyl alcohol	1230
2-Methyl-2-hydroxy-3-butyne	
3-Methyl-3-methoxy butanol	
3-Methyl-3-methoxy butyl acetate	
2-Methylpentane*	1208
Milk	
Molasses	
1-Octadecanol	
Olefins (C_{13} and above, all isomers)	
Paraffin wax	
1-Pentadecene	
Petroleum spirit	1271
Polyaluminium chloride solution	
Polybutene	
Polyethylene glycols	
Polyethylene glycol dimethyl ether	

* Asterisk indicates that the substance has been provisionally included in this list and that further data are necessary in order to complete the evaluation of its environmental hazards, particularly in relation to living resources.

Substance	UN Number
Polypropylene glycol methyl ether	
Polysiloxane	
1,2-Propylene glycol	
Propylene tetramer	2850
Sodium alumino silicate slurry	
Sodium chlorate solution (50% or less)	2428
Sodium salicylate	
Sorbitol	
Sulpholane*	
Sulphur (molten)	2448
1-Tetradecanol	
Tetradecene	
Tridecanol	
Tridecene	
Triethylene glycol	
Triethylene glycol butyl ether	
Triisobutylene	2324
Tripropylene glycol	
Urea solution	
Urea resin solution	
Vegetable protein solution (hydrolyzed)	
Wine	

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* Asterisk indicates that the substance has been provisionally included in this list and that further data are necessary in order to complete the evaluation of its environmental hazards, particularly in relation to living resources.

APPENDIX IV

CARGO RECORD BOOK FOR SHIPS CARRYING
NOXIOUS LIQUID SUBSTANCES IN BULK

The existing Appendix IV is replaced by the following:

"Appendix IV

FORM OF CARGO RECORD BOOK

CARGO RECORD BOOK FOR SHIPS CARRYING
NOXIOUS LIQUID SUBSTANCES IN BULK

Name of ship :

Distinctive number
or letters :

Gross tonnage :

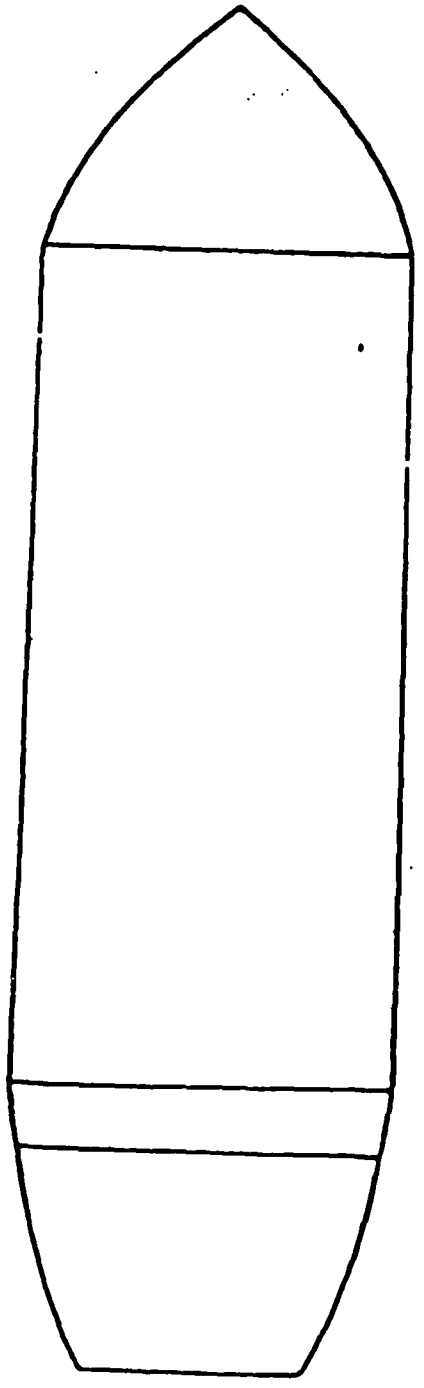
Period from: to:

Note: Every ship carrying noxious liquid substances in bulk shall be provided with a Cargo Record Book to record relevant cargo/ballast operations.

NAME OF SHIP: .....

DISTINCTIVE NUMBER
OR LETTERS: .....

PLAN VIEW OF CARGO AND SLOP TANKS
(to be completed on board)



Identification of the tanks	Capacity

(Give the capacity of each tank in cubic metres)

INTRODUCTION

The following pages show a comprehensive list of items of cargo and ballast operations which are, when appropriate, to be recorded in the Cargo Record Book on a tank-to-tank basis in accordance with paragraph 2 of Regulation 9 of Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended. The items have been grouped into operational sections, each of which is denoted by a letter.

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

Each completed operation shall be signed for and dated by the officer or officers in charge and, if applicable, by a surveyor authorized by the competent authority of the State in which the ship is unloading. Each completed page shall be countersigned by the master of the ship.

Entries in the Cargo Record Book are required only for operations involving Categories A, B, C and D substances. For the category of a substance, refer to Table 1 of the ship's Procedures and Arrangements Manual.

LIST OF ITEMS TO BE RECORDED

Entries are required only for operations involving Categories A, B, C and D substances.

(A) LOADING OF CARGO

1. Place of loading
2. Identify tank(s), name of substance(s) and category(ies).

(B) INTERNAL TRANSFER OF CARGO

3. Name and category of cargo(es) transferred.
4. Identity of tanks.
   - .1 From:
   - .2 To:
5. Was (were) tank(s) in 4.1 emptied?
6. If not, quantity remaining in tank(s).

(C) UNLOADING OF CARGO

7. Place of unloading
8. Identity of tank(s) unloaded.
9. Was (were tank(s) emptied?
   - .1 If yes, confirm that the procedure for emptying and stripping has been performed in accordance with the ship's Procedures and Arrangements Manual (i.e., list, trim, stripping temperature).
   - .2 If not, quantity remaining in tank(s).
10. Does the ship's Procedures and Arrangements Manual require a prewash with subsequent disposal to reception facilities?
11. Failure of pumping and/or stripping system.
    - .1 Time and nature of failure.
    - .2 Reasons for failure.
    - .3 Time when system has been made operational.

(D) MANDATORY PREWASH IN ACCORDANCE WITH THE SHIP'S PROCEDURES AND ARRANGEMENTS MANUAL

12. Identify tank(s), substance(s) and category(ies).

13. Washing method:

.1 Number of washing machines per tank.

.2 Duration of wash/washing cycles.

.3 Hot/cold wash.

14. Prewash slops transferred to:

.1 Reception facility in unloading port (identify port).

.2 Reception facility otherwise (identify port).

(E) CLEANING OF CARGO TANKS EXCEPT MANDATORY PREWASH (OTHER PREWASH OPERATIONS, FINAL WASH, VENTILATION ETC.

15. State time, identify tank(s), substance(s) and category(ies) and state:

.1 Washing procedure used.

.2 Cleaning agent(s) (identify agent(s) and quantities.

.3 Dilution of cargo residues with water, state how much water used (only Category D substances).

.4 Ventilation procedure used (state number of fans used, duration of ventilation).

16. Tank washings transferred:

.1 Into the sea.

.2 To reception facility (identify port).

.3 To slops collecting tank (identify tank).

(F) DISCHARGE INTO THE SEA OF TANK WASHINGS

17. Identify tank(s).

.1 Were tank washings discharged during cleaning of tank(s), if so at what rate?

.2 Were tank washing(s) discharged from a slops collecting tank. If so, state quantity and rate of discharge.

18. Time commenced and stopped pumping.

19. Ship's speed during discharge.

(G) BALLASTING OF CARGO TANKS

20. Identity of tank(s) ballasted.

21. Time at start of ballasting.

(H) DISCHARGE OF BALLAST WATER FROM CARGO TANKS.

22. Identity of tank(s).

23. Discharge of ballast:

.1 Into the sea.

.2 To reception facilities (identify port).

24. Time commenced and stopped ballast discharge.

25. Ship's speed during discharge.

(I) ACCIDENTAL OR OTHER EXCEPTIONAL DISCHARGE

26. Time of occurrence.

27. Approximate quantity, substance(s) and category(ies).

28. Circumstances of discharge or escape and general remarks.

(J) CONTROL BY AUTHORIZED SURVEYORS

29. Identify port.

30. Identify tank(s), substance(s), category(ies) discharged ashore.

31. Have tank(s), pump(s), and piping system(s) been emptied?

32. Has a prewash in accordance with the ships's Procedures and Arrangements Manual been carried out?

33. Have tank washings resulting from the prewash been discharged ashore and is the tank empty?

34. An exemption has been granted from mandatory prewash.

35. Reasons for exemption.

36. Name and signature of authorized surveyor.

37. Organization, company, government agency for which surveyor works.

(K) ADDITIONAL OPERATIONAL PROCEDURES AND REMARKS

NAME OF SHIP: .....

DISTINCTIVE NUMBER
OR LETTERS: .....

CARGO/BALLAST OPERATIONS

Date	Code (letter)	Item (number)	Record of operations/signature of officer in charge/ name of and signature of authorized surveyor

Signature of Master .....

APPENDIX V

FORM OF CERTIFICATE

The existing form of the Certificate is replaced by the following:

"INTERNATIONAL POLLUTION PREVENTION CERTIFICATE FOR THE CARRIAGE OF NOXIOUS LIQUID SUBSTANCES IN BULK

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

.....

(full official designation of the country)

by

.....

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

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

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the provisions of Regulation 10 of Annex II of the Convention.

2 That the survey showed that the structure, equipment, systems, fitting, arrangements and material of the ship and the condition thereof are in all respects satisfactory and that the ship complies with the applicable requirements of Annex II of the Convention.

3 That the ship has been provided with a manual in accordance with the standards for procedures and arrangements as called for by Regulation 5, 5A and 8 of Annex II of the Convention, and that the arrangements and equipment of the ship prescribed in the manual are in all respects satisfactory and comply with the applicable requirements of the said Standards.

4 That the ship is suitable for the carriage in bulk of the following noxious liquid substances, provided that all relevant operational provisions of Annex II of the Convention are observed.

Noxious liquid substances	Conditions of carriage (tank numbers etc.)
*Continued on additional signed and dated sheets	

* Delete as necessary

This certificate is valid, until .....
subject to surveys in accordance with Regulation 10 of Annex II of the Convention

Issued at .....
(place of issue of Certificate)

..... 19.. .....
(Date of issue) (Signature of duly authorized official issuing the Certificate)

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

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by Regulation 10 of Annex II of the Convention the ship was found to comply with the relevant provisions of the Convention:

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

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* Delete as appropriate

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ANNEX 4

Resolution MEPC 18(22)

ADOPTION OF THE STANDARDS FOR PROCEDURES AND ARRANGEMENTS FOR THE DISCHARGE OF NOXIOUS LIQUID SUBSTANCES

adopted on 5 December 1985

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MEPC 16(22) by which it adopted amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (the 1978 Protocol) which introduced, inter alia, the concepts of efficient stripping of cargo tanks and mandatory prewash of unloaded tanks for certain noxious liquid substances, under Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol (MARPOL 73/78)

NOTING ALSO that Regulations 5, 5A and 8 of Annex II of MARPOL 73/78, as amended, call upon the Organization to develop standards for procedures and arrangements for the discharge of noxious substances into the sea, for procedures for assessing the residues in cargo tanks and associated pipings and for procedures for the removal of cargo residues from tanks by prewashing or ventilating such tanks, with a view to providing a uniform basis for the guidance of Parties to the 1978 Protocol in approving such procedures and arrangements,

NOTING FURTHER resolution A.544(13) by which the Assembly adopted the Standards for Procedures and Arrangements called for by Annex II of MARPOL 73/78 and requested the Committee to keep the Standards under review in the light of the experience gained from trial application of them and other developments,

HAVING CONSIDERED the revision of the Standards for Procedures and Arrangements called for by Annex II of MARPOL 73/78 to bring them in line with the above-mentioned amendments,

1. ADOPTS the Standards for Procedures and Arrangements for the Discharge of Noxious Liquid Substances (called for by Annex II of MARPOL 73/78), the text of which is given in the Annex to the present resolution to supersede the Standards annexed to resolution A.544(13);

2. REQUESTS the Secretary-General to transmit a copy of the present resolution, together with the text of the Standards, to all Members of the Organization and to all Parties to the 1978 Protocol which are not Members of the Organization.

ANNEX

STANDARDS FOR PROCEDURES AND ARRANGEMENTS FOR THE DISCHARGE OF NOXIOUS LIQUID SUBSTANCES (called for by Annex II of MARPOL 73/78, as amended)

Contents

Preamble

(1) Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78) and as further amended by the Organization (hereafter referred to as Annex II) inter alia provides for the control of operational discharges of noxious liquid substances carried in bulk by ships. Operational discharges in this context mean the discharges of noxious liquid substances or water contaminated by these substances which are the result of cargo tank and line washing, deballasting of unwashed cargo tanks or cargo pump room bilge slops.

(2) Annex II prohibits the discharge into the sea of noxious liquid substances except when the discharge is made under specified conditions. These conditions vary according to the degree of hazard a noxious liquid substance poses to the marine environment. For this purpose the noxious liquid substances have been divided into four categories, A,B,C and D.

(3) Regulation 5 of Annex II specifies the conditions under which discharge of residues of categories A,B,C and D substances may take place. These conditions, which are not reproduced in this document, include such parameters as: the maximum quantity which may be discharged into the sea, speed of ship, distance from nearest land, depth of water, maximum concentration of substance in ship's wake or dilution of substance prior to discharge.

(4) For certain sea areas, referred to as "Special Areas", more stringent discharge criteria apply.

(5) The standards for procedures and arrangements called for by Annex II (hereafter referred to as the Standards) have been developed in response to resolution 13 of the International Conference on Marine Pollution, 1973, and in compliance with regulations 5, 5A and 8 of Annex II. The Standards provide a uniform basis for the guidance of the Parties to MARPOL 73/78 in approving procedures and arrangements for the discharge of noxious liquid substances of a specific ship.

(6) The Standards will take effect on 6 April 1987, the date of implementation of Annex II, and apply to all ships which carry noxious liquid substances in bulk.

(7) The Annex II requirements are not restated in the Standards. To ensure compliance with Annex II, the requirements of Annex II and those contained in the Standards should be considered together.

(8) Annex II discharge requirements and certification requirements have been interpreted as requiring each ship to have a Procedures and Arrangements Manual approved by the Administration. The Manual should contain the information specified in the Standards and the requirements of Annex II. Compliance with the procedures and arrangements set out in a ship's Manual will ensure that the discharge requirements of Annex II are met.

(9) Regulation 5A of Annex II requires that the efficiency of the cargo pumping system of a tank certified fit to carry category B or C substances be tested in accordance with Standards developed by the Organization. The test procedure is set out in the Standards. The pump stripping efficiency determined by the test will be assumed to be the stripping efficiency achieved when unloading the tank in accordance with the specified procedures.

(10) The presence of a "sheen" resulting after discharges of some Category B, C and D substances should not be regarded as contrary to the principles of Annex II, provided that the discharges have been made in accordance with the Standards.

(11) Throughout the Standards the word "discharge" is used to refer to the discharge of residues or residue/water mixtures either into the sea or to reception facilities, whilst the word "unloading" is used to refer to the unloading of cargo to receivers, terminals or ports.

Chapter 1 - Introductory

1.1 Purpose

The purpose of the Standards is to provide a uniform international basis for approving procedures and arrangements by which ships carrying noxious liquid substances in bulk can satisfy the discharge provisions of Annex II. It is on the basis of these Standards that the Administration should approve the procedures and arrangements necessary for the issue of an "International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk" or a "Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk" or an "International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk" to each such ship. For that purpose the procedures and arrangements for each ship are to be laid out in an approved Procedures and Arrangements Manual (hereinafter called the "Manual") for use on board the ship. It is not intended that these Standards be used by the ship's crew.

1.2 Scope

1.2.1 These Standards apply to all ships which carry category A,B,C or D noxious liquid substances in bulk, including those provisionally assessed as such.

1.2.2 The Standards have been developed to ensure that the criteria for discharge of noxious liquid substances specified in regulations 5 and 8 will be met. For category A substances, the Standards identify a prewash procedure which may be used in lieu of measuring the concentration of the effluent from a tank from which tank washings containing a category A substance are discharged. For category B and C substances, the Standards identify procedures and arrangements which will ensure that the maximum quantity of residue that may be discharged per tank and the maximum permitted concentration of the substance in the ship's wake are not exceeded. For category B and C substances, the Standards identify procedures and arrangements for assessing compliance with regulation 5A. For category A,B,C and D substances, the Standards identify ventilation procedures which may be used to remove residues from cargo tanks. The prewash procedures contained in appendix B to the Standards also enable Administrations to approve the prewash procedure referred to in regulation 5A(6)(b)(i).

1.2.3 The Standards do not cover the means by which the Administration ensures compliance with a ship's approved procedures and arrangements, and neither do they cover details of any constructions or materials used.

1.2.4 Regulation 13 requires, inter alia, chemical tankers carrying category A, B or C noxious liquid substances to comply with the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk* (hereinafter referred to as the "IBC Code") or the "Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk"* (hereinafter referred to as "the BCH Code") as may be amended. All constructions, materials and equipment fitted as a requirement of Annex II and of the Standards shall therefore comply with the IBC or BCH Code for all substances of categories A, B or C the chemical tanker is certified fit to carry in accordance with its Certificate of Fitness under that Code.

1.3 Definitions

1.3.1 "New Ship" means a ship constructed on or after 1 July 1986.

1.3.2 "Existing Ship" means a ship that is not a new ship.

1.3.3 "Residue" means any noxious liquid substance which remains for disposal.

1.3.4 "Residue/water mixture" means residue to which water has been added for any purpose (e.g. tank cleaning, ballasting, bilge slops).

1.3.5 "Miscible" means soluble with water in all proportions at washwater temperatures.

1.3.6 "Associated piping" means the pipeline from the suction point in a cargo tank to the shore connection used for unloading the cargo and includes all ship's piping, pumps and filters which are in open connection with the cargo unloading line.

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* The IBC and BCH Codes extended to cover marine pollution aspects were adopted by the Marine Environment Protection Committee (MEPC) of the Organization by resolution MEPC 19(22) and MEPC 20(22) respectively on 5 December 1985.

1.3.7 "Solidifying substance" means a noxious liquid substance which:

.1 in the case of substances with melting points less than 15°C, is at a temperature, at the time of unloading, of less than 5°C above its melting point; or

.2 in the case of substances with melting points equal to or greater than 15°C, is at a temperature, at the time of unloading, of less than 10°C above its melting point.

1.3.8 "Non-solidifying substance" means a noxious liquid substance which is not a solidifying substance.

1.3.9 "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 to or greater than 60 mPa.s at the unloading temperature.

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

1.3.11 "Regulation" means a regulation of Annex II to MARPOL 73/78.

1.4 Equivalents

The equivalent provisions in regulation 2(5) and (6) are also applicable to the Standards.

1.5 Certification

1.5.1 Before issuing the appropriate Certificate referred to in paragraph 1.1, the Administration should examine, and, if satisfied, approve:

.1 the Manual for compliance with Annex II and the Standards;

.2 the equipment and arrangements provided for compliance with the Standards.

1.5.2 Reference to the approved Manual should be made by the Administration in the appropriate Certificate issued to the ship.

1.6 Responsibilities of the master

The master must ensure that no discharges into the sea of cargo residues or residue/water mixtures containing category A, B, C or D substances shall take place, unless such discharges are made in full compliance with the operational procedures contained in the Manual and that the arrangements required by the Manual and needed for such discharges are used.

1.7 Safety considerations

1.7.1 The Standards are concerned with the marine environmental aspects of the cleaning of cargo tanks which have contained noxious liquid substances, and the discharge of residues and residue/water mixtures from these operations. Certain of these operations are potentially hazardous but no attempt is made in the Standards to lay down safety standards covering all aspects of these operations. For a description of potential hazards reference should be made to the IBC or BCH Codes and other documents as developed and published by the relevant associations or organizations, e.g. the Tanker Safety Guide (Chemicals) of the International Chamber of Shipping (ICS). Some potential safety hazards are mentioned below.

1.7.2 Compatibility

In mixing residue/water mixtures containing different substances, compatibility should be carefully considered.

1.7.3 Electrostatic hazards

The hazards associated with the generation of electrostatic charges during the cargo tank washing should be carefully considered.

1.7.4 Tank entry hazards

The safety of persons required to enter cargo tanks or slop tanks for any purpose should be carefully considered.

1.7.5 Reactivity hazards

The water washing of cargo tanks and slop tanks containing residues of certain substances may produce dangerous reactions and should be carefully considered.

1.7.6 Ventilation hazards

The hazards associated with tank ventilation identified in the ICS Tanker Safety Guide (Chemicals) should be carefully considered.

1.7.7 Line clearing hazards

The hazards associated with line clearing identified in the ICS Tanker Safety Guide (Chemicals) should be carefully considered.

1.8 Cleaning agents or additives

1.8.1 When a cleaning agent (i.e. a solvent used instead of water or a solvent mixed with water) that is a harmful substance as defined by either Annex I or Annex II of MARPOL 73/78 is used to wash a tank having contained a noxious liquid substance, the discharge of this cleaning agent must be governed by the restrictions of Annex I or Annex II that would apply as if this cleaning agent had been carried as cargo.

1.8.2 When small amounts of cleaning additives (i.e. detergents) are added to water in order to facilitate tank washing, no restrictions additional to those applicable to the tank due to the previous cargo should apply.

Chapter 2 - Preparation of the Procedures and Arrangements Manual

2.1 Each ship which carries noxious liquid substances in bulk should be provided with a Manual as described in this chapter.

2.2 The main purpose of the Manual is to identify for the ship's officers the physical arrangements and all the operational procedures with respect to cargo handling, tank cleaning, slops handling, and cargo tank ballasting and deballasting which must be followed in order to comply with the requirements of Annex II.

2.3 The Manual should be based on the Standards. It should cover all noxious liquid substances which the ship is certified fit to carry.

2.4 The Manual should as a minimum contain the following information and operational instructions:

.1 a description of the main features of Annex II, including discharge requirements;

.2 a table of noxious liquid substances which the ship is certified fit to carry and which specifies information on these substances as detailed in appendix D;

.3 a description of the tanks carrying noxious liquid substances; and a table identifying in which cargo tanks each noxious liquid substance may be carried;

.4 a description of all arrangements and equipment including cargo heating and temperature control system, which are on board the ship and for which requirements are contained in chapters 3 or 8 including a list of all tanks that may be used as slop tanks, a description of the discharge arrangements, a schematic drawing of the cargo pumping and stripping systems showing the respective position of pumps and control equipment and identification of means for ensuring that the equipment is operating properly (check lists);

.5 details of the procedures set out in the Standards as applied to the individual ship which should, where appropriate, include instructions such as:

.5.1 methods of stripping cargo tanks and under what restrictions, such as minimum list and trim, the stripping system should be operated;

.5.2 methods of draining cargo pumps, cargo lines and stripping lines;

.5.3 cargo tank prewash programmes;

.5.4 procedures for cargo tank ballasting and deballasting;

.5.5 procedures for discharge of residue/water mixtures; and

.5.6 procedures to be followed when a cargo tank cannot be unloaded in accordance with the required procedure;

.6 for existing ships operating under the provisions of regulation 5A(2)(b) or 5A(4)(b) a residue table developed in accordance with appendix A, which indicate for each tank in which category B or C substances are to be carried, the quantities of residue which will remain in the tank and associated piping system after unloading and stripping;

.7 a table which indicates the quantities measured as a result of carrying out the water test performed for assessing the "stripping quantity" referred to in paragraph 1.2.1 of appendix A; and

.8 the responsibility of the Master in respect of operational procedures to be followed and the use of the arrangements. The Master must ensure that no residues or residue/water mixtures are discharged into the sea, unless the arrangements listed in the Manual and needed for the discharge are used.

2.5 In the case of a ship engaged in international voyages, the Manual should be produced in the standard format as outlined in the attached appendix D. If the language used is neither English nor French, the text should include a translation into one of these languages.

2.6 The Administration may approve a Manual containing only those parts applicable to the substances, the ship is certified fit to carry.

2.7 For a ship referred to in regulation 5A(6) or 5A(7), the format and the content of the Manual should be to the satisfaction of the Administration.

2.8 For a ship carrying only category D substances, the format and the content of the Manual should be to the satisfaction of the Administration.

Chapter 3 - Equipment and Constructional Standards for New Ships

3.1 General

3.1.1 This chapter contains the standards for the equipment and constructional features enabling a new ship to comply with the residue discharge requirements of Annex II.

3.1.2 The equipment requirements in this chapter should be read in conjunction with the operating requirements in chapters 4, 5, 6 and 7 in order to determine what equipment is needed on the ship.

3.2 Carriage requirements

A category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

3.3 Cargo unloading system

3.3.1 The cargo unloading system for category B and C substances should be capable of unloading the cargo to the residue quantities not in excess of the quantities specified in regulations 5 and 5A. The performance test required by regulation 5A(5) should be carried out in accordance with appendix A.

3.4 Underwater discharge outlet location

The underwater discharge outlet (or outlets) should be located within the cargo area in the vicinity of the turn of the bilge and should be so arranged as to avoid the re-intake of residue/water mixtures by the ship's sea water intakes.

3.5 Underwater discharge outlet size

3.5.1 The underwater discharge outlet arrangement should be such that the residue/water mixture discharged into the sea in accordance with the Standards will not pass through the ship's boundary layer. To this end, when

the discharge is made normal to the ship's shell plating, the minimum diameter of the discharge outlet is governed by the following equation:

$$D = \frac{Q_D}{5L}$$

where D = minimum diameter of the discharge outlet, m

L = distance from the forward perpendicular to the discharge outlet, m

Q_D = the maximum rate selected at which the ship may discharge a residue/water mixture through the outlet, m^3/h.

3.5.2 When the discharge is directed at an angle to the ship's shell plating, the above relationship should be modified by substituting for Q_D the component of Q_D, which is normal to the ship's shell plating.

3.6 Slop tanks

Although Annex II does not require the fitting of dedicated slop tanks, slop tanks may be needed for certain washing procedures. Cargo tanks may be used as slop tanks.

3.7 Ventilation equipment

If residues from cargo tanks are removed by means of ventilation, ventilation equipment meeting the requirements of appendix C should be provided.

Chapter 4 - Operational Standards for New Ships Carrying Category A Substances

4.1 General

This chapter applies to any new ship certified fit to carry category A substances.

4.2 Prewash of category A substances from cargo tanks

4.2.1 Annex II requires that when a cargo tank that has contained a category A substance is washed, the resulting residue/water mixtures be discharged to a reception facility until the concentration of the substance in the effluent is at or below a specified value and until the tank is empty. Where it is found to be impracticable to measure the concentration of the substance in the effluent, a prewash procedure in accordance with appendix B should be applied in conformity with regulation 8(4) .

4.2.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

4.2.3 Any water subsequently introduced into the cargo tank may be discharged into the sea in accordance with the requirements of regulation 5(1) or regulation 5(7) in respect of the ship's position, speed and discharge outlet location.

4.3 Ventilation of category A substances from cargo tanks

4.3.1 Ventilation procedures may be applied only to those substances having a vapour pressure greater than 5×10^3 Pa at $20^{\circ}C$.

4.3.2 The ventilation procedures set out in appendix C should be followed when a tank is to be ventilated.

4.3.3 In ventilating a tank the associated piping of the tank should be cleared of liquid and the tank should be ventilated until no visible remains of liquid can be observed in the tank. When direct observation is impossible or impracticable, means for detection of liquid remains should be provided.

4.3.4 When the cargo tank has been ventilated dry in accordance with the Standards, any water subsequently introduced into the cargo tank for ballasting or for preparing the tank to receive the next cargo should be regarded as clean and should not be subject to the discharge requirements of Annex II.

Chapter 5 - Operational Standards for New Ships Carrying Category B Substances

5.1 General

5.1.1 This chapter applies to any new ship certified fit to carry category B substances.

5.1.2 If a cargo tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 5.2 to 5.7 apply.

5.1.3 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing category B substances are allowed cannot be met, no such discharges may be made.

5.2 Pumping and stripping

In unloading a cargo tank containing a category B substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

5.3 Tank washing and residue discharge procedures outside Special Areas

5.3.1 High viscosity or solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and

.3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed, and discharge outlet location.

5.3.2 Low viscosity, non-solidifying substances

.1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

5.4 Tank washing and residue discharge procedures within Special Areas

5.4.1 A prewash procedure as specified in appendix B should be applied.

5.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

5.4.3 Any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(8) in respect of ship's position, speed and discharge outlet location.

5.4.4 Notwithstanding the provisions of paragraphs 5.4.1 to 5.4.3, residues or residue/water mixtures containing only low viscosity, non-solidifying substances may be retained on board and discharged into the sea outside Special Areas in accordance with the provisions of paragraph 5.3.2 or 5.5.2.

5.5 Discharges from a slop tank

5.5.1 Residue/water mixtures in a slop tank should not be discharged into the sea within Special Areas.

5.5.2 Residue/water mixtures in a slop tank which contain only low viscosity, non-solidifying substances may be discharged into the sea outside Special Areas at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

5.5.3 Residue/water mixtures in a slop tank which contain high viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

5.6 Ventilation of category B substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks, the requirements set out at section 4.3 apply.

5.7 Ballasting and deballasting

5.7.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 5.3 and 5.4.

5.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 metres deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 6 - Operational Standards for New Ships Carrying Category C Substances

6.1 General

6.1.1 This chapter applies to any new ship certified fit to carry category C substances.

6.1.2 If a cargo tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 6.2 to 6.7 apply.

6.1.3 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing category C substances are allowed cannot be met, no such discharges may be made.

6.2 Pumping and stripping

In unloading a cargo tank containing a category C substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

6.3 Tank washing and residue discharge procedures outside Special Areas

6.3.1 High viscosity or solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and

.3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

6.3.2 Low viscosity, non-solidifying substances

.1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

6.4 Tank washing and residue discharge procedures within Special Areas

6.4.1 High viscosity* or solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8;

.3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location; and

.4 notwithstanding the provisions of paragraphs 6.4.1.1 to 6.4.1.3, residue/water mixtures containing non-solidifying substances with a viscosity less than 60 mPa.s at the unloading temperature may be retained on board and discharged into the sea outside Special Areas in accordance with the provisions of paragraph 6.3.2.

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* i.e. a substance with a viscosity equal to or greater than 25m unloading temperature. See definition of a high viscosity category substance discharged within Special Areas.

6.4.2 Low viscosity*, non-solidifying substances

.1 Any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location.

6.5 Discharges from a slop tank

6.5.1 Residue/water mixtures in a slop tank which contains only low viscosity**, non-solidifying substances may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 3.5 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulations 5(3) and 5(9) in respect of ship's position, speed and discharge outlet location.

6.5.2 Residue/water mixtures in a slop tank which contains high viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

6.6 Ventilation of category C substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks, the requirements set out at section 4.3 apply.

6.7 Ballasting and Deballasting

6.7.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 6.3 and 6.4.

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* i.e. a substance with a viscosity less than 25 mPa.s at the unloading temperature, within Special Areas.

** i.e. a substance with a viscosity less than 25 mPa.s at the unloading temperature if discharged within Special Areas, or a substance with a viscosity less than 60 mPa.s at the unloading temperature if discharged outside Special Areas.

6.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 metres deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 7 - Operational Standards of New Ships Carrying Category D Substances

7.1 General

This chapter applies to any new ship certified fit to carry category D substances.

7.2 Discharge of category D residues

Although residue(s) of category D substances is(are) required to be discharged within and outside Special Areas in a diluted form in accordance with regulation 5(4), such residue(s) may also be discharged in accordance with the operational standards for low viscosity, non-solidifying category C substances as specified in Chapter 6.

7.3 Ventilation of category D substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks the requirements set out in section 4.3 apply.

Chapter 8 - Equipment and Constructional Standards for Existing Ships

8.1 General

8.1.1 This chapter contains the standards for the equipment and constructional features enabling an existing ship to comply with the residue discharge requirements of Annex II.

8.1.2 The equipment requirements in this chapter should be read in conjunction with the operating requirements in chapters 9, 10, 11 and 12 in order to determine what equipment is needed on the ship.

8.2 Carriage requirements

A category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

8.3 Cargo unloading system

The cargo unloading system for category B and C substances should be capable of unloading the cargo to the residue quantities not in excess of the quantities specified in regulations 5 and 5A. The performance test required by regulation 5A(5) should be carried out in accordance with appendix A.

8.4 Residue discharge system

8.4.1 When for the purpose of discharging residues into the sea, controlled pumping rates are needed to meet the requirements of chapter 10, one of the following systems should be used:

.1 a variable rate pumping system in which:

.1.1 the capacity is adjusted by varying the pump speed; or

.1.2 the capacity is adjusted through the use of a throttling arrangement fitted on the discharge piping;

.2 a fixed rate pumping system with a capacity not exceeding the permissible discharge rate as set out under sections 10.5 and 10.6.

8.4.2 If the pumping rates are controlled in accordance with 8.4.1.1, a flow rate indicating device should be provided.

8.5 Underwater discharge outlet location

8.5.1 The underwater discharge outlet (or outlets) should be located within the cargo area in the vicinity of the turn of the bilge and should be so arranged as to avoid the re-intake of residue/water mixtures by the ship's sea water intakes.

8.5.2 If dual outlets are provided to achieve a higher permissible discharge rate, these should be located on opposite sides of the ship.

8.6 Underwater discharge outlet size

8.6.1 The underwater discharge outlet arrangement should be such that the residue/water mixture discharged into the sea in accordance with the Standards will not pass through the ship's boundary layer. To this end, when the discharge is made normal to the ship's shell plating, the minimum diameter of the discharge outlet is governed by the following equation:

$$D = \frac{Q_D}{5L}$$

where D = minimum diameter of the discharge outlet, m
L = distance from the forward perpendicular to the discharge outlet, m
Q_D = maximum rate selected at which the ship may discharge a residue/water mixture through the outlet, m^3/h

8.6.2 When the discharge is directed at an angle to the ship's shell plating, the above relationship should be modified by substituting for Q_D the component of Q_D, which is normal to the ship's shell plating.

8.7 Recording devices

8.7.1 When in accordance with chapter 10 it is necessary to record the discharge of residue/water mixtures, means should be provided for recording the start and stop time of the discharge with actual time (GMT or other standard time). The device should be in operation when there is a discharge into the sea which is to be recorded. The date should be recorded either manually or automatically. The record should be identifiable as to time and date and should be kept for at least three years.

8.7.2 When in accordance with chapter 10 it is necessary to record the rate at which residue/water mixtures are discharged, means should be provided for measuring such flow rates. The accuracy of the flow recording unit should be within 15% of the actual flow.

8.7.3 If the recording units described in paragraphs 8.7.1 or 8.7.2 become defective, a manual alternative method should be used. The Master should record such a defect in the Cargo Record Book. The defective unit should be made operable as soon as possible but at least within a period of 60 days.

8.8 Slop tanks

Although Annex II does not require the fitting of dedicated slop tanks, slop tanks may be needed for certain washing procedures. Cargo tanks may be used as slop tanks.

8.9 Ventilation equipment

If residues from cargo tanks are removed by means of ventilation, ventilation equipment meeting the requirements of appendix C should be provided.

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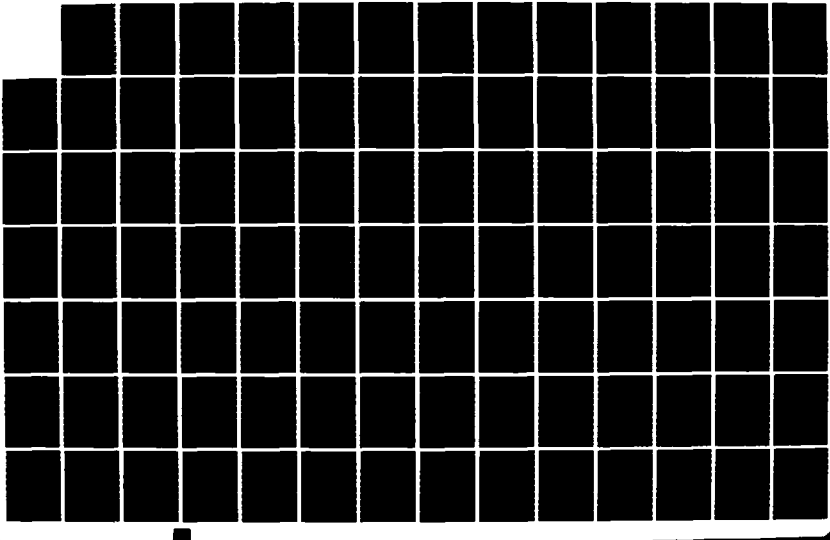

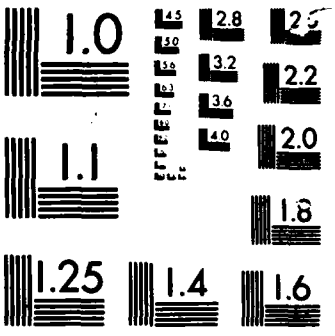
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Chapter 9 - Operational Standards for Existing Ships Carrying Category A Substances

9.1 General

This chapter applies to any existing ship certified fit to carry category A substances.

9.2 Prewash of a category A substance from a cargo tank

9.2.1 Annex II requires that when a tank that has contained a category A substance is washed, the resulting residue/water mixtures be discharged to a reception facility until the concentration of the substance in the effluent is reduced below a specified value and until the tank is empty. Where it is found to be impracticable to measure the concentration of the substance in the effluent, a prewash procedure in accordance with appendix B should be applied in conformity with regulation 8(4).

9.2.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

9.2.3 Any water subsequently introduced into the cargo tank may be discharged into the sea in accordance with the requirements of regulation 5(1) or regulation 5(7) in respect of the ship's position, speed and discharge outlet location.

9.3 Ventilation of category A substances from cargo tanks

9.3.1 Ventilation procedures may be applied only to those substances having a vapour pressure greater than 5×10^3 Pa at 20°C.

9.3.2 The ventilation procedures set out in appendix C should be followed when a tank is to be ventilated.

9.3.3 In ventilating a tank the associated piping of the tank should be cleared of liquid and the tank should be ventilated until no visible remains of liquid can be observed in the tank. When direct observation is impossible or impracticable, means for detection of liquid remains should be provided.

9.3.4 When the cargo tank has been ventilated dry in accordance with the Standards, any water subsequently introduced into the cargo tank for ballasting or for preparing the tank to receive the next cargo should be regarded as clean and should not be subject to the discharge requirements of Annex II.

Chapter 10 - Operational Standards for Existing Ships Carrying Category B Substances

10.1 General

10.1.1 This chapter applies to any existing ship certified fit to carry category B substances.

10.1.2 When a cargo tank on an existing ship is fitted with a cargo unloading system capable of unloading the cargo to the residue quantities not in excess of the quantity specified in regulation 5A(2)(a) and if the tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of chapter 5 apply.

10.1.3 If a tank other than that referred to in paragraph 10.1.2 is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 10.2 to 10.8 apply.

10.1.4 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing category B substances are allowed cannot be met, no such discharges may be made.

10.2 Pumping and stripping

In unloading a cargo tank containing a category B substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

10.3 Tank washing and residue discharge procedures outside Special Areas

10.3.1 High viscosity or solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and

.3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.3.2 Low viscosity, non-solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8 or transferred to a slop tank for subsequent discharge into the sea in accordance with section 10.5 or 10.6; and

.3 any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.4 Tank washing and residue discharge procedures within Special Areas

10.4.1 A prewash procedure as specified in appendix B should be applied.

10.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

10.4.3 Any water subsequently introduced into the tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the requirements of regulation 5(8) in respect of ship's position, speed and discharge outlet location.

10.4.4 Notwithstanding the provisions of paragraphs 10.4.1 to 10.4.3, residue or residue/water mixtures containing only low viscosity, non-solidifying substances may be retained on board and discharged into the sea outside Special Areas in accordance with sections 10.5 or 10.6.

10.5 Discharge into the sea of a miscible residue/water mixture from a slop tank

10.5.1 Prewash residue/water mixtures containing category B substances should not be discharged into the sea within Special Areas.

10.5.2 Before a miscible residue/water mixture is discharged into the sea outside Special Areas, the composite concentration, C_s, should be determined as follows:

$$C_s = n/V_r$$

where n = number of tanks containing category B residues which have been transferred to the slop tank. (For the sake of simplification, it is assumed that each tank contains 1 m^3 of residue.)

V_r = volume of residue/water mixtures in the slop tank prior to discharge (determined from ullage tables), m^3

10.5.3 The residue/water mixture may be discharged into the sea, provided that the rate does not exceed the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed or that defined by one of the equations below, whichever is smaller:

$$Q_D = \frac{KV^{1.4} L^{1.6}}{C_s}$$ when a single outlet is used; or

$$Q_D = \frac{1.5\ KV^{1.4} L^{1.6}}{C_s}$$ when dual outlets are used

where Q_D = rate of discharge of residue/water mixture, m^3/h

V = ship's speed, knots

L = ship's length, m

K = 4.3×10^{-5}

C_s = Composite concentration referred to in paragraph 10.5.2.

10.6.4 The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.5.5 Residue/water mixtures discharged into the sea in accordance with this Section should be recorded using the device referred to in paragraph 8.7.1. If a variable capacity pump is used for the discharge, the flow rate should also be recorded using the device referred to in paragraph 8.7.2.

10.6 Discharge into the sea of an immiscible residue/water mixture from a slop tank

10.6.1 Prewash residue/water mixtures containing category B substances should not be discharged into the sea within Special Areas.

10.6.2 The residue/water mixture may be discharged into the sea outside Special Areas, provided that the rate does not exceed the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed or that defined by one of the equations below, whichever is smaller:

$$Q_D = KV^{1.4} L^{1.6}$$ when a single outlet is used; or

$$Q_D = 1.5\ KV^{1.4} L^{1.6}$$ when dual outlets are used.

10.6.3 The discharge must also be in accordance with the other discharge requirements of regulation 5(2) in respect of ship's position, speed and discharge outlet location.

10.6.4 Residue/water mixtures discharged into the sea in accordance with this Section should be recorded using the device referred to in paragraph 8.7.1. If a variable capacity pump is used for the discharge the flow rate should also be recorded using the device referred to in paragraph 8.7.2.

10.7 Ventilation of category B substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks, the requirements set out at section 9.3 apply.

10.8 Ballasting and deballasting

10.8.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 10.3 to 10.6.

10.8.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 metres deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 11 - Operational Standards for Existing Ships Carrying Category C Substances

11.1 General

11.1.1 This chapter applies to any existing ship certified fit to carry category C substances.

11.1.2 When a cargo tank on an existing ship is fitted with a cargo unloading system capable of unloading the cargo to the residue quantities not in excess of the quantity specified in regulation 5A(4)(a) and if the tank is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of chapter 6 apply. However, an existing ship may only discharge residue/water mixtures containing category C substances within Special Areas in accordance with paragraph 6.4.2.1 if the cargo unloading system meets the requirements as specified for new ships in Regulation 5A(3). If the cargo unloading system does not meet these requirements, discharge of residue/water mixtures within Special Areas should be carried out in accordance with section 11.4 or 11.5.

11.1.3 If a cargo tank other than that referred to in paragraph 11.1.2 is to be washed or ballasted and some or all of the residue left in the tank is to be discharged into the sea, the requirements of sections 11.2 to 11.7 apply.

11.1.4 If the requirements of this chapter under which discharges into the sea of residues and residue/water mixtures containing category C substances are allowed cannot be met, no such discharges may be made.

11.2 Pumping and stripping

11.2.1 In unloading a cargo tank containing a category C substance, the tank and its associated piping should be emptied to the maximum extent practicable by maintaining a positive flow of cargo to the tank's suction point and using the stripping procedure set out in the Manual.

11.3 Tank washing and residue discharge procedures outside Special Areas

11.3.1 High viscosity or solidifying substances

.1 A prewash procedure as specified in appendix B should be applied;

.2 the residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8; and

.3 any water subsequently introduced into the tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

11.3.2 Low viscosity, non-solidifying substances

.1 any water introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of ship's position, speed and discharge outlet location.

11.4 Tank washing and residue discharge procedures within Special Areas

11.4.1 A prewash procedure as specified in appendix B should be applied.

11.4.2 The residue/water mixture generated during the prewash should be discharged to a reception facility in accordance with regulation 8.

11.4.3 Any water subsequently introduced into the cargo tank may be discharged into the sea at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(9) in respect of ship's position, speed and discharge outlet location.

11.4.4 Notwithstanding the provisions of paragraphs 11.4.1 to 11.4.3, residue/water mixtures containing only non-solidifying substances with a viscosity less than 60 mPa.s at the unloading temperature may be retained on board and discharged into the sea outside Special Areas in accordance with paragraph 11.5.2.

11.5 Discharges from a slop tank

11.5.1 Residue/water mixtures in a slop tank should not be discharged into the sea within Special Areas.

11.5.2 Residue/water mixtures in a slop tank which contain only low viscosity, non-solidifying substances may be discharged into the sea outside Special Areas at a rate not exceeding the maximum rate for which the underwater discharge outlet(s) referred to in section 8.6 is(are) designed. The discharge must also be in accordance with the other discharge requirements of regulation 5(3) in respect of the ship's position, speed and discharge outlet location.

11.5.3 Residue/water mixtures in a slop tank which contain high viscosity or solidifying substances, retained on board in accordance with regulation 8, should be discharged to a reception facility.

11.6 Ventilation of category C substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks, the requirements set out at section 9.3 apply.

11.7 Ballasting and deballasting

11.7.1 After unloading, and, if required, carrying out a prewash, a cargo tank may be ballasted. Procedures for the discharge of such ballast are set out in sections 11.3 to 11.4.

11.7.2 Ballast introduced into a cargo tank which has been washed to such an extent that the ballast contains less than 1 ppm of the substance previously carried, may be discharged into the sea without regard to the discharge rate, ship's speed and discharge outlet location, provided that the ship is not less than 12 miles from land and in water that is not less than 25 metres deep. It is assumed this degree of cleanliness has been achieved when a prewash as specified in appendix B has been carried out and the tank has been subsequently washed with a complete cycle of the cleaning machine.

Chapter 12 - Operational Standards for Existing Ships Carrying Category D Substances

12.1 General

This chapter applies to any existing ship certified fit to carry category D substances.

12.2 Discharge of category D residues

Although residue(s) of category D substances is(are) required to be discharged within and outside Special Areas in a diluted form in accordance with regulation 5(4), such residue(s) may also be discharged in accordance with the operational standards for low viscosity, non-solidifying category C substances as specified in Chapter 11.

12.3 Ventilation of category D substances from cargo tanks

When ventilation procedures are used to remove residue from cargo tanks the requirements set out in section 9.3 apply.

APPENDIX A

ASSESSMENT OF RESIDUE QUANTITIES IN CARGO TANKS, PUMPS AND PIPING

1 INTRODUCTION

1.1 Purpose

1.1.1 The purpose of this appendix is:

.1 to provide the procedure for testing the efficiency of cargo pumping systems; and

.2 to provide the method for calculating the residue quantities on the cargo tank surfaces.

1.2 Background

1.2.1 The ability of the pumping system of a tank to comply with regulation 5A(1), (2), (3) or (4) is determined by performing a test in accordance with the procedure set out in section 3 of this appendix. The quantity measured is termed the "stripping quantity". The stripping quantity of each tank shall be recorded in the ship's Manual.

1.2.2 For tanks of existing ships not satisfying the appropriate pumping efficiency requirement of regulation 5A(2)(a) or (4)(a) it is necessary to calculate the quantity of residue remaining on tank surfaces. The method for calculating the clingage residue is given in section 4.

1.2.3 For tanks referred to in 1.2.2, it is necessary to calculate the total quantity of residue remaining in the cargo tanks and its associated piping. The total residue quantity is the sum of the water test result and the calculated clingage quantity.

1.2.4 After having determined the stripping quantity and calculated clingage quantity (when required) of one tank, the Administration may use the determined quantities for a similar tank, provided the Administration is satisfied that the pumping system in that tank is similar and operating properly.

2 DESIGN CRITERIA AND PERFORMANCE TEST

2.1 The cargo pumping systems should be designed to meet the required $0.1m^3$ and $0.3m^3$ or $0.3m^3$ and $0.9m^3$ respectively for category B or C substances as specified by regulation 5A to the satisfaction of the Administration.

2.2 In accordance with regulation 5A(5), the cargo pumping systems should be tested with water to prove their performance. Such water tests should, by measurement, show that the system meets the requirements of regulation 5A with the tolerance of 50 litres per tank.

3 WATER TEST PROCEDURE

3.1 Test Condition

3.1.1 The ship's trim and list should be such as to provide favourable drainage to the suction point. During the water test the ship's trim should not exceed 3° by the stern, and the ship's list should not exceed 1°.

3.1.2 The trim and list chosen for the water test should be the minimum favourable trim and list as given in the ship's Manual for the stripping of the cargo tanks.

3.1.3 During the water test means should be provided to maintain a back pressure of not less than 1 bar at the cargo tank's unloading manifold (see figures A-1 and A-2).

Figure A-1

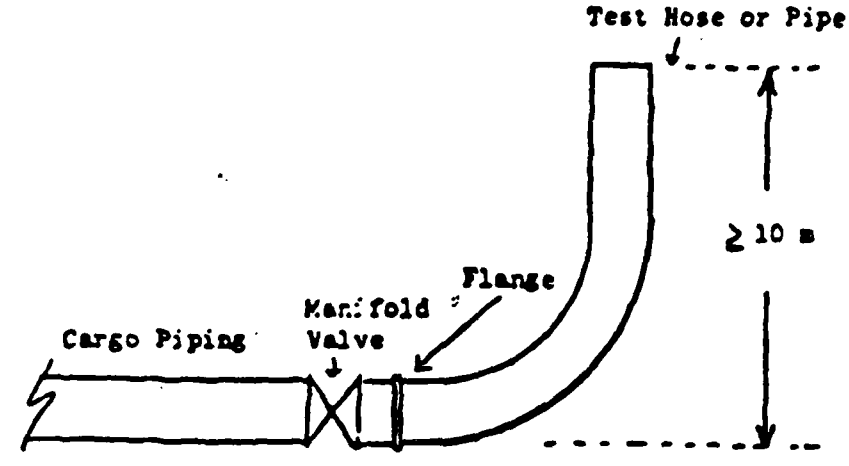
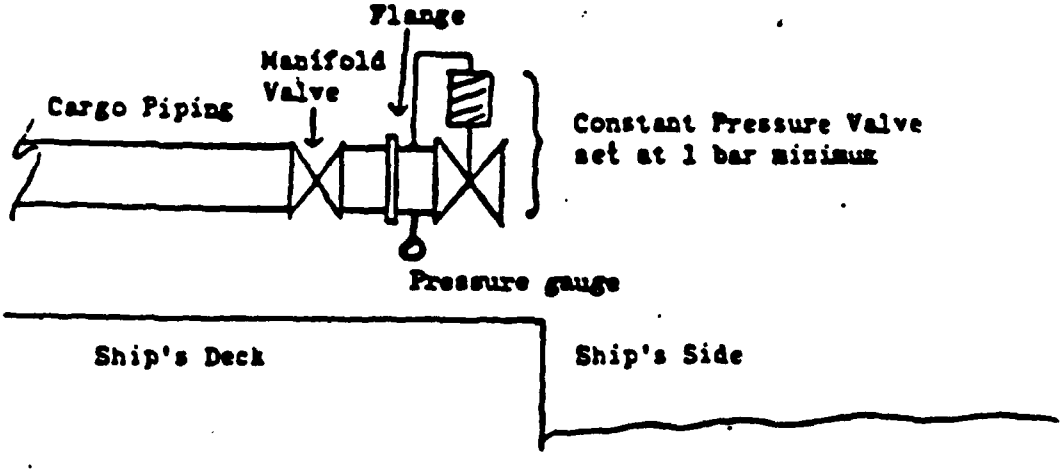


Figure A-2



The above figures illustrate test arrangements that would provide a backpressure of not less than 1 bar at the cargo tank's unloading manifold.

3.2 Test Procedure

3.2.1 Ensure that the cargo tank to be tested and its associated piping have been cleaned and that the cargo tank is safe for entry.

3.2.2 Fill the cargo tank with water to a depth necessary to carry out normal end of unloading procedures.

3.2.3 Pump and strip the cargo tank and its associated piping in accordance with the ship's approved Manual.

3.2.4 Collect water remaining in the cargo tank and its associated piping into a calibrated container for measurement. Water residues should be collected from the following points:

.1 the cargo tank suction and its vicinity;

.2 any entrapped areas on the cargo tank bottom;

.3 the low point drain of the cargo pump; and

.4 all low point drains of piping associated with the cargo tank up to the manifold valve.

3.2.5 The total water volumes collected above determines the stripping quantity for the cargo tank.

3.2.6 Where a group of tanks is served by a common pump or piping, the water test residues associated with the common system(s) may be apportioned equally among the tanks provided that the following operational restriction is included in the ship's approved Manual: "For sequential unloading of tanks in this group, the pump or piping is not to be washed until all tanks in the group have been unloaded".

4 CALCULATION OF CLINGAGE RESIDUES

4.1 Calculate the clingage residues using the following formula:

$$Q_{RES}(surf) = 1.1 \times 10^{-4} A_d + 1.5 \times 10^{-5} A_w + 4.5 \times 10^{-4} L^{1/2} A_b$$

4.3 Symbols and units used in residue equation

A_b = Area of tank bottom and horizontal components of tank structural members facing upwards (m^2)

A_d = Area underdecks and horizontal components of tank structural members facing downwards (m^2)

A_w = Surface area of tank walls and vertical components of tank structural members (m^2)

L = Length of tank (m)

$Q_{RES}(surf)$ = Amount of clingage residue on tank surfaces (m^3)

NOTE: 1. For purposes of calculating A_b, A_d and A_w inclined (greater than 30° from the horizontal) and curved surfaces should be treated as vertical.

2. Methods of approximating A_b, A_d, and A_w are permissible. (A method presented in BCH 15/INF.5 by Japan is an example).

APPENDIX B

PREWASH PROCEDURES

In several sections of the Standards a prewash procedure is required in order to meet certain Annex II requirements. This appendix explains how these prewash procedures should be performed.

Prewash procedures for non-solidifying substances

1 Tanks should be washed by means of a rotary water jet, operated at sufficiently high water pressure. In the case of category A substances washing machines should be operated in such locations that all tank surfaces are washed. In the case of category B and C substances only one location need be used.

2 During washing the amount of water in the tank should be minimized by continuously pumping out slops and promoting flow to the suction point (positive list and trim). If this condition cannot be met the washing procedure should be repeated three times, with thorough stripping of the tank between washings.

3 Those substances which have a viscosity equal to or greater than 25 mPa.s at 20°C should be washed with hot water (temperature at least 60°C).

4 The number of cycles of the washing machine used should not be less than that specified in table B1. A washing machine cycle is defined as the period between two consecutive identical orientations of the washing machine (rotation through 360°).

5 After washing, the washing machine(s) should be kept operating long enough to flush the pipeline, pump and filter.

Prewash procedures for solidifying substances

1 Tanks should be washed as soon as possible after unloading. If possible tanks should be heated prior to washing.

2 Residues in hatches and manholes should preferably be removed prior to the prewash.

3 Tanks should be washed by means of a rotary water jet operated at sufficiently high water pressure and in locations to ensure that all tank surfaces are washed.

4 During washing the amount of water in the tank should be minimized by pumping out slops continuously and promoting flow to the suction point (positive list and trim). If this condition cannot be met, the washing procedure should be repeated 3 times with thorough stripping of the tank between washings.

5 Tanks should be washed with hot water (temperature at least 60°C).

6 The number of cycles of the washing machine used should not be less than that specified in table B1. A washing machine cycle is defined as the period between two consecutive identical orientations of the machine (rotation through 360°).

7 After washing, the washing machine(s) should be kept operating long enough to flush the pipeline, pump and filter.

TABLE B1 - Number of washing machine cycles to be used in each location

Category of substance	Number of washing machine cycles	
	non-solidifying substances	solidifying substances
Category A (residual concentration 0.1% or 0.05%)	1	2
Category A (residual concentration 0.01% or 0.005%)	2	3
Category B	1/2	1
Category C	1/2	1

Note: For an explanation of "residual concentration" see regulation 5(1) and 5(7) of Annex II.

APPENDIX C

VENTILATION PROCEDURES

1 Cargo residues of substances with a vapour pressure greater than 5×10^3 Pa at 20°C may be removed from a cargo tank by ventilation.

2 Before residues of noxious liquid substances are ventilated from a tank the safety hazards relating to cargo flammability and toxicity should be considered. With regard to safety aspects, the operational requirements for openings in cargo tanks in the International Bulk Chemical Code, the Bulk Chemical Code, and the ventilation procedures in the ICS Tanker Safety Guide (Chemicals) should be consulted.

3 Port authorities may also have regulations on cargo tank ventilation.

4 The procedures for ventilation of cargo residues from a tank are as follows:

.1 the pipelines should be drained and further cleared of liquid by means of ventilation equipment;

.2 the list and trim should be adjusted to the minimum levels possible so that evaporation of residues in the tank is enhanced;

.3 ventilation equipment producing an airjet which can reach the tank bottom shall be used. Figure C-1 could be used to evaluate the adequacy of ventilation equipment used for ventilating a tank of a given depth;

.4 ventilation equipment should be placed in the tank opening closest to the tank sump or suction point;

.5 ventilation equipment should, when practicable, be positioned so that the airjet is directed at the tank sump or suction point and impingement of the airjet on tank structural members is to be avoided as much as possible; and

.6 ventilation shall continue until no visible remain of liquid can be observed in the tank. This shall be verified by a visual examination or an equivalent method.

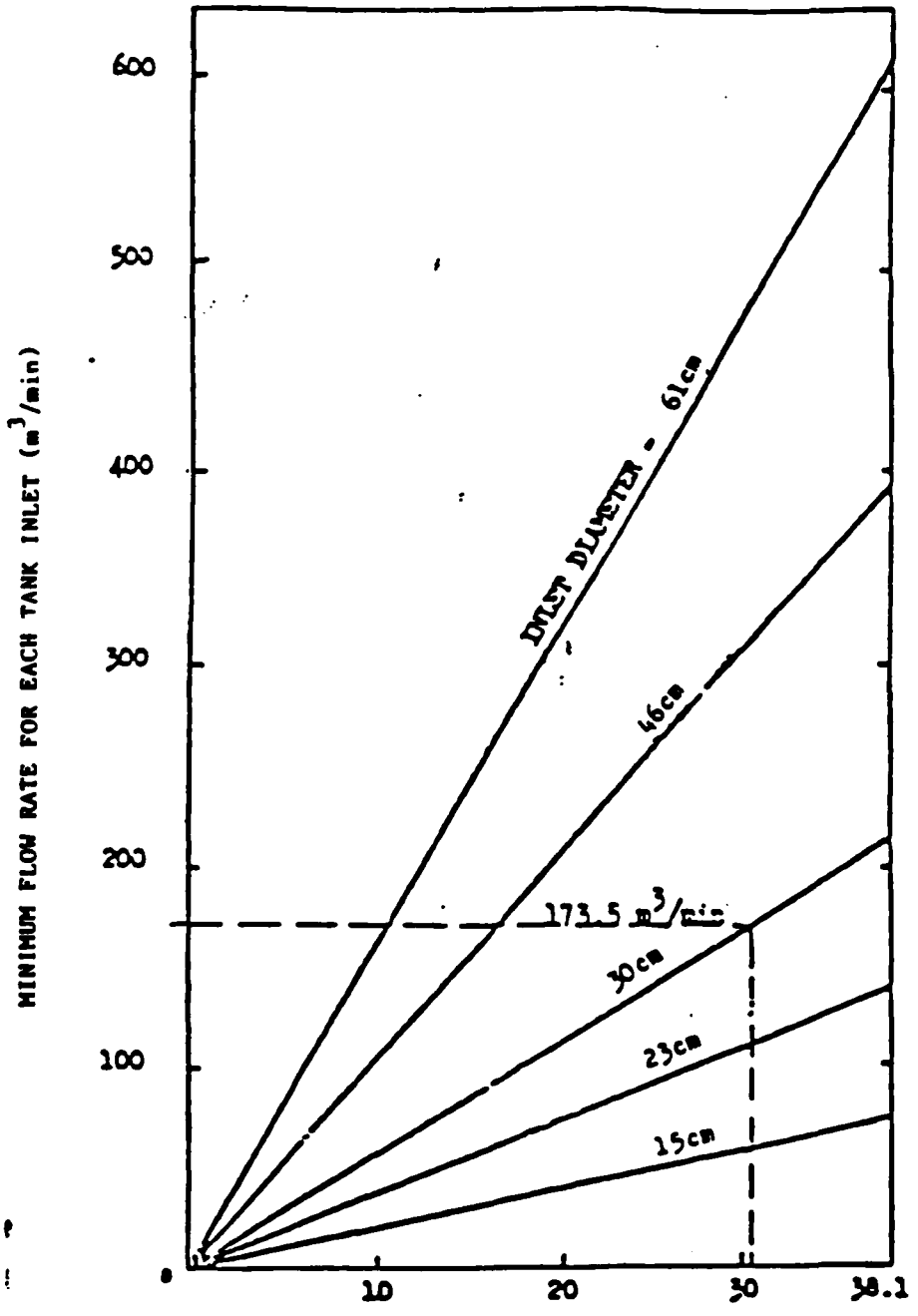


FIGURE C-1. MINIMUM FLOW RATE AS A FUNCTION OF JET PENETRATION DEPTH. JET PENETRATION DEPTH SHOULD BE COMPARED AGAINST TANK HEIGHT.

APPENDIX D

STANDARD FORMAT FOR THE PROCEDURES AND ARRANGEMENTS MANUAL

Note 1. The standard format consists of a standardized text of an introduction, of an index and of the leading paragraphs to each section. This standardized text should be reproduced in the Manual provided for each ship followed by the information necessary to complete each section as applicable to the particular ship. The necessary information is indicated within with left hand marking. When a section is not applicable NA should be entered. It is recognized that the content of the Manual will vary depending on the design of the ship, the trade and the types of cargoes intended to be carried.

Note 2. If the Administration requires or accepts information and operational instructions in addition to those outlined in this Standard Format, they should be included in part 2 of the Manual. If no such additional information or operating instructions are required or accepted by the Administration, the Manual will consist of one part only.

STANDARD FORMAT

MARPOL 73/78 ANNEX II PROCEDURES AND ARRANGEMENTS MANUAL

Name of Ship .....

Distinctive Numbers or Letters .....

Port of Registry .....

Approval stamp of Administration:

INTRODUCTION

1. The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, (hereinafter referred to as MARPOL 73/78) was established in order to prevent the pollution of the marine environment by discharges into the sea from ships of harmful substances or effluents containing such substances. In order to achieve its aim, MARPOL 73/78 contains five Annexes in which detailed regulations are given with respect to the handling on board ships and the discharge into the sea of five main groups of harmful substances, i.e. Annex I (mineral oils), Annex II (liquid noxious substances carried in bulk), Annex III (harmful substances carried in packaged forms), Annex IV (sewage) Annex V (garbage).

2. Regulation 5 of Annex II prohibits the discharge into the sea of noxious liquid substances of Categories A, B, C and D or of ballast water, tank washings or other residues or mixtures containing such substances, except in compliance with specified conditions including procedures and arrangements based upon standards developed by the International Maritime Organization (IMO) to ensure that the criteria specified for each Category will be met.

3. The Standards for Procedures and Arrangements called for by Annex II of MARPOL 73/78 (as referred to above) require that each ship which is certified for the carriage of noxious liquid substances in bulk shall be provided with a Procedures and Arrangements Manual, hereinafter referred to as the Manual.

4. This Manual has been written in accordance with chapter 2 of the Standards and is concerned with the marine environmental aspects of the cleaning of cargo tanks and the discharge of residues and mixtures from these operations. The Manual is <u>not</u> a safety guide and reference should be made to other publications specifically to evaluate safety hazards.

5. The purpose of [Part 1 of]* the Manual, is to identify the arrangements and equipment required to enable compliance with Annex II and to identify for the ship's officers all operational procedures with respect to cargo handling, tank cleaning, slops handling, residue discharging, ballasting and deballasting, which must be followed in order to comply with the requirements of Annex II. [Part 2 of the Manual contains additional information and operational instructions required or accepted by the Administration].*

6. In addition. this Manual, together with the ship's Cargo Record Book and [International Certificate for the Carriage of Noxious Liquid Substances in Bulk/Certificate of Fitness issued under the International Bulk Chemical Code/Certificate of Fitness issued under the Bulk Chemical Code,]** will be used by Administrations for control purposes in order to ensure full compliance with the requirements of Annex II by this snip.

7. The master shall ensure that no discnarges into the sea of cargo residues or residue/water mixtures containing Category A, B, C or D substances shall take place, unless such discharges are made in full compliance with the operational procedures contained in this Manual and that the equipment required by this Manual and needed for such discharge is used.

8. This Manual nas been approved by tne Administration and no alteration or revision snall be made to any part of it without the prior approval of the Administration.

Footnote:

* The parts in [ ] marked tnus * to be included only if a Part 2 is incorporated in the Manual.

** Include only the Certificate issued to the particular ship.

INDEX OF SECTIONS

[Part 1]

Page

SECTION 1 - Main features of MARPOL 73/78, Annex II

1.1 The requirements of Annex II apply to all ships carrying noxious liquid substances in bulk. Substances posing a threat of harm to the marine environment are divided into four categories, A, B, C and D, and listed as such in Appendix II to Annex II. Category A substances are those posing the greatest threat to the marine environment, whilst Category D substances are those posing the smallest threat.

1.2 Annex II prohibits the discharge into the sea of any effluent containing substances falling under these categories, except when the discharge is made under conditions which are specified in detail for each category. These conditions include, where applicable, such parameters as:

- the maximum quantity of substances per tank which may be discharged into the sea;

- the speed of the ship during the discharge;

- the minimum distance from the nearest land during discharge;

- the minimum depth of water at sea during discharge;

- the maximum concentration of substances in the ship's wake or the dilution of substances prior to discharge; and

- the need to effect the discharge below the waterline.

1.3 For certain sea areas identified as "special areas" more stringent discharge criteria are given. Under Annex II the special areas are the Baltic Sea Area* and the Black Sea Area**.

1.4 Annex II requires that every ship is provided with pumping and piping arrangements to ensure that each tank designated for the carriage of Category B and C substances does not retain after unloading a quantity of residue in excess of the quantity given in the Annex. For each tank intended for the carriage of such substances an assessment of the residue quantity has to be made. Only when the residue quantity as assessed is less than the quantity prescribed by the Annex may a tank be approved for the carriage of a

1.5 In addition to the conditions referred to above, an important requirement contained in Annex II is that the discharge operations of certain cargo residues and certain tank cleaning and ventilation operations may only be carried out in accordance with approved procedures and arrangements based upon standards developed by the International Maritime Organization (IMO).

1.6 To enable this requirement to be complied with, this Manual contains in Section 2 all particulars of the ship's equipment and arrangements, in Section 3 operational procedures for cargo unloading and tank stripping and in Section 4 procedures for discharge of cargo residues, tank washing, slops collection, ballasting and deballasting as may be applicable to the substances the ship is certified to carry.

1.7 By following the procedures as set out in this Manual, it will be ensured that the ship complies with all relevant requirements of Annex II to MARPOL 73/78.

Note: MARPOL 73/78, Annex II defines these areas as follows:

* The Baltic Sea area means the Baltic Sea proper with the Gulf of Bothnia, the Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57° 44.8'N.

** The Black Sea area means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41° N.

SECTION 2 - Description of the ship's equipment and arrangements

2.1 This section contains all particulars of the ship's equipment and arrangements necessary to enable the crew to follow the operational procedures set out in sections 3 and 4.

2.2 General Arrangement of ship and description of cargo tanks

This section should contain a brief description of the cargo area of the ship with the main features of the cargo tanks and their positions.

Line or schematic drawings showing the general arrangement of the ship and indicating the position and numbering of the cargo tanks and heating arrangements should be included. Identification of the cargo tanks certified fit to carry noxious liquid substances should be made in conjunction with Table 1 of this Manual.

2.3 Description of cargo pumping and piping arrangements and stripping system

This section should contain a description of the cargo pumping and piping arrangements and of the stripping system.

Line or schematic drawings should be provided showing the following and be supported by textual explanation where necessary:

- cargo piping arrangements with diameters;
- cargo pumping arrangements with pump capacities;
- piping arrangements of stripping system with diameters;
- pumping arrangements of stripping system with pump capacities;
- location of suction points of cargo lines and stripping lines inside every cargo tank;
- if a suction well is fitted, the location and cubic capacity thereof;
- line draining and stripping or blowing arrangements; and
- quantity and pressure of nitrogen or air required for line blowing if applicable.

2.4 Description of ballast tanks and ballast pumping and piping arrangements

This section should contain a description of the ballast tanks and ballast pumping and piping arrangements.

Line or schematic drawings and tables should be provided showing the following:

- a general arrangement showing the segregated ballast tanks and cargo tanks to be used as ballast tanks together with their capacities (cubic metres);
- ballast piping arrangement;
- pumping capacity for those cargo tanks which may also be used as ballast tanks; and
- any interconnection between the ballast piping arrangements and the underwater outlet system.

2.5 Description of dedicated slop tanks with associated pumping and piping arrangements

This section should contain a description of the dedicated slop tanks with the associated pumping and piping arrangements.

Line or schematic drawings should be provided showing the following:

- which dedicated slop tanks are provided together with the capacities of such tanks;
- pumping and piping arrangements of dedicated slop tanks with piping diameters and their connection with the underwater discharge outlet.

2.6 Description of underwater discharge outlet for effluents containing noxious liquid substances

This section should contain information on position and maximum flow capacity of the underwater discharge outlet (or outlets) and the connections to this outlet from the cargo tanks and slop tanks.

Line or schematic drawings should be provided showing the following:

- location and number of underwater discharge outlets;
- connections to underwater discharge outlet;
- location of all seawater intakes in relation to underwater discharge outlets.

2.7 Description of flow rate indicating and recording devices

This section, which applies only to ships operating under Regulation 5A(2)(b), should contain a description of the means of measuring the flow rate, and if required also the means of recording of the flow rate and time, and the methods of operation.

A line or schematic drawing showing the position and connections of these devices should be provided.

2.8 Description of cargo tank ventilation system

This section should contain a description of the cargo tank ventilation system.

Line or schematic drawings and tables should be provided showing the following and supported by textual explanation if necessary:

- the noxious liquid substances the ship is certified fit to carry having a vapour pressure over 5×10^3 Pa at 20° suitable for cleaning by ventilation to be listed in table 1;
- ventilation piping and fans;
- position of the ventilation openings;
- the minimum flow rate of the ventilation system to adequately ventilate the bottom and all parts of the cargo tank;
- the location of structures inside the tank affecting ventilation;
- the method of ventilating the cargo pipeline system, pumps, filters, etc; and
- means for ensuring that the tank is dry.

2.9 Description of tank washing arrangements and washwater heating system

This section should contain a description of the cargo tank washing arrangements, washwater heating system and all necessary tank washing equipment.

Line or schematic drawings and tables or charts showing the following:

- arrangements of piping dedicated for tank washing with pipeline diameters;
- type of tank washing machines with capacities and pressure rating;
- maximum number of tank washing machines which can operate simultaneously;
- position of deck openings for cargo tank washing;
- the number of washing machines and their location required for ensuring complete coverage of the cargo tank walls;
- maximum capacity of washwater which can be heated to 60°C by the installed heating equipment; and
- maximum number of tank washing machines which can be operated simultaneously at 60°C.

SECTION 3 - Cargo unloading procedures and tank stripping

3.1 This Section contains operational procedures in respect of cargo unloading and tank stripping which must be followed in order to ensure compliance with the requirements of Annex II.

3.2 Cargo unloading

This Section should contain procedures to be followed including the pump and cargo unloading and suction line to be used for each tank. Alternative methods may be given.

The method of operation of the pump or pumps and the sequence of operation of all valves should be given.

The basic requirement is to unload the cargo to the maximum practicable extent.

3.3 Cargo tank stripping

This section should contain procedures to be followed during the stripping of each cargo tank.

The procedures should include the following:

- operation of stripping system;

- list and trim requirements;

- line draining and stripping or blowing arrangements if applicable.

3.4 Cargo temperature

This section should contain information on the heating requirements of cargoes which have been identified as being required to be at a certain minimum temperature during unloading.

Information should be given on control of the heating system and the method of temperature measurement.

3.5 Procedures to be followed when a cargo tank cannot be unloaded in accordance with the required procedures

This section should contain information on the procedures to be followed in the event that the requirements contained in Sections 3.3 and/or 3.4 cannot be met due to circumstances such as the following:

- failure of cargo tank stripping system; and

- failure of cargo tank heating system.

3.6 Cargo Record Book

The cargo record book should be completed in the appropriate places on completion of cargo unloading.

SECTION 4 - Procedures relating to the cleaning of cargo tanks, the discharge of residues, ballasting and deballasting

4.1 This section contains operational procedures in respect of tank cleaning, ballast and slops handling which must be followed in order to ensure compliance with the requirements of Annex II.

4.2 The following paragraphs outline the sequence of actions to be taken and contain the information essential to ensure that noxious liquid substances are discharged without posing a threat of harm to the marine environment.

4.3 Establish if the last cargo in the tank is included in the ship's approved list of noxious liquid substances, see table 1. If not included, no special tank cleaning, residue discharge, ballasting and deballasting procedures apply under the provisions of Annex II.

4.4 If the last cargo in the tank is included in the above mentioned list, the information necessary to establish the procedures for discharging the residue of that cargo, cleaning, ballasting and deballasting tank, should take into account the following:

4.4.1 Category of substance

Obtain the category of the substance from table 1.

4.4.2 Stripping efficiency of tank pumping system

[The contents of this section will depend on the design of the ship and whether it is a new ship or existing ship. (See flow diagrams - pumping/stripping requirements.)

4.4.3 Vessel within or outside Special Area

[This section should contain instructions on whether the tank washings can be discharged into the sea within a Special Area (as defined in section 1.3) or outside a Special Area. The different requirements should be made clear and will depend on the design and trade of the ship.

4.4.4 Solidifying or high viscosity substance

The properties of the substance should be obtained from the shipping document.

4.4.5 Miscibility in water

This property of the substance should be obtained from table 1.

Note: This section should be completed only for existing ships and only for Category B substances.

4.4.6 Compatibility with slops containing other substances

This section should contain instructions on the permissible and non-permissible mixing of cargo slops. Reference should be made to compatibility guides.

4.4.7 Discharge to reception facility

This section should identify those substances the residues of which are required to be prewashed and discharged to a reception facility.

4.4.8 Discharging into the sea

This section should contain information on the factors to be considered in order to identify whether the residue/water mixtures are permitted to be discharged into the sea.

4.4.9 Use of cleaning agents or additives

This section should contain information on disposal of cleaning agents (e.g. bulk solvent used for tank cleaning) and information on the use of additives to tank washing water (e.g. detergents).

4.4.10 Use of ventilation procedures for tank cleaning

This section should make reference to table 1 to ascertain the suitability of the use of ventilation procedures.

4.5 Having assessed the above information, the correct operational procedures to be followed should be identified using the instructions and flow diagrams in this Section. Appropriate entries should be made in the cargo record book indicating the procedure adopted.

This section should contain procedures, which will depend on the age of the ship and pumping efficiency, based on the Standards. Examples of flow diagrams referred to in this section are given at addendum A and incorporate comprehensive requirements applicable to both new and existing ships. The Manual for a particular ship should only contain those requirements specifically applicable to that ship. The Manual should contain the following information and procedures:

Table 1: List of noxious liquid substances allowed to be carried.

Table 2: Cargo tank information.

Addendum A: Flow diagrams.

Addendum B: Prewash programmes.

Addendum C: Ventilation procedure.

Addendum D: Determination of permitted residue discharge rates for Category B Substances as required.

Outlines of the above tables and addenda follow.

Table 1: List of noxious liquid substances allowed to be carried

Substance	Category	Tanks (tank groups)* fit for carriage	Melting point °C	Viscosity at 20°C mPa.s			Suitable for ventilation Yes/No	Miscible in water Yes/No
				<25	25-60	≥60		

Note: Information need only be inserted in the fourth and fifth columns, relating to melting point and viscosity, for those substances which have a melting point greater than 0°C or a viscosity greater than 25 mPa.s at 20°C. When more than one commercial grade is shipped and the viscosities or the melting points of those commercial grades differ, enter and note that other commercial grades may have lower viscosities or melting points or give the values for each commercial grade which will be shipped.

* Tank numbers (tank groups) should be identical to those in the ship's Certificate of Fitness.

Table 2: Cargo tank information

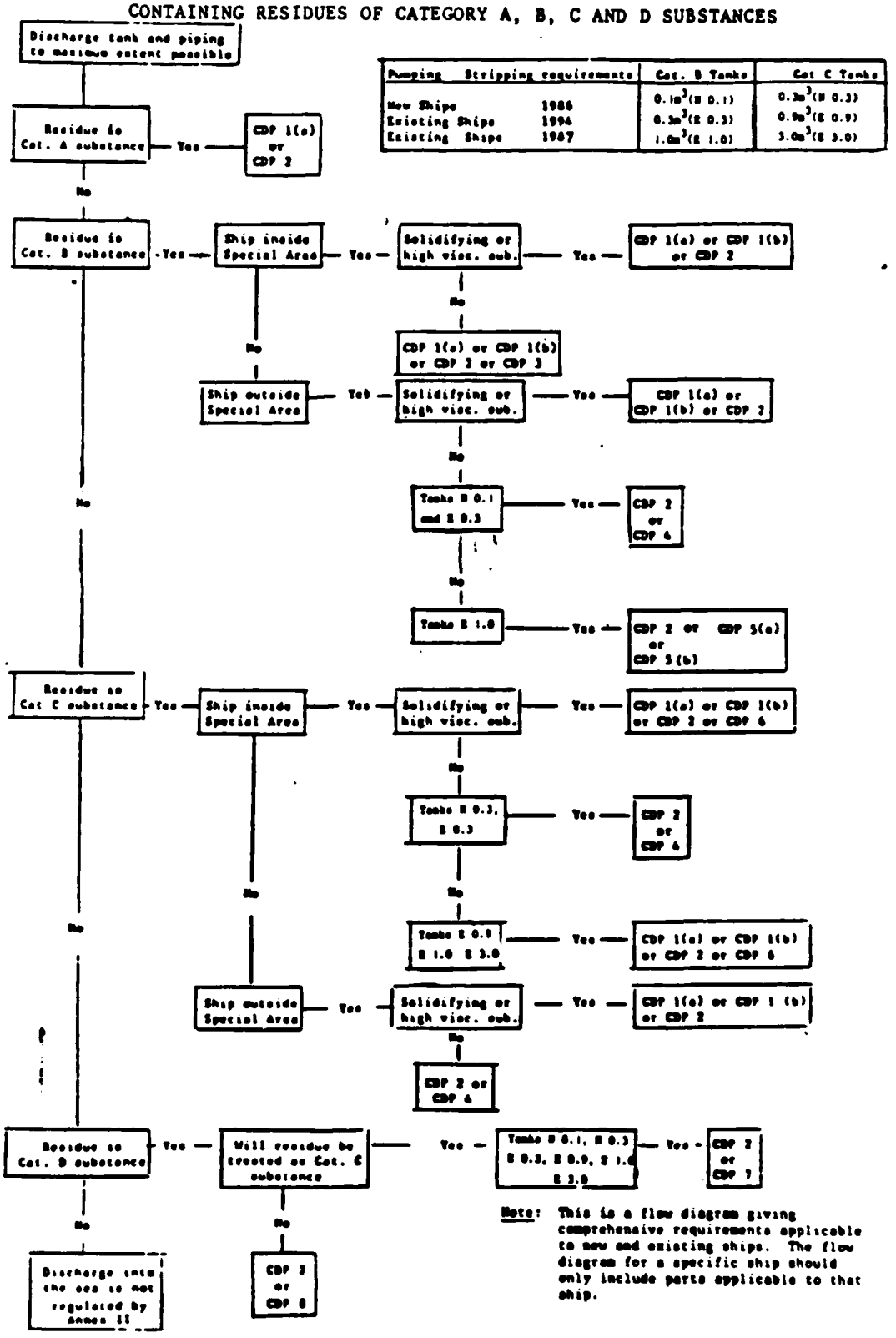
Tank No.	Capacity m^3	Stripping quantity in litres	Total residue* in m^3	Approved Stripping Level under Reg.5A

* For ships referred to in regulation 5A(2)(b) and 5A(4)(b) only.

ADDENDUM A

FLOW DIAGRAMS

CLEANING OF CARGO TANKS AND DISPOSAL OF TANK WASHINGS/BALLAST CONTAINING RESIDUES OF CATEGORY A, B, C AND D SUBSTANCES



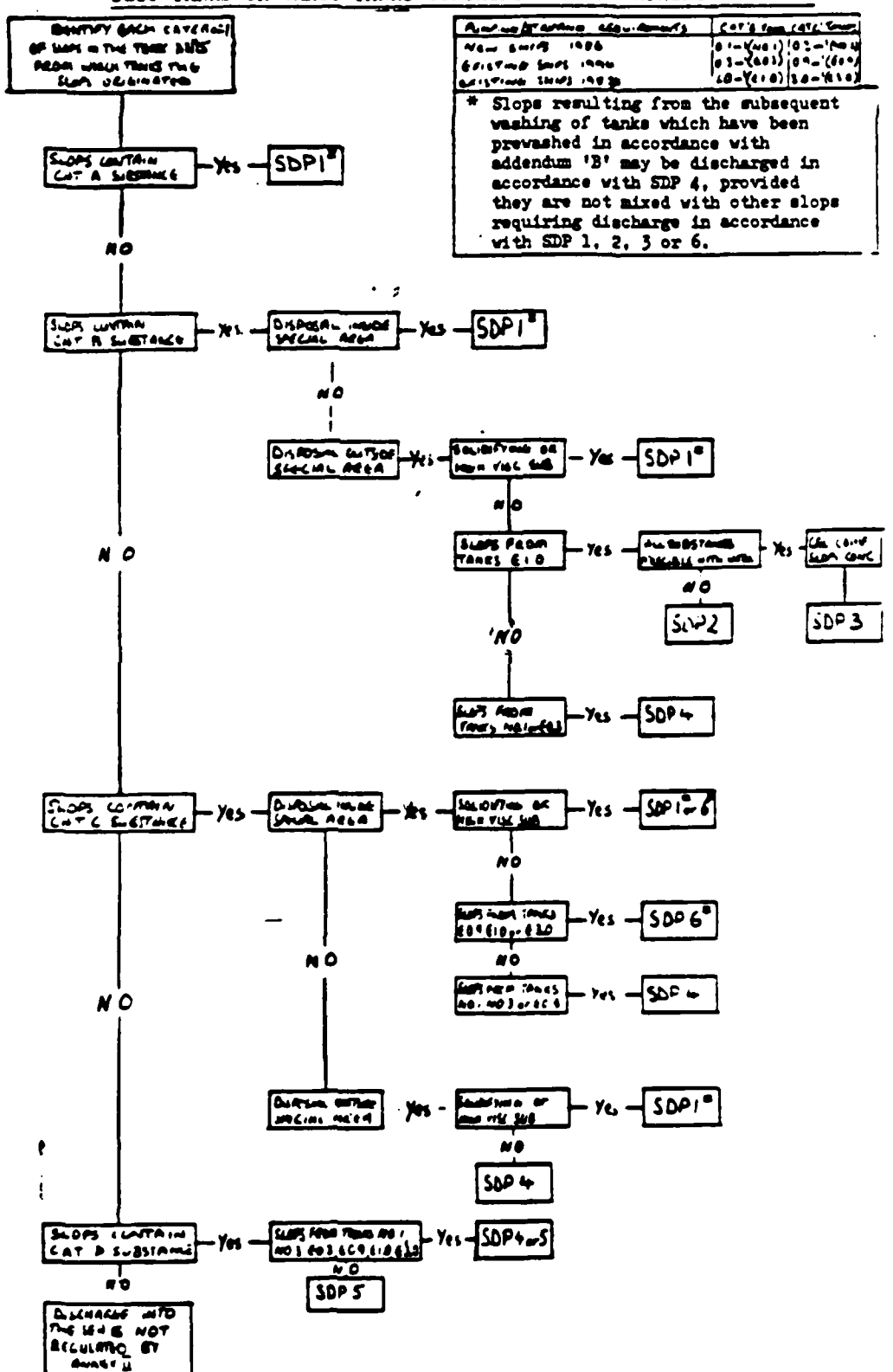
Pumping Stripping requirements		Cat. B Tanks	Cat C Tanks
New Ships	1986	$0.1m^3$(E 0.1)	$0.3m^3$(E 0.3)
Existing Ships	1994	$0.3m^3$(E 0.3)	$0.9m^3$(E 0.9)
Existing Ships	1997	$1.0m^3$(E 1.0)	$3.0m^3$(E 3.0)

Note: This is a flow diagram giving comprehensive requirements applicable to new and existing ships. The flow diagram for a specific ship should only include parts applicable to that ship.

CLEANING AND DISPOSAL PROCEDURES (CDP)	SEQUENCE OF PROCEDURES									
	1(a)	1(b)	2	3	4	5(a)	5(b)	6	7	8
Apply prewash in accordance with appendix B and discharge residue to reception facility	X	X								
Apply prewash in accordance with Appendix B and transfer residues to slop tank for discharge to sea in accordance with chapter 10, section 10.5 or 10.6						X	X			
Apply subsequent wash of minimum one cycle		X					X			
Apply ventilation procedures in accordance with appendix C			X							
Residue may be retained on board and discharged outside special area				X						
Residues of substances with viscosities <60 mPa.s at the unloading temperature may be retained on board and discharged outside special area. Alternatively, tanks may be prewashed and slops discharged ashore								X		
Dilute residue in cargo tanks with water to obtain residue concentration in mixture of 10% or less										X
Ballast tank or, wash tank to commercial requirements	X			X	X	X		X	X	
Conditions for discharge of ballast/ residue/water mixtures other than prewash:										
>12 miles from land	X	X		X	X	X	X	X	X	X
> 7 knots ships's speed	X	X		X	X	X	X	X	X	X
>25 metres water depth	X	X		X	X	X	X	X		
Using underwater discharge	X	X		X	X	X	X	X	X	
Ballast added to tank		X					X			
Condition for discharge of ballasts:										
>12 miles from land		X					X			
>25 metres water depth		X					X			
Alternatively, residue/water mixtures may be discharged ashore (N.B. optional not MARPOL requirement)	X	X		X	X	X	X	X	X	X
Any water subsequently introduced into the tank may be discharged into the sea without restrictions	X	X	X	X	X	X	X	X	X	X

Note: Start at the top of the column under the CDP number specified and complete each procedure in sequence where marked X.

DISPOSAL OF PREWASH OR TANK WASHINGS CONTAINING CATEGORY A, B, C or D SUBSTANCES FROM DEDICATED SLOP TANKS OR CARGO TANKS CONTAINING TANK WASHING OR SLOPS



"Note: This is a flow diagram giving comprehensive requirements applicable to new and existing ships. The flow diagram for a specific ship should only include parts applicable to that ship."

ATTACHMENT 1

SLOPS DISPOSAL PROCEDURES (SDP)	SEQUENCE OF PROCEDURES					
	1	2	3	4	5	6
Slops must be discharged ashore	X					
Establish discharge rate of immiscible residue/water mixture in accordance with Addendum D		X				
Establish discharge rate of miscible residue/water mixture in accordance with Addendum D			X			
The figure obtained shows the rate at which discharge is permitted		X	X			
Residues of substances with viscosities 60 mPa.s at the unloading temperature may be retained on board and discharged outside special area. Alternatively, tanks may be prewashed and slops discharged ashore						X
Dilute slops with water to obtain a solution of 10% or less - no restriction on discharge rate					X	
Discharge rate is maximum permitted by underwater discharge outlet				X		X
Additional discharge conditions:						
- ship's speed at least 7 knots		X	X	X	X	X
- outside 12 miles from nearest land		X	X	X	X	X
- depth of water at least 25 m		X	X	X		X
- using underwater discharge		X	X	X		X

Note: Start at the top of the column under the SDP number specified and complete each procedure in sequence where marked X.

ADDENDUM B

PREWASH PROCEDURES

This addendum to the Manual should contain prewash procedures based on appendix B of the Standards. These procedures should contain specific requirements for the use of the tank washing arrangements and equipment provided on the particular ship and include the following:

- washing machine positions to be used
- slops pumping out procedure
- requirements for hot washing
- number of cycles of washing machine (or time)
- minimum operating pressures

ADDENDUM C

VENTILATION PROCEDURES

This addendum to the Manual should contain ventilation procedures based on appendix C of the Standards. The procedures should contain specific requirements for the use of the cargo tank ventilation system, or equipment, fitted on the particular ship and should include the following:

- ventilation positions to be used
- minimum flow or speed of fans
- procedures for ventilating cargo pipeline, pumps, filters, etc.
- procedures for ensuring that tanks are dry on completion.

ADDENDUM D

DETERMINATION OF PERMITTED RESIDUE DISCHARGE RATES FOR CATEGORY B SUBSTANCES

This addendum to the Manual, which is required only by ships operating under regulation 5A(2)(b), should contain a method for the ship's crew to determine the permitted discharge rates for category B substances. The method should be based on sections 10.5 and 10.6 of the Standards.

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ANNEX 5

Resolution MEPC 19(22)

ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (IBC CODE)

adopted on 5 December 1985

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MEPC 16(22) by which it adopted amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (the 1978 Protocol), to make the provisions of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) and the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) mandatory under the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the 1978 Protocol (MARPOL 73/78),

NOTING ALSO resolution MSC.4(48) by which the Maritime Safety Committee adopted the IBC Code to be made mandatory under chapter VII of the International Convention for the Safety of Life at Sea, 1974 (the 1974 SOLAS Convention),

NOTING FURTHER resolution 15 of the International Conference on Marine Pollution, 1973, which recommended the Organization to amend the Bulk Chemical Code in order to include requirements necessary from the marine pollution point of view,

HAVING CONSIDERED the text of the proposed Code which incorporates amendments to the IBC Code (resolution MSC.4(48)) from the marine pollution prevention point of view developed in pursuance of the said Conference resolution,

CONSIDERING that it is highly desirable for the IBC Codes made mandatory under MARPOL 73/78 and the 1974 SOLAS Convention to remain identical,

1. ADOPTS the IBC Code, the text of which is given in the Annex to the present resolution;

2. INVITES the Maritime Safety Committee to consider the adoption of corresponding amendments to the IBC Code (resolution MSC.4(48)) in accordance with the provisions of Article VIII of the 1974 SOLAS Convention as soon as the 1983 amendments to the 1974 SOLAS Convention enter into force;

3. REQUEST the Secretary-General to transmit a copy of the present resolution together with the text of the IBC Code to all Members of the Organization and to all Parties to the 1978 Protocol which are not Members of the Organization.

ANNEX

THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK

(The IBC Code to be annexed to the MEPC resolution will incorporate the amendments listed below)

Preamble

Paragraph 1

In the existing text, after the word "dangerous", the words "and noxious" are inserted.

Paragraph 2

The following sentence is added at the end of the paragraph:

"as well as the hazard they may present to the environment if accidentally released".

Paragraphs 9 and 10

New paragraphs 9 and 10 are added to the existing text as follows:

"9 In response to resolution 15 of the International Conference on Marine Pollution, 1973, the Marine Environment Protection Committee at its twenty-second session adopted with resolution MEPC 19(22) the IBC Code extended to cover the marine pollution prevention aspects for the implementation of Annex II to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

10 As from the date of entry into force of the 1983 amendments to the 1974 SOLAS Convention and the date of implementation of Annex II of MARPOL 73/78, this Code will be mandatory requirements under these Conventions. Any future amendment to the Code, whether from the point of

view of safety or of marine pollution, must be adopted and brought into force in accordance with the procedures laid down in Article VIII of SOLAS 74 and Article 16 of MARPOL 73/78 respectively. In order to achieve a common date of entry into force of future amendments to the Code under SOLAS 74 and MARPOL 73/78, the Maritime Safety Committee and the Marine Environment Protection Committee intend to establish an appropriate procedure in conformity with the provisions of the said Articles."

1.1 Application

1.1.1 In the introductory sentence of the existing text the words "or noxious" are inserted between the words "dangerous" and "liquid".

1.1.2A New paragraph 1.1.2A is added as follows:

"1.1.2A For the purpose of the 1974 SOLAS Convention, the Code does not apply to ships which are engaged in the carriage of products included in chapter 17 solely on the basis of their pollution characteristics and identified as such by an entry of "P" only in column b"."

1.1.2B New paragraph 1.1.2B is added as follows:

"1.1.2B For the purposes of MARPOL 73/78, the Code applies only to chemical tankers as defined in Regulation 1(1) of Annex II thereof, which are engaged in the carriage of noxious liquid substances falling into Category A, B or C and identified as such by an entry of "A, B or C" in column b."

1.1.5 The following sentence is added to the existing text of paragraph 1.1.5:

"This conversion provision does not apply to the modification of a ship referred to in regulation 1(12) of Annex II of MARPOL 73/78."

1.2 Hazards

1.2.6 New paragraph 1.2.6 is added as follows:

"1.2.6 Marine pollution hazard as defined by

.1 bioaccumulation with attendant risk to aquatic life or human health or cause tainting to seafood;
.2 damage to living resources;
.3 hazard to human health; and
.4 reduction of amenities."

1.3 Definitions

1.3.5 In the first sentence the words "or slop tanks" are inserted after the words "adjacent to cargo tanks".

1.3.18A, 1.3.18B and 1.3.27A The following new definitions are added:

"1.3.18A MARPOL 73/78 means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto.

1.3.18B Noxious Liquid Substance means any substance designated in appendix II to Annex II of MARPOL 73/78 or provisionally assessed under the provisions of regulation 3(4) of that Annex as falling into category A, B, C or D.

1.3.27A Standards for the Procedures and Arrangements means the Standards for the Procedures and Arrangements for the Discharge of Noxious Liquid Substances called for by Annex II of MARPOL 73/78 adopted by the Marine Environment Protection Committee at its twenty-second session by resolution MEPC 18(22) as may be amended by the Organization."

1.4 Equivalents

1.4.2 After the words "1974 SOLAS CONVENTION" in the existing text, the words "and Parties to MARPOL 73/78" are inserted.

1.5 Surveys and certification

1.5.4.1 After the words "to a chemical tanker" in the existing text, the words "engaged in international voyages" are inserted.

1.5.5.1 In lines 1 and 2 of the existing text, the words "Contracting Government" are replaced by "Party to 1974 SOLAS Convention and Parties to MARPOL 73/78" and "Government of another State" by "another Party" respectively.

2.5.2 The title "Other damage" is deleted and the existing text of 2.5.2.1 is made 2.5.2 and the existing text of 2.5.2.2 is deleted.

2.6 Location of cargo tanks

2.6.1 The following sentence is added to the existing texts of subparagraphs .1 and .2

"This requirement does not apply to the tanks for diluted slops arising from tank washing."

2.9.3.1 At the end of the first sentence of the existing text, "m/rad" is replaced by "m.rad".

3.1 Cargo segregation

3.1.2 The existing text of the paragraph before .1 is amended to read:

"Cargoes, residues of cargoes or mixtures containing cargoes which react in a hazardous manner with other cargoes, residues or mixtures, should:"

10.2.3.5 In the existing text, the words "cofferdams within the cargo area" are replaced by the words "cofferdams within the cargo tank block".

12.1.8.1 In the existing text, the words "impellers and housing" are replaced by the words "impellers *or* housing".

15.5 Hydrogen peroxide solution over 60% but not over 70%.

The existing title is amended to read "Hydrogen peroxide solutions and sub-title without a number is inserted to read "Hydrogen peroxide solutions over 60% but not over 70%".

15.5.1 In the existing text the words "over 60% but not over 70%" are inserted between the words "solutions" and "should".

15.5.14 The following text is added after the existing text of paragraph 15.5.13:

"Hydrogen peroxide solutions over 8% but not over 60% by weight.

15.5.14 The ship's shell plating should not form any boundaries of tanks containing this product.

15.5.15 Hydrogen Peroxide should be carried in tanks thoroughly and effectively cleaned of all traces of previous cargoes and their vapours or ballast. Procedures for inspection, cleaning, passivation and loading of tanks should be in accordance with MSC/Circ.394. A certificate should be on board the vessel indicating that the procedures in the circular have been followed. The passivation requirement may be waived by an Administration for domestic shipments of short duration. Particular care in this respect is essential to ensure the safe carriage of hydrogen peroxide.

.1 When hydrogen peroxide is carried no other cargoes should be simultaneously carried.

.2 Tanks which have contained hydrogen peroxide may be used for other cargoes after cleaning in accordance with the procedures outlined in MSC/Circ.394.

.3 Consideration in design should provide minimum internal tank structure, free draining, no entrapment and ease of visual inspection.

15.5.16 Cargo tanks and associated equipment should be either pure aluminium (99.5%) or solid stainless steel of types suitable for use with hydrogen peroxide (e.g. 304, 304L, 316, 316L, 316Ti). Aluminium should not be used for piping on deck. All non-metallic materials of construction for the containment system should neither be attacked by hydrogen peroxide nor contribute to its decomposition.

15.5.17 Cargo tanks should be separated by a cofferdam from fuel oil tanks or any other space containing materials incompatible with hydrogen peroxide.

15.5.18 Temperature sensors should be installed at the top and bottom of the tank. Remote temperature readouts and continuous monitoring should be located on the navigating bridge. If the temperature in the tank rises above 35°C, visible and audible alarms should activate on the navigating bridge.

15.5.19 Fixed oxygen monitors (or gas sampling lines) should be provided in void spaces adjacent to tanks to detect leakage of the cargo into these spaces. The enhancement of flammability by oxygen enrichments should be recognized. Remote readouts, continuous monitoring (if gas sampling lines are used, intermittent sampling is satisfactory) and visible and audible alarms similar to those for the temperature sensors should also be located on the navigating bridge. The visible and audible alarms should activate if the oxygen concentrations in these void spaces exceed 30% by volume. Two portable oxygen monitors should also be available as back-up systems.

15.5.20 As a safeguard against uncontrolled decomposition, a cargo jettisoning system should be installed to discharge the cargo overboard. The cargo should be jettisoned if the temperature rise of the cargo exceeds a rate of 2°C per hour over a five hour period or when the temperature in the tank exceeds 40°C.

15.5.21 Cargo tank venting systems with filtration should have pressure vacuum relief valves for normal controlled venting, and a device for emergency venting, should tank pressure rise rapidly as a result of an uncontrolled decomposition rate, as stipulated in 15.5.20. These venting systems should be designed in such a manner that there is no introduction of seawater into the cargo tank even under heavy sea conditions. Emergency venting should be sized on the basis of tank design pressure and tank size.

15.5.22 A fixed water spray system should be provided for diluting and washing away any concentrated solution spilled on deck. The areas covered by the waterspray should include the manifold/hose connections and the tank tops of those tanks designated for the carriage of hydrogen peroxide solutions. The minimum application rate should satisfy the following criteria:

.1 The product should be diluted from the original concentration to 35% by weight within five minutes of the spill.

.2 The rate and estimated size of the spill should be based upon maximum anticipated loading and discharge rates, the time required to stop flow of cargo in the event of tank overfill or a piping/hose failure, and the time necessary to begin application of dilution water with actuation at the cargo control location or on the navigating bridge.

15.5.23 Hydrogen peroxide should be stabilized to prevent decomposition. A certificate of stabilization should be provided by the manufacturer specifying:

.1 name and amount of stabilizer added;
.2 date stabilizer was added and duration of effectiveness;
.3 any temperature limitations qualifying the stabilizer's effective lifetime;
.4 the action to be taken should the product become unstable during the voyage.

15.5.24 Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1.0% per year at 25°C should be carried. Certification from the shipper that the product meets this standard should be presented to the Master and kept on board. A technical representative of the manufacturer should be on board to monitor the transfer operations and have the capability to test the stability of the hydrogen peroxide. He should certify to the Master that the cargo has been loaded in a stable condition.

15.5.25 Protective clothing that is resistant to hydrogen peroxide should be provided for each crew member involved in cargo transfer operations. Protective clothing should include coveralls that are non-flammable, suitable gloves, boots and eye protection.

15.5.26 During transfer of hydrogen peroxide the related piping system should be separate from all other systems. Cargo hoses used for transfer of hydrogen peroxide should be marked "for hydrogen peroxide transfer only".

15.8 The existing section 15.8 is replaced by the following:

"15.8 Propylene oxide and mixtures of ethylene oxide/propylene oxide with an ethylene oxide content of not more than 30% by weight.

15.8.1 Products transported under the provisions of this section should be acetylene free.

15.8.2 Unless cargo tanks are properly cleaned, these products should not be carried in tanks which have contained as one of the three previous cargoes any products known to catalyse polymerization, such as:

.1 mineral acids (e.g. sulphuric, hydrochloric, nitric);
.2 carboxylic acids and anhydrides (e.g. formic, acetic);
.3 halogenated carboxylic acids (e.g. chloracetic);
.4 sulphonic acids (e.g. benzene sulphonic);
.5 caustic alkalis (e.g. sodium hydroxide, potassium hydroxide);
.6 ammonia and ammonia solutions;
.7 amines and amine solutions;
.8 oxidizing substances.

15.8.3 Before loading, tanks should be thoroughly and effectively cleaned, to remove all traces of previous cargoes from tanks and associated pipework, except where the immediately prior cargo has been propylene oxide or ethylene oxide/propylene oxide mixtures. Particular care should be taken in the case of ammonia in tanks made of steel other than stainless steel.

15.8.4 In all cases, the effectiveness of cleaning procedures for tanks and associated pipework should be checked by suitable testing or inspection, to ascertain that no traces of acidic or alkaline materials remain that might create a hazardous situation in the presence of these products.

15.8.5 Tanks should be entered and inspected prior to each initial loading of these products to ensure freedom from contamination, heavy rust deposits and visible structural defects. When cargo tanks are in continuous service for these products, such inspections should be performed at intervals of not more than two years.

15.8.6 Tanks for the carriage of these products should be of steel or stainless steel construction.

15.8.7 Tanks for the carriage of these products may be used for other cargoes after thorough cleaning of tanks and associated pipework systems by washing or purging.

15.8.8 All valves, flanges, fittings and accessory equipment should be of a type suitable for use with the products and should be constructed of steel or stainless steel or other material acceptable to the Administration. The chemical composition of all material used should be submitted to the Administration for approval prior to fabrication. Discs or disc faces, seats and other wearing parts of valves should be made of stainless steel containing not less than 11% chromium.

15.8.9 Gaskets should be constructed of materials which do not react with, dissolve in, or lower the auto-ignition temperature of, these products and which are fire resistant and possess adequate mechanical behaviour. The surface presented to the cargo should be polytetrafluorethylene (PTFE), or materials giving a similar degree of safety by their inertness. Spirally-wound stainless steel, with a filler of PTFE or similar fluorinated polymer, may be accepted by the Administration.

15.8.10 Insulation and packing, if used, should be of a material which does not react with, dissolve in, or lower the auto-ignition temperature of, these products.

15.8.11 The following materials are generally found unsatisfactory for gaskets, packing and similar uses in containment systems for these products and would require testing before being approved by the Administration:

.1 Neoprene or natural rubber, if it comes into contact with the products.

.2 Asbestos, or binders used with asbestos.

.3 Materials containing oxides of magnesium, such as mineral wools.

15.8.12 Threaded joints should not be permitted in the cargo liquid and vapour lines.

15.8.13 Filling and discharge piping should extend to within 100 mm of the bottom of the tank or any sump pit.

15.8.14.1 The containment system for a tank containing these products should have a valved vapour return connection.

15.8.14.2 The products should be loaded and discharged in such a manner that venting of the tanks to atmosphere does not occur. If vapour return to shore is used during tank loading, the vapour return system connected to a containment system for the product should be independent of all other containment systems.

15.8.14.3 During discharging operations, the pressure in the cargo tank must be maintained above 0.07 bar gauge.

15.8.15 The cargo may be discharged only by deepwell pumps, hydraulically operated submerged pumps, or inert gas displacement. Each cargo pump should be arranged to ensure that the product does not heat significantly if the discharge line from the pump is shut off or otherwise blocked.

15.8.16 Tanks carrying these products should be vented independently of tanks carrying other products. Facilities should be provided for sampling the tank contents without opening the tank to atmosphere.

15.8.17 Cargo hoses used for transfer of these products should be marked "FOR ALKYLENE OXIDE TRANSFER ONLY".

15.8.18 Cargo tanks, void spaces and other enclosed spaces, adjacent to an integral gravity cargo tank carrying propylene oxide, should either contain a compatible cargo (those cargoes specified in 15.8.2 are examples of substances

considered incompatible) or be inerted by injection of a suitable inert gas. Any hold space in which an independent cargo tank is located should be inerted. Such inerted spaces and tanks should be monitored for these products and oxygen. The oxygen content of these spaces should be maintained below 2%. Portable sampling equipment is satisfactory.

15.8.19 In no case should air be allowed to enter the cargo pump or piping system while these products are contained within the system.

15.8.20 Prior to disconnecting shore-lines, the pressure in liquid and vapour lines should be relieved through suitable valves installed at the loading header. Liquid and vapour from these lines should not be discharged to atmosphere.

15.8.21 Propylene oxide may be carried in pressure tanks or in independent or integral gravity tanks. Ethylene oxide/propylene oxide mixtures should be carried in independent gravity tanks or pressure tanks. Tanks should be designed for the maximum pressure expected to be encountered during loading, conveying and discharging cargo.

15.8.22.1 Tanks for the carriage of propylene oxide with a design pressure less than 0.6 bar gauge and tanks for the carriage of ethylene oxide/propylene oxide mixtures with a design pressure less than 1.2 bar gauge should have a cooling system to maintain the cargo below the reference temperature.

15.8.22.2 The refrigeration requirement for tanks with a design pressure less than 0.6 bar gauge may be waived by the Administration for ships operating in restricted areas or on voyages of restricted duration; and account may be taken in such cases of any insulation of the tanks. The area and times of year for which such carriage would be permitted should be included in the conditions of carriage of the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

15.8.23.1 Any cooling system should maintain the liquid temperature below the boiling temperature at the containment pressure. At least two complete cooling plants automatically regulated by variations within the tanks should be provided. Each cooling plant should be complete with the necessary

auxiliaries for proper operation. The control system should also be capable of being manually operated. An alarm should be provided to indicate malfunctioning of the temperature controls. The capacity of each cooling system should be sufficient to maintain the temperature of the liquid cargo below the reference temperature* of the system.

15.8.23.2 An alternative arrangement may consist of three cooling plants, any two of which should be sufficient to maintain the liquid temperatures below the reference temperature*.

15.8.23.3 Cooling media which are separated from the products by a single wall only should be non-reactive with the products.

15.8.23.4 Cooling systems requiring compression of the products should not be used.

15.8.24 Pressure relief valve settings should not be less than 0.2 bar gauge and for pressure tanks not greater than 7.0 bar gauge for the carriage of propylene oxide and not greater than 5.3 bar gauge for carriage of propylene oxide/ethylene oxide mixtures.

15.8.25.1 The piping system for tanks to be loaded with these products should be separated (as defined in 1.3.24) from piping systems for all other tanks, including empty tanks. If the piping system for the tanks to be loaded is not independent (as defined in 1.3.15), the required piping separation should be accomplished by the removal of spool pieces, valves, or other pipe sections, and the installation of blank flanges at these locations. The required separation applies to all liquid and vapour piping, liquid and vapour vent lines and any other possible connections, such as common inert gas supply lines.

15.8.25.2 These products may be transported only in accordance with cargo handling plans that have been approved by the Administration. Each intended loading arrangement should be shown on a separate cargo handling plan. Cargo

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* See 15.8.22.1

handling plans should show the entire cargo piping system and the locations for installation of blank flanges needed to meet the above piping separation requirements. A copy of each approved cargo handling plan should be maintained on board the ship. The International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be endorsed to include reference to the approved cargo handling plans.

15.8.25.3 Before each initial loading of these products and before every subsequent return to such service, certification verifying that the required piping separation has been achieved should be obtained from a responsible person acceptable to the Port Administration and carried on board the ship. Each connection between a blank flange and a pipeline flange should be fitted with a wire and seal by the responsible person to ensure that inadvertent removal of the blank flange is impossible.

15.8.26.1 No cargo tanks should be more than 98% liquid full at the reference temperature*.

15.8.26.2 The maximum volume to which a cargo tank should be loaded is:

$$V_L = 0.98\ V\ \frac{d_R}{d_L}$$

where V_L = maximum volume to which the tank may be loaded

V = volume of the tank

d_R = relative density of cargo at the reference temperature*

d_L = relative density of cargo at the loading temperature and pressure.

15.8.26.3 The maximum allowable tank filling limits for each cargo tank should be indicated for each loading temperature which may be applied, and for the applicable maximum reference temperature, on a list to be approved by the Administration. A copy of the list should be permanently kept on board by the master.

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* See 15.8.22.1

15.8.27 The cargo should be carried under a suitable protective padding of nitrogen gas. An automatic nitrogen make-up system should be installed to prevent the tank pressure falling below 0.07 bar gauge in the event of product temperature fall due to ambient conditions or maloperation of refrigeration systems. Sufficient nitrogen should be available on board to satisfy the demand of the automatic pressure control. Nitrogen of commercially pure quality (99.9% by volume) should be used for padding. A battery of nitrogen bottles connected to the cargo tanks through a pressure reduction valve satisfies the intention of the expression "automatic" in this context.

15.8.28 The cargo tank vapour space should be tested prior to and after loading to ensure that the oxygen content is 2% by volume or less.

15.8.29 A water spray system of sufficient capacity should be provided to blanket effectively the area surrounding the loading manifold, the exposed deck piping associated with product handling, and the tank domes. The arrangement of piping and nozzles should be such as to give a uniform distribution rate of 10 l/m^2 min. The water spray system should be capable of both local and remote manual operation, and the arrangement should ensure that any spilled cargo is washed away. Additionally, a water hose with pressure to the nozzle, when atmospheric temperatures permit, should be connected ready for immediate use during loading and unloading operations.

15.8.30 A remotely operated, controlled closing-rate, shut-off valve should be provided at each cargo hose connection used during cargo transfer."

16.2 Cargo information

Following new paragraphs 16.2.6, 16.2.7, 16.2.8 and 16.2.9 and a footnote for paragraph 16.2.8 are added to the existing texts:

"16.2.6 Where column "m" in the table of chapter 17 refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

16.2.7 Where column "m" in the table of chapter 17 refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 60 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 60 mPa.s should be specified in the shipping document.

16.2.8 Where column "m" in the table of chapter 17 refers to this paragraph and the possibility exists that it will be unloaded within a Special Area*, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

16.2.9 Where column "m" in the table of chapter 17 refers to this paragraph, the cargo's melting point should be indicated in the shipping document.

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* Special Areas are defined in regulation 1(7) of Annex II to MARPOL 73/78."

16A New Chapter 16A is added to the existing text as follows:

"CHAPTER 16A - ADDITIONAL MEASURES FOR THE PROTECTION OF THE MARINE ENVIRONMENT

16A.1 GENERAL

16A.1.1 The requirements of this chapter apply to ships carrying products noted as Category A, B or C noxious liquid substances in chapter 17.

16A.2 CONDITION OF CARRIAGE

16A.2.1 The condition of carriage for products listed in the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should reflect the requirements of regulation 5A of Annex II of MARPOL 73/78.

16A.2.2 A Category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

16A.3 PROCEDURES AND ARRANGEMENTS MANUAL

16A.3.1 Each ship should be provided with a Procedures and Arrangements Manual developed for the ship in accordance with the provisions of the Standards for the Procedures and Arrangements and approved by the Administration.

16A.3.2 Each ship should be fitted with equipment and arrangements identified in its Procedures and Arrangements Manual."

Existing text of chapter 17 is replaced by the following:

CHAPTER 17 - SUMMARY OF MINIMUM REQUIREMENTS

	EXPLANATORY NOTES*
Product name (column a)	The product names are not identical with the names given in previous issues of the Code, or the IBC Code for explanation see index of chemicals.
UN number (column b)	The number relating to each product shown in the recommendations proposed by the United Nations Committee of Experts on the Transport of Dangerous Goods. UN numbers, where available, are given for information only.
Pollution category (column c)	The letter A, B, C or D means the pollution category assigned to each product under Annex II of MARPOL 73/78. "III" means the product was evaluated and found to fall outside the categories A, B, C or D. Pollution Category in brackets indicates that the product is provisionally categorized and that further data are necessary to complete the evaluation of their pollution hazards. Until the hazard evaluation is completed, the Pollution Category assigned is used.
Hazards (column d)	S means that the product is included in the Code because of its safety hazards; P means that the product is included in the Code because of its pollution hazards; and S/P means that the product is included in the Code because of both its safety and pollution hazards.
Ship type (column e)	1 = ship type 1 (2.1.2) 2 = ship type 2 (2.1.2) 3 = ship type 3 (2.1.2)
Tank type (column f)	1 = independent tank (4.1.1) 2 = integral tank (4.1.2) G = gravity tank (4.1.3) P = pressure tank (4.1.4)

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* Note by the Secretariat:

References to columns a - o in the other chapters of the Code will be amended according to the column designations shown here.

Tank vents (column g)	Open:	open venting
	Cont:	controlled venting
	SR:	safety relief valve
Tank environmental control* (column h)	Inert:	inerting (9.1.2.1)
	Pad:	liquid or gas (9.1.2.2)
	Dry:	drying (9.1.2.3)
	Vent:	natural or forced (9.1.2.4)
Electrical equipment (column i)	T1 to T6	temperature classes**
	IIA, IIB or IIC	apparatus groups**
	NF:	non-flammable product (10.1.6)
	Yes:	flashpoint exceeding 60°C (closed cup test) (10.1.6)
	No:	flashing point not exceeding 60°C (closed cup test) (10.1.6)
Gauging (column j)	O:	open gauging (13.1.1.1)
	R:	restricted gauging (13.1.1.2)
	C:	closed gauging (13.1.1.3)
	I:	indirect gauging (13.1.1.3)
Vapour detection* (column k)	F:	flammable vapours
	T:	toxic vapours
Fire protection (column l)	A:	alcohol-resistant foam
	B:	regular foam, encompasses all foams that are not of an alcohol-resistant type, including fluoroprotein and aqueous-film-forming foam (AFFF)
	C:	water-spray
	D:	dry chemical
	No:	no special requirements under this Code
Materials of construction (column m)	N:	see 6.2.2
	Z:	see 6.2.3
	Y:	see 6.2.4
	A blank indicates no special guidance given for materials of construction	
Respiratory and eye protection* (column n)	E:	see 14.2.8

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* "No" indicates nil requirements.

** Temperature classes and apparatus groups as defined in International Electrotechnical Commission Publication 79 (part 1, appendix D, parts 4, 8 and 12). A blank indicates that data are currently not available.

Product Name	UN Number	Pollution Category	Hazards	Ship Type	Tank Type	Tank Vents	Tank Environmental Control	Electrical Equipment			Gauging	Vapour Detection	Fire Protection	Materials of Construction	Respiratory and Eye Protection	Special Requirements (see Chapter 15)
								Class	Group	Flashpoint >60°C						
a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Acetic acid	2789	C	S/P	3	2G	Cont.	No	T1	IIA	No	R	F	A	Y1, Z	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8, 16.2.9
Acetic anhydride	1715	C	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A	Y1	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8
Acetone cyanohydrin	1541	A	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A	Y1	E	15.1, 15.12, 15.17 to 15.19, 16.6
Acetonitrile	1648	III	S	2	2G	Cont.	No	T2	IIA	No	R	F-T	A		No	15.12
Acrylamide solution, (50% or less)	2074	D	S	2	2G	Open	No	NF			C	No	No		No	15.12.3, 15.13, 15.16.1, 15.19.6, 16.6.1
Acrylic acid	2218	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	Y1	No	15.13, 16.6.1
Acrylonitrile	1093	B	S/P	2	2G	Cont.	No	T1	IIB	No	C	F-T	A	Y3, Z	E	15.12, 15.13, 15.17, 15.19
Adiponitrile	2205	D	S	3	2G	Cont.	No		IIB	Yes	R	T	A		No	
Alkyl acrylate vinyl pyridine copolymer in toluene		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Alkyl benzene sulphonic acid	2584 2586	C	S/P	3	2G	Open	No			Yes	0	No	B		No	
Allyl alcohol	1098	B	S/P	2	2G	Cont.	No	T2	IIB	No	C	P-T	A		E	15.12, 15.17, 15.19
Allyl chloride	1100	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	P-T	A		E	15.12, 15.17, 15.19
2-(2-Aminoethoxy)ethanol	3055	D	S	3	2G	Open	No			Yes	0	No	A,C, D	M2	No	15.19.6
Aminoethyl ethanolamine		(D)	S	3	2G	Open	No	T2	IIA	Yes	0	No	A	M1	No	
N-Aminoethyl piperazine	2815	D	S	3	2G	Cont.	No			Yes	R	T	A,C, D	M2	No	15.19.6
Ammonia aqueous, (28% or less)	2672 (a)	C	S/P	3	2G	Cont.	No	NF			R	T	C	M6	E(a)	
Ammonium nitrate solution, (93% or less)	2426	D	S	2	1G	Open	No	NF			0	No	No	Y4	No	15.2, 15.11.4, 15.11.6, 15.18, 15.19.6
Ammonium sulphide solution (45% or less)	2683	B	S/P	2	2G	Cont.	No	-	-	No	C	P-T	A,C	M1	E	15.12, 15.14, 16.6 15.16.1, 15.17, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
n-Amyl acetate	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
sec-Amyl acetate	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Amyl acetate, commercial	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Aniline	1547	C	S/P	2	2G	Cont.	No	TI	IIA	Yes	C	T	A		No	15.12, 15.17, 15.19,
Benzene and mixtures having 10% benzene or more	1114(t	C	S/P	3	2G	Cont.	No	TI	IIA	No	R	F-T	B		No	15.12.1, 15.17, 16.2.9
Benzenesulphonyl chloride	2225	D	S	3	2G	Cont.	No			Yes	R	T	B,D	NI	No	15.19.6
Benzyl alcohol		C	P	3	2G	Open	No			Yes	O	No	A		No	
Benzyl chloride	1738	B	S/P	2	2G	Cont.	No	TI	IIA	Yes	C	T	B		E	15.12, 15.13, 15.17, 15.19
n-Butyl acetate	1123	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
n-Butyl acrylate	2348	D	S	2	2G	Cont.	No	T2	IIB	No	R	P-T	A		No	15.13, 16.6.1, 16.6.2
Butylamine (all isomers)	1125 1214	C	S/P	2	2G	Cont.	No			No	R	P-T	A	NI	E	15.12, 15.17, 15.19.6
Butyl benzyl phthalate		A	P	2	2G	Open	No			Yes	0	No	A		No	15.19.6
Butyl/Decyl/Octyl/ Eicosyl methacrylate mixture		D	S	3	2G	Cont.	No			Yes	R	No	A,C, D		No	15.13, 16.6.1, 16.6.2
n-Butyl ether	1149	C	S/P	3	2G	Cont.	Inert	T4	IIB	No	R	P-T	A,D		No	15.4.6, 15.12
Butyl methacrylate		D	S	3	2G	Cont.	No		IIA	No	R	P-T	A,D		No	15.13, 16.6.1, 16.6.2
n-Butyraldehyde	1129	B	S/P	3	2G	Cont.	No	T3	IIA	No	0	P-T	A		No	15.16.1
Butyric acid	2820	B	S/P	3	2G	Cont.	No			Yes	R	No	A	YI	No	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Calcium hypochlorite solution		B	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1
Calcium naphthenate in mineral oil		A	P	3	2G	Open	No			Yes	O	No	A		No	
Camphor oil	1130	B	S/P	2	2G	Cont.	No		IIA	No	O	F	B		No	15.19.6
Carbolic oil		A	S/P	2	2G	Cont.	No			Yes	C	F-T	A		No	15.12, 15.19
Carbon disulphide	1131	A	S/P	2	1G	Cont.	Pad+ inert	T5	IIC	No	C	F-T	C		E	15.3, 15.12, 15.15, 15.19
Carbon tetrachloride	1846	B	S/P	3	2G	Cont.	No	NF			C	T	No	Z	E	15.12, 15.17, 15.19.6
Cashew nut shell oil (untreated)		D	S	3	2G	Cont.	No			Yes	R	T	B		No	
Cetyl/Eicosyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A,C, D		No	15.13, 16.6.1, 16.6.2
Chloroacetic acid (80% or less)	1750	C	S/P	2	2G	Cont.	No	NF			C	No	No	Y5	No	15.11.2, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.19, 16.2.9
Chlorobenzene	1134	B	S/P	2	2G	Cont.	No	T1	IIA	No	R	F-T	B		No	15.19.6
Chloroform	1888	B	S/P	3	2G	Cont.	No	NF			R	T	No		E	15.12
Chlorohydrins, crude		(D)	S	2	2G	Cont.	No		IIA	No	C	F-T	A		No	15.12, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
o-Chloronitrobenzene	1578	B	S/P	2	2G	Cont.	No			Yes	C	T	B,C,D		No	15.12, 15.17 to 15.19 16.2.6, 16.2.9, 16A.2.2
2- or 3-Chloro-propionic acid	2511 (n)	(C)	S/P	3	2G	Open	No			Yes	O	No	A	Y1	No	15.11.2 to 15.11.4, 15.11.6 to 15.11.8, 16.2.9
Chlorosulphonic acid	1754	C	S/P	1	2G	Cont.	No	NF			C	T	No		E	15.11.2 to 15.11.8, 15.12, 15.16.2, 15.19
m-Chlorotoluene	2238	B	S/P	3	2G	Cont.	No			No	R	P-T	B,C		No	
o-Chlorotoluene	2238	A	S/P	3	2G	Cont.	No			No	R	P-T	B,C		No	
p-Chlorotoluene	2238	B	S/P	2	2G	Cont.	No			No	R	P-T	B,C		No	15.19.6, 16.2.9
Chlorotoluenes (mixed isomers)	2238	A	S/P	2	2G	Cont.	No			No	R	P-T	B,C		No	15.19.6,
Coal tar naphtha solvent		B	S/P	3	2G	Cont.	No	T3	IIA	No	R	P-T	A,D		No	
Creosote (coal tar)		(C)	S/P	3	2G	Open	No	T2	IIA	Yes	O	No	B,D		No	

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Creosote (wood)		A	S/P	2	2G	Open	No	T2	IIA	Yes	0	No	B,D		No	15.19.6
Cresols (mixed isomers)	2076	A	S/P	2	2G	Open	No	T1	IIA	Yes	0	No	B		No	15.19.6
Crotonaldehyde	1143	B	S/P	2	2G	Cont.	No	T3	IIB	No	R	P-T	A		E	15.12, 15.16.1, 15.17
Cyclohexane	1145	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9
Cyclohexanol		C	P	3	2G	Open	No			Yes	0	No	A		No	16.2.7, 16.2.9
Cyclohexanone	1915	D	S	3	2G	Cont.	No	T2	IIA	No	R	P-T	A	N5	No	
Cyclohexylamine	2357	C	S/P	3	2G	Cont.	No	T3	IIA	No	R	P-T	A,D	N1	No	
p-Cymene	2046	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Decene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Decyl acrylate		A	S/P	2	2G	Open	No	T3	IIA	Yes	0	No	A,C,D	N2	No	15.13, 15.19.6, 16.6.1, 16.6.2
Decyl alcohol (all isomers)		B	P	3	2G	Open	No			Yes	0	No	A		No	16.2.9(s)
Dibutylamine		C	S/P	3	2G	Cont.	No	T2	IIA	No	R	P-T	B,D	N4	No	
Dibutyl phthalate		A	P	2	2G	Open	No			Yes	0	No	A		No	15.19.6
o-Dichlorobenzene	1591	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	R	T	B,D	N5	No	15.19.6
1,1-Dichloroethane	2362	B	S/P	3	2G	Cont.	No	T2	IIA	No	R	P-T	B		E	
Dichloroethyl ether	1916	B	S/P	2	2G	Cont.	No	T2	IIA	No	R	P-T	A	N5	No	
2,2-Dichloroisopropyl ether	2490	C	S/P	2	2G	Cont.	No			Yes	R	T	B,C, D	N5	No	15.12, 15.17, 15.19
2,6-Dichlorophenol	2021	A	S/P	2	2G	Cont.	Dry			Yes	R	T	B,C, D	N1	No	15.19.6
2,4-Dichlorophenoxy-acetic acid, diethanolamine salt solution		(A)	S/P	3	2G	Open	No	NF			0	No	No	N1	No	

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
2,4-Dichlorophenoxyacetic acid, dimethylamine salt (70% or less) solution		(A)	S/P	3	2G	Open	No	NF			0	No	No	N1	No	
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution		(A)	S/P	3	2G	Open	No	NF			0	No	No	N1	No	
1,2-Dichloropropane	1279	B	S/P	2	2G	Cont.	No	T1	IIA	No	R	P-T	B	Z	No	15.12
1,3-Dichloropropene		B	S/P	2	2G	Cont.	No	T1	IIA	No	R	P-T	B		No	15.12
1,3-Dichloropropene	2047	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	P-T	B		E	15.12, 15.17 to 15.19
Dichloropropene/Dichloropropane mixtures		B	S/P	2	2G	Cont.	No			No	C	P-T	B,C,D		E	15.12, 15.17 to 15.19
2,2-Dichloropropionic acid		D	S	3	2G	Cont.	Dry			Yes	R	No	A	Y5	No	15.11.2, 15.11.4, 15.11.6, 15.11.8
Diethanolamine		III	S	3	2G	Open	No	T1	IIA	Yes	0	No	A	N2	No	
Diethylamine	1154	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	P-T	A	N1	E	15.12

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Diethylaminoethanol	2686	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	P-T	A,D	N1	No	
Diethylbenzene	2049	C	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6
Diethylene glycol methyl ether		C	P	3	2G	Open	No			Yes	0	No	A		No	
Diethylenetriamine	2079	(D)	S	3	2G	Open	No	T2	IIA	Yes	0	No	A	N2	No	
Diethyl ether	1155	III	S	2	NG	Cont.	Inert	T4	IIB	No	C	P-T	A	N7	E	15.4, 15.14, 15.15, 15.19
Di-(2-ethylhexyl) phosphoric acid	1902	C	S/P	3	2G	Open	No			Yes	0	No	B,C, D	N2	No	
Diethyl phthalate		C	P	3	2G	Open	No			Yes	0	No	A		No	
Diethyl sulphate	1594	(B)	S/P	2	2G	Cont.	No			Yes	C	T	A,D	N3	No	15.19.6
Diglycidyl ether of Bisphenol A		B	P	3	2G	Open	No			Yes	0	No	A		No	16.2.9
Diisobutylamine	2361	(C)	S/P	2	2G	Cont.	No			No	R	P-T	B,D	N1	No	15.12.3, 15.19.6
Diisobutylene	2050	B	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Diisobutyl phthalate		B	P	3	2G	Open	No			Yes	0	No	A		No	16.2.6
Diisopropanolamine		C	S/P	3	2G	Open	No	T2	IIA	Yes	0	No	A	N2	No	16.2.7, 16.2.9
Diisopropylamine	1158	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	P-T	A	N2	E	15.12, 15.19
Diisopropylbenzene (all isomers)		A	P	2	2G	Open	No			Yes	0	No	A		No	15.19.6
Dimethylamine solution (45% or less)	1160	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	P-T	C,D	N1	E	15.12
Dimethylamine solution (greater than 45% but not greater than 55%)	1160	C	S/P	2	2G	Cont.	No			No	C	P-T	A,C, D	N1	E	15.12, 15.17, 15.19
Dimethylamine solution (greater than 55% but not greater than 65%)	1160	C	S/P	2	2G	Cont.	No			No	C	P-T	A,C, D	N1	E	15.12, 15.14, 15.17, 15.19
N,N-Dimethylcyclo-hexylamine	2264	C	S/P	2	2G	Cont.	No			No	R	P-T	A,C	N1	No	15.12, 15.17, 15.19.6
Dimethylethanolamine	2051	D	S	3	2G	Cont.	No	T3	IIA	No	R	P-T	A,D	N2	No	
Dimethylformamide	2265	D	S	3	2G	Cont.	No	T2	IIA	No	R	P-T	A,D		No	
Dimethyl hydrogen phosphite			S	3	2G	Cont.	No			Yes	R	T	A,D		No	15.12.1

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Dimethyl phthalate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Dinitrotoluene (molten)	1600	B	S/P	2	2G (o)	Cont	No			Yes	C	T	A		No	15.12, 15.17, 15.19, 16.2.6, 16.2.9, 16A.2.2(p)
1,4-Dioxane	1165	D	S	2	2G	Cont.	No	T4	IIB	No	C	P-T	A		No	15.12, 15.19
Dipentene	2052	C	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6
Diphenyl ether		A	P	3	2G	Open	No			Yes	O	No	A		No	
Diphenylmethane diisocyanate	2489	(B)	S/P	2	2G	Cont.	Dry			Yes	C	T(b)	C(c) D	M5	No	15.12, 15.16.2, 15.17, 15.19.6, 16.2.6, 16.2.9, 16A.2.2
Diphenyl oxide/Diphenyl phenyl ether mixture		A	P	3	2G	Open	No			Yes	O	No	A		No	
Di-n-propylamine	2383	C	S/P	3	2G	Cont.	No			No	R	P-T	A	M2	No	15.12.3, 15.19.6
Dodecene (all isomers)		B	P	3	2G	Open	No			Yes	O	No	A		No	
Dodecyl alcohol		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.6, 16.2.9, 16A.2.2
Dodecyl benzene		C	P	3	2G	Open	No			Yes	O	No	A		No	

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Dodecyl diphenyl oxide disulphonate solution		B	S/P	3	2G	Open	No	NF			O	No	No		No	16.2.6, 15.2.9, 16A.2.2
Dodecyl methacrylate		III	S	3	2G	Open	No			Yes	O	No	A,C		No	15.13
Dodecyl/Pentadecyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A,C,D		No	15.13, 16.6.1, 16.6.2
Dodecyl phenol		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19
Epichlorohydrin	2023	C	S/P	2	2G	Cont.	No		IIB	No	C	F-T	A		E	15.12, 15.17, 15.19
Ethanolamine	2491	D	S	3	2G	Open	No	T2	IIA	Yes	O	F-T	A	N2	No	
2-Ethoxyethyl acetate	1172	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ethyl acrylate	1917	B	S/P	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		E	15.13, 16.6.1, 16.6.2
Ethylamine	1036	C	S/P	2	1G	Cont.	No	T2	IIA	No	C	F-T	C,D	N2	E	15.12, 15.14

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Ethylamine solutions, (72% or less)	2270	C	S/P	2	2G	Cont.	No			No	C	P-T	A,C	N1	E	15.12, 15.14, 15.17, 15.19
Ethylbenzene	1175	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
N-Ethylbutylamine		(C)	S/P	3	2G	Cont.	No			No	R	P-T	A	N1	No	15.12.3, 15.19.6
N-Ethylcyclohexylamine		D	S	3	2G	Cont.	No			No	R	P-T	A,C	N1	No	15.19.6
Ethylene chlorohydrin	1135	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	P-T	D		E	15.12, 15.17, 15.19
Ethylene cyanohydrin		(D)	S	3	2G	Open	No		IIB	Yes	O	No	A		No	
Ethylenediamine	1604	C	S/P	2	2G	Cont.	No	T2	IIA	No	R	P-T	A	N2	No	16.2.9
Ethylene dibromide	1605	B	S/P	2	2G	Cont.	No	NF			C	T	No		E	15.12, 15.19.6, 16.2.9
Ethylene dichloride	1184	B	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	B	N4	No	15.19
Ethylene oxide/propylene oxide mixtures with an ethylene oxide content of not more than 30% by weight	2983	D	S	2	1G	Cont.	Inert	T2	IIB	No	C	F-T	A,C		No	15.8, 15.12, 15.14 15.15, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
2-Ethylhexyl acrylate		D	S	3	2G	open	No	T3	IIB	Yes	O	No	A		No	15.13, 16.6.1, 16.6.2
2-Ethylhexylamine	2276	B	S/P	2	2G	Cont.	No			No	R	P-T	A	N2	No	15.12
Ethylidene norbornene		B	S/P	3	2G	Cont.	No			No	R	P-T	B,C,D	N6	No	15.12.1, 15.16.1, 15.19.6
Ethyl methacrylate	2277	(D)	S	3	2G	Cont.	No		IIA	No	R	P-T	B,D		No	15.13, 16.6.1, 16.6.2
2-Ethyl-3-propylacrolein		B	S/P	3	2G	Cont.	No		IIA	No	R	P-T	A		No	16.2.9
Ethyltoluene		(B)	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6
Fatty alcohols(C_{12}-C_{20})		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.6, 16.2.9
Formaldehyde solutions (45% or less)	1198(d) 2209	C	S/P	3	2G	Cont.	No	T2	IIB	No	R	P-T	A		E(e)	15.16.1
Formic acid	1779	D	S	3	2G	Cont.	No	T1	IIA	No	R	T	A	Y2/ Y3	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8
Fumaric adduct of rosin, water dispersion		B	P	3	2G	Open	No			Yes	O	No	No		No	16.2.6
Furfural	1199	C	S/P	3	2G	Cont.	No	T2	IIB	No	R	P-T	A		No	15.16.1

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Furfuryl alcohol	2874	C	P	3	2G	Open	No			Yes	O	No	A		No	
Glutaraldehyde solutions (50% or less)		D	S	3	2G	Open	No	NF			O	No	No		No	15.16.1
Glycidyl ester of C_{10} trialkyl acetic acid		B	P	3	2G	Open	No			Yes	O	No	A		No	
Heptanol (all isomers)(q)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Heptane (mixed isomers)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Heptyl acetate		(B)	P	3	2G	Open	No			Yes	O	No	A		No	
Hexamethylenediamine solution	1783	C	S/P	3	2G	Cont.	No			Yes	R	T	A	N2	No	15.19.6, 16.2.9
Hexamethyleneimine	2493	C	S/P	2	2G	Cont.	No			No	R	F-T	A,C	N1	No	
1-Hexene	2370	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Hexyl acetate	1233	B	P	3	2G	Cont.	No			No	R	F	A*		No	15.19.6
Hydrochloric acid	1789	D	S	3	1G	Cont.	No	NF			R	T	No		E(f)	15.11

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Hydrogen peroxide solutions (over 60% but not over 70%)	2015	C	S/P	2	2G	Cont.	No	NF			C	No	No		No	15.5.1 to 15.5.13 15.19.6
Hydrogen peroxide solutions (over 8% but not over 60%)	2014 2984	C	S/P	3	2G	Cont.	No	NF			C	No	No		No	15.5.14 to 15.5.26 15.18, 15.19.6
2-Hydroxyethyl acrylate		B	S/P	2	2G	Cont.	No			Yes	C	T	A		No	15.12, 15.13, 15.19.6 16.6.1, 16.6.2
Isoamyl acetate	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Isobutyl acetate	1213	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Isobutyl acrylate	2527	D	S	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.13, 16.6.1, 16.6.2
Isobutyraldehyde	2045	C	S/P	3	2G	Cont.	No	T3	IIA	No	O	F-T	A		No	15.16.1
Isophorone diamine	2289	D	S	3	2G	Cont.	No			Yes	R	T	A	N2	No	
Isophorone diisocyanate	2290	B	S/P	2	2G	Cont.	Dry			Yes	C	T	C(c) D	N5	No	15.12, 15.16.2, 15.17 15.19.6
Isoprene	1218	C	S/P	3	2G	Cont.	No	T3	IIB	No	R	F	B		No	15.13, 15.14, 16.6.1, 16.6.2
Isopropanolamine		C	S/P	3	2G	Open	No	T2	IIA	Yes	O	F-T	A	N2	No	16.2.9, 16.2.8

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Isopropylamine	1221	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	C,D	N2	E	15.12. 15.14, 15.19.
Isopropylbenzene	1918	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Isopropyl ether	1159	D	S	3	2G	Cont.	Inert			No	R	F	A		No	15.4.6, 15.13.3, 15.19.6
Isovaleraldehyde	2058	C	S/P	3	2G	Cont	Inert	T3	IIB	No	R	F-T	A		No	15.4.6, 15.16.1
Maleic anhydride	2215	D	S	3	2G	Cont.	No			Yes	R	No	A (g) C		No	
Mercaptobenzothiazol, sodium salt solution		(B)	S/P	3	2G	Open	No	NF			O	No	No	N1	No	16.2.9
Mesityl oxide	1229	D	S	3	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.19.6
Methacrylic acid	2531	D	S	3	2G	Cont.	No			Yes	R	T	A	Y1	No	15.13, 16.6.1
Methacrylonitrile		(B)	S/P	2	2G	Cont.	No			No	C	F-T	A	N2	E	15.12, 15.13, 15.17, 15.19
Methyl acrylate	1919	C	S/P	2	2G	Cont.	No	T1	IIB	No	R	F-T	B		E	15.13, 16.6.1 16.6.2
Methylamine solutions (42% or less)	1235	C	S/P	2	2G	Cont.	No			No	C	F-T	A,C, D	N1	E	15.12, 15.17, 15.19
Methylamyl acetate	1233	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Methylamyl alcohol	2053	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Methyl amyl ketone	1110	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Dichloromethane (move to p.28)	1593	D	S	3	2G	Cont.	No	T1	IIA	Yes	R	T	No		No	
2-Methyl-6-ethylaniline		C	S/P	3	2G	Open	No			Yes	O	No	B,C, D		No	
2-Methyl-5-ethylpyridine	2300	(B)	S/P	3	2G	Open	No		IIA	Yes	O	No	D	N4	No	
Methyl formate	1243	D	S	2	2G	Cont.	No			No	R	F-T	A		E	15.12, 15.14, 15.19
2-Methyl-2-hydroxy-3-butyne		III	S	3	2G	Cont.	No.			No	R	F-T	A,C D	N6	No	15.19.6
Methyl methacrylate	1247	D	S	2	2G	Cont.	No.	T2	IIA	No	R	F-T	B		No	15.13, 16.6.1, 16.6.2

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
2-Methyl-1-pentene	2288	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
2-Methylpyridine	2313	B	S/P	2	2G	Cont.	No			No	C	F	A,C	N4	No	15.12.3, 15.19.6
4-Methylpyridine	2313	B	S/P	2	2G	Cont.	No			No	C	F-T	A,C,D	N4	No	15.12.3, 15.19 16.2.9
N-Methyl-2-pyrrolidone		B	P	3	2G	Open	No			Yes	O	No	A		No	
Methyl salicylate		(B)	P	3	2G	Open	No			Yes	O	No	A		No	
alpha-Methylstyrene	2303	A	S/P	2	2G	Cont.	No	T1	IIB	No	R	F-T	D		No	15.13, 15.19.6, 16.6.1, 16.6.2
Morpholine	2054	D	S	3	2G	Cont.	No	T2	IIA	No	R	F	A	N2, Z	No	
Motor fuel anti-knock compounds	1649	A	S/P	2	2G	Cont.	No	T4	IIA	No	C	F-T	B,C		E	15.6, 15.12, 15.18, 15.19
Naphthalene (molten)	2304	A	S/P	2	2G	Cont.	No	T1	IIA	Yes	R	No	A,D		No	15.19.6
Neodecanoic acid		(B)	P	3	2G	Open	No			Yes	O	No	A		No	
Nitrating acid (mixture of sulphuric and nitric acids)	1796	(C)	S/P	2	2G	Cont.	No	N*			C	T	No		E	15.11, 15.16.2, 15.17 15.19
Nitric acid (70% and over)	2031, 2032 (h)	C	S/P	2	2G	Cont.	No	N*			C	T	No		E	15.11, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Nitric acid (less than 70%)	2031	C	S/P	2	2G	Cont.	No	NF			R	T	No		E	15.11, 15.19
Nitrobenzene	1662	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	D		No	15.12, 15.17 to 15.19 16.2.9
o-Nitrophenol (molten)	1663	B	S/P	2	2G	Cont.	No			Yes	C	T	A,C,D		No	15.12, 15.19.6, 16.2.6, 16.2.9, 16A.2.2
1- or 2-Nitropropane	2608	D	S	3	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	
Nitropropane (60%)/ Nitroethane (40%) mixture		D	S	3	2G	Cont.	No			No	R	F-T	A,C[1/]	M4	No	
(o- and p-) Nitrotoluenes	1664	C	S/P	2	2G	Cont.	No		IIB	Yes	C	T	B		No	15.12, 15.17, 15.19 16.2.9
Nonene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Nonyl alcohol		C	P	3	2G	Open	No			Yes	O	No	A		No	
Nonylphenol		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Octanol (all isomers)		C	P	3	2G	Open.	No			Yes	O	No	A		No	
Octene (all isomers)		B	P	3	2G	Cont	No			No	R	F	A		No	15.19.6
Olefins, straight chain mixtures		B	P	3	2G	Cont	No			No	R	F	A		No	15.19.6, 16.2.6, 16.2.9

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Oleum	1831	C	S/P	2	2G	Cont.	No	NF			C	T	No		E	15.11.2 to 15.11.8, 15.12.1, 15.16.2, 15.17, 15.19, 16.2.7
Paraldehyde	1264	C	S/P	3	2G	Cont.	No	T3	IIB	No	R	F	A		No	16.2.9
Pentachloroethane	1669	B	S/P	2	2G	Cont.	No	NF			R	T	No		No	15.12, 15.17, 15.19.6
1,3-Pentadiene		C	S/P	3	2G	Cont.	No			No	R	P-T	B		No	15.13, 16.6
n-Pentane	1265	C	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6
Pentene (all isomers)		C	P	3	2G	Cont.	No			No	R	P	A		No	15.19.6, 16.2.9
Perchloroethylene	1897	B	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12.1, 15.12.2
Phenol	2312	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A		No	15.12, 15.19, 16.2.6, 16.2.9, 16A.2.2
1-Phenyl-1-xylyl ethane		C	P	3	2G	Open	No			Yes	O	No	B		No	
Phosphoric acid	1805	D	S	3	2G	Open	No	NF			O	No	No		No	15.11.1 to 15.11.4, 15.11.6 to 15.11.8
Phosphorus, yellow or white	2447	A	S/P	1	1G	Cont.	Pad + (vent or inert			No (k)	C	No	C		E	15.7, 15.19
Phthalic anhydride	2214	C	S/P	3	2G	Cont.	No	T1	IIA	Yes	R	No	D		No	16.2.9
Pinene	2368	A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Polyethylene polyamines	2734 (i) 2735	C	S/P	3	2G	Open	No			Yes	O	No	A	N2	No	16.2.9
Polymethylene polyphenyl isocyanate	2206 (i) 2207	D	S	2	2G	Cont.	Dry			Yes	C	T (b)	C(c) D	N5	No	15.12, 15.16.2, 15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Potassium hydroxide solution	1814	C	S/P	3	2G	Open	No	NF			0	No	No	N8	No	16.2.9
n-Propanolamine		C	S/P	3	2G	Open	No			Yes	0	No	A,D	N2	No	16.2.9
beta-Propiolactone		D	S	2	2G	Cont.	No		IIA	Yes	R	T	A		No	
Propionaldehyde	1275	D	S	3	2G	Cont.	No			No	R	F-T	A		E	15.16.1, 15.17
Propionic acid	1848	D	S	3	2G	Cont.	No	T1	IIA	No	R	F	A	Y1	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8
Propionic anhydride	2496	C	S/P	3	2G	Cont.	No	T2	IIA	Yes	R	T	A	Y1	No	
Propionitrile	2404	C	S/P	2	1G	Cont.	No	T1	IIB	No	C	F-T	A,D		E	15.12, 15.17 to 15.19
n-Propylamine	1277	C	S/P	2	2G	Cont.	Inert	T2	IIA	No	C	F-T	C,D	N2	E	15.12, 15.19
Propylene dimer		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Propylene oxide	1280	D	S	2	2G	Cont.	Inert	T2	IIB	No	C	F-T	A,C	Z	No	15.8, 15.12.1, 15.14, 15.15, 15.19
Propylene trimer	2057	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Pyridine	1282	B	S/P	3	2G	Cont.	No	T1	IIA	No	R	F	A	N4	No	
Rosin		A	P	3	2G	Open	No			Yes	0	No	A		No	
Rosin soap (disproportionated) solution		B	P	3	2G	Open	No			Yes	0	No	A		No	
Sodium borohydride (15% or less)/Sodium hydroxide solution		C	S/P	3	2G	Open	No	NF			0	No	No	N1	No	16.2.7
Sodium chlorate solution (50% or less)		III	S	3	2G	Open	No	NF			0	No	No		No	15.9, 15.16.1, 15.19.6
Sodium dichromate solution (70% or less)		B	S/P	2	2G	Open	No	NF			C	No	No	N2	No	15.12.3, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Sodium hydrosulphide solution (45% or less)	2949	B	S/P	3	2G	Cont.	Vent or pad (gas)	NF			R	T	No		No	15.16.1, 16.2.9
Sodium hydrosulphide/ Ammonium sulphide solution		B	S/P	2	2G	Cont.	No	-	-	No	C	P-T	A,C	N1	E	15.12, 15.14, 15.16.1 15.17, 15.19, 16.6
Sodium hydroxide solution	1824	D	S	3	2G	Open	No	NF			O	No	No	N3	No	
Sodium hypochlorite solution (15% or less)	1791	B	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1
Styrene monomer	2055	B	S/P	3	2G	Cont.	No	T1	IIA	No	O	P	B	N4,Z	No	15.13, 16.6.1, 16.6.2
Sulphur (molten)	2448	III	S	3	1G	Open	Vent or pad (gas)	T3		Yes(1)	O	P-T	No		No	15.10
Sulphuric acid	1830	C	S/P	3	2G	Open	No	NF			O	No	No		No	15.11, 15.16.2, 16.2.8, 16.2.9
Sulphuric acid, spent	1832	C	S/P	3	2G	Open	No	NF			O	No	No		No	15.11, 15.16.2, 16.2.8, 16.2.9

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Tall oil, crude and distilled		A	P	3	2G	Open	No			Yes	O	No	A		No	
Tall oil fatty acid (resin acids less than 20%)		(C)	P	3	2G	Open	No			Yes	O	No	A		No	
Tall oil soap (disproportionated) solution		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.6, 16.2.9
Tetrachloroethane	1702	B	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12, 15.17
Tetraethylenepentamine	2320	D	S	3	2G	Open	No			Yes	O	No	A	NI	No	
Tetrahydrofuran	2056	D	S	3	2G	Cont.	No	T3	IIB	No	R	P-T	A,D		No	
Tetrahydronaphthalene		C	P	3	2G	Open	No			Yes	O	No	A		No	
Toluene	1294	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Toluenediamine	1709	C	S/P	2	2G	Cont.	No			Yes	C	T	B,C,D	NI	E	15.12, 15.17, 15.19 16.2.9

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Toluene diisocyanate	2078	C	S/P	2	2G	Cont.	Dry	T1	IIA	Yes	C	F-T	C(c), D	M4	E	15.12, 15.16.2, 15.17, 15.19, 16.2.9
o-Toluidine	1708	C	S/P	2	2G	Cont.	No			Yes	C	T	A,C		No	15.12, 15.17, 15.19
Tributyl phosphate		B	P	3	2G	Open	No			Yes	O	No	A		No	
1,2,4-Trichlorobenzene	2321	B	S/P	2	2G	Cont.	No			Yes	R	T	C		No	15.19.6, 16.2.9, 16A.2.2
1,1,1-Trichloroethane	2831	B	P	3	2G	Open	No			Yes	O	No	A		No	
1,1,2-Trichloroethane		B	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12.1
Trichloroethylene	1710	B	S/P	3	2G	Cont.	No	T2	IIA	Yes	R	T	No		No	15.12, 15.16.1, 15.17
1,2,3-Trichloropropane		B	S/P	2	2G	Cont.	No			Yes	C	T	B,C, D		No	15.12, 15.17, 15.19
1,1,2-Trichloro-1,2,2-Trifluoroethane		C	P	3	2G	Open	No	NF			O	No	No		No	
Tricresyl phosphate (containing less than 1% ortho-isomer)		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Tricresyl phosphate (containing 1% or more ortho-isomer)	2574 (j)	A	S/P	1	2G	Cont.	No	T2	IIA	Yes	C	No	B		No	15.12.3, 15.19

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Triethanolamine		D	S	3	2G	Open	No		IIA	Yes	O	No	A	N1	No	
Triethylamine	1296	C	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	B	N2	E	15.12
Triethylbenzene		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Triethylenetetramine	2259	D	S	3	2G	Open	No	T2	IIA	Yes	O	No	A	N1	No	
Triethyl phosphite	2323		S	3	2G	Cont.	No			No	R	F-T	A,D		No	15.12.1
Trimethylacetic acid		D	S	3	2G	Cont.	No			Yes	R	No	A,C	Y1	No	15.11.2 to 15.11.8
1,2,4-Trimethylbenzene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Trimethylhexamethylene diamine (2,2,4- and 2,4,4-isomers	2327	D	S	3	2G	Open	No			Yes	O	No	A,C	N1	No	15.19.6
Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4-isomers)	2328	B	S/P	2	2G	Cont.	Dry			Yes	C	T	A, C(c)		No	15.12, 15.16.2, 15.17, 15.19.2
2,2,4-Trimethyl-1, 3-Pentanediol-1-isobutyrate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Trimethyl phosphite	2329		S	3	2G	Cont.	No			No	R	F-T	A,D		No	15.12.1, 15.16.2, 15.19.6

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Trixylyl phosphate		A	P	1	2G	Open	No			Yes	0	No	A		No	15.19
Turpentine	1299	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
1-Undecene		B	P	3	2G	Open	No			Yes	0	No	A		No	
Undecyl alcohol		B	P	3	2G	Open	No			Yes	0	No	A		No	16.2.9, 16A.2.2(r)
Urea, Ammonium Nitrate solution (containing aqua ammonia)		C	S/P	3	2G	Cont.	No	NF			R	T	A	N6 N7	No	
n-Valeraldehyde	2058	D	S	3	2G	Cont.	Inert	T3	IIB	No	R	F-T	A		No	15.4.6, 15.16.1
Vinyl acetate	1301	C	S/P	3	2G	Cont.	No	T2	IIA	No	0	F	A		No	15.13, 16.6.1, 16.6.2
Vinyl ethyl ether	1302	C	S/P	2	2G	Cont.	Inert	T3	IIB	No	C	F-T	A	N6	E	15.4, 15.13, 15.14, 15.19, 16.6.1, 16.6.2
Vinylidene chloride	1303	B	S/P	2	2G	Cont.	Inert	T2	IIA	No	R	F-T	B	N5	E	15.13, 15.14, 16.6.1, 16.6.2
Vinyl neodecanoate		C	S/P	3	2G	Open	No			Yes	0	No	B		No	15.13, 15.16.1, 16.6.1, 16.6.2
Vinyl toluene	2618	A	S/P	3	2G	Cont.	No		IIA	No	R	F	D	N1	No	15.13, 15.19.6, 16.6.1, 16.6.2

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
White spirit, low (15-20%) aromatic	1300	(B)	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6
Xylene	1307	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9
Xylenol	2261	B	S/P	3	2G	Open	No		IIA	Yes	0	No	B		No	16.2.9, 16A.2.2

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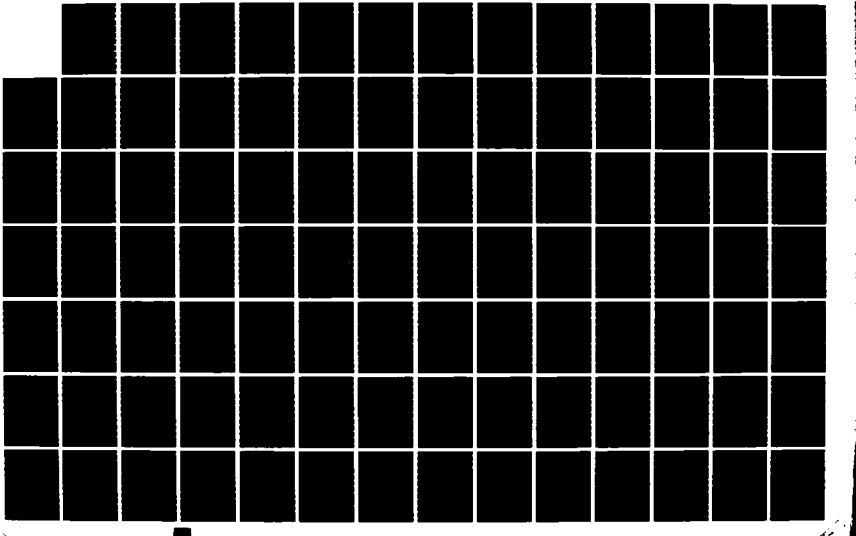

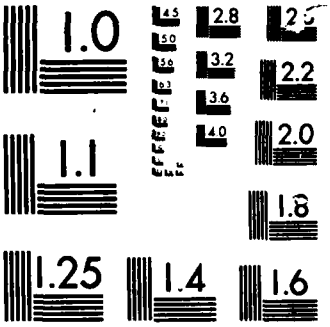

MICROCOPY CHART

a Applies to ammonia aqueous, 28% or less but not below 10%.

b If the product to be carried contains flammable solvents such that the flashpoint does not exceed 60°C, then special electrical systems and a flammable vapour detector should be provided.

c Although water is suitable for extinguishing open air fires involving chemicals to which this footnote applies, water should not be allowed to contaminate closed tanks containing these chemicals because of the risk of hazardous gas generation.

d UN number 1198 only applies if flashpoint is below 60°C c.c.

e Applies to formaldehyde solutions 45% or less, but not below 5%.

f Applies to hydrochloric acid not below 10%.

g Dry chemical cannot be used because of the possibility of an explosion.

n UN number 2032 assigned to red fuming nitric acid.

i UN number depends on boiling point of substance.

j UN number assigned to this substance containing more than 3% of ortho-isomer.

k Phosphorus, yellow or white, is carried above its autoignition temperature and therefore flashpoint is not appropriate. Electrical equipment requirements may be similar to those for substances with a flashpoint above 60°C.

l Sulphur (molten) has a flashpoint above 60°C, however, electrical equipment should be certified safe for gases evolved.

m UN number 2072 refers to 10-35%.

n UN number 2511 applies to 2-Chloropropionic acid only.

o Dinitrotoluene should not be carried in deck tanks.

p Temperature sensors should be used to monitor the cargo pump temperature to detect overheating due to pump failure.

q Requirements are based on those isomers having a flashpoint of 60°C or less, some isomers have a flashpoint greater than 60°C, and therefore the requirements based on flammability would not apply to such isomers.

r Reference to 16A.2.2 applies to 1-Undecyl alcohol only.

s Applies to n-Decyl alcohol only.

t UN number 1114 applies to Benzene.

u Dry chemicals should not be used as a fire-fighting medium.

CHAPTER 18 - LIST OF CHEMICALS TO WHICH THE CODE DOES NOT APPLY*

The existing text of chapter 18 is replaced by the following:

1 The following are products which are not considered to come within the scope of the Code. This list may be used as a guide in considering bulk carriage of products whose hazards have not yet been evaluated.

2 Although the products listed in this chapter fall outside the scope of the Code, the attention of Administrations is drawn to the fact that some safety precautions may be needed for their safe transportation. Accordingly Administrations should prescribe appropriate safety requirements.

Chapter 18	UN number
Acetone	1090
Alcohols (C_{13} and above)	-
Alkyl (C_9-C_{17}) benzenes	-
Aluminium sulphate solution	
Aminoethyl diethanolamine/ Aminoethyl ethanolamine, water solution	
n-Amyl alcohol	1105
sec-Amyl alcohol	1105
tert-Amyl alcohol	1105
Amyl alcohol, primary	1105
Butene Oligomer	
sec-Butyl acetate	1123
n-Butyl alcohol	1120
sec-Butyl alcohol	1120
tert-Butyl alcohol	1120

* The product names are not always identical with the names given in the various editions of the Bulk Chemical Code (resolution A.212(VII)).

Chapter 18	UN number
Butylene glycol	-
γ-Butyrolactone	-
Butyl stearate	-
Calcium alkyl salicylate	-
Calcium bromide solution	-
Calcium chloride solution	-
Caprolactam (molten or aqueous solutions)	-
Choline chloride solutions	-
Coconut oil fatty acid methyl ester	-
Dextrose solution	-
Diacetone alcohol	1148
Dialkyl (C_7-C_{13}) phthalates	-
Dicyclopentadiene	2048
Diethylene glycol	-
Diethylene glycol butyl ether	-
Diethylene glycol butyl ether acetate	-
Diethylene glycol dibutyl ether	-
Diethylene glycol diethyl ether	-
Diethylene glycol ethyl ether	-
Diethylene glycol ethyl ether acetate	-
Diethylene glycol methyl ether acetate	-
Diethylenetriamine pentaacetic acid pentasodium salt solution	-
Di-(2-ethyl hexyl) adipate	-
Di-(2-ethyl hexyl) phthalate	-
Diheptyl phthalate	-
Dihexyl phthalate	-

Chapter 18	UN number
Diisobutyl ketone	1157
Diisodecyl phthalate	-
Diisononyl adipate	-
Diisopropyl naphthalene	-
Dinonyl phthalate	-
Diisooctyl phthalate	-
2,2-Dimethyloctanoic acid	-
Dioctyl phthalate	-
Dipropylene glycol	-
Dipropylene glycol methyl etner	-
Diundecyl phthalate	-
Dodecane	-
2-Ethoxyethanol	1171
Ethyl acetate	1173
Ethyl acetoacetate	-
Ethyl alcohol	1170
Ethylcyclohexane	-
Ethylene carbonate	-
Ethylenediamine tetraacetic acid tetrasodium salt solution	-
Ethylene glycol	-
Ethylene glycol butyl ether	2369
Ethylene glycol butyl ether acetate	-
Ethylene glycol methyl butyl ether	-
Ethylene glycol methyl ether	1188
Ethylene glycol methyl ether acetate	1189
Ethylene glycol phenyl ether	-

Chapter 18	UN number
Ethylene glycol tert-butyl ether	-
Ethylene glycol phenyl ether/ Diethylene glycol phenyl ether mixture	-
2-Ethylhexanoic acid	-
Formamide	-
Ethylene-vinyl acetate copolymer (emulsion)	-
Glycerin	-
Glycine, sodium salt, solution	-
Ground nut oil	-
n-Heptane	1206
Hexamethylene diamine adipate, (50% in water)	-
n-Hexane	1208
1-Hexanol	2282
Hexylene glycol	-
N-(Hydroxyethyl) ethylenediamine triacedic acid, trisodium salt, solution	-
Isoamyl alcohol	1105
Isobutyl alcohol	1212
Isobutyl formate	2393
Isododecane	-
Isopentane	1265
Isopentene	2371
Isophorone	-
Isopropyl acetate	1220
Isopropyl alcohol	1219
Lactic acid	-

Chapter 18	UN number
Latex: Styrene butadiene rubber latex Carboxylated styrene-butadiene copolymer	-
Lignin sulphonic acid, salt (low COD) solution	-
Magnesium chloride solution	-
Magnesium hydroxide slurry	-
3-Methoxy-1-butanol	-
3-Methoxyl butyl acetate	-
Methyl acetate	1231
Methyl alcohol	1230
Methyl tert-butyl ether	2398
Methyl ethyl ketone	1193
Methyl isobutyl ketone	1245
3-Methyl-3-methoxy butanol	-
3-Methyl-3-methoxy butyl acetate	-
Molasses	-
Nonane	1920
Oleic acid	-
Octane	1262
Olefins (C_{13} and above, all isomers)	-
alpha-Olefins (C_{16}-C_{18})	-
n-Paraffins (C_{10}-C_{20})	-
Paraffin wax	-
Petrolatum	-
Petroleum naphtha	1255
Polyaluminium chloride solution	-
Polybutene	-
Polyethylene glycol	-

Chapter 18	UN number
Polyethylene glycol dimethyl ether	-
Polypropylene glycol	-
Polypropylene glycol methyl ether	-
Polysiloxane	-
n-Propyl acetate	1276
n-Propyl alcohol	1274
Propylene glycol	-
Propylene glycol ethyl ether	-
Propylene glycol methyl ether	-
Propylene tetramer	2850
Sodium aluminosilicate slurry	-
Sulpholane	-
Tridecanol	-
Triethylene glycol	-
Triethylene glycol butyl ether	-
Triisopropanolamine	-
Trimethylol propane polyethoxylate	-
Tripropylene glycol	-
Tripropylene glycol methyl ether	-
Urea solution	
Urea, ammonium nitrate solution	-
Urea, ammonium phosphate solution	-
Urea resin solution	-
Vegetable oil (those not otherwise listed)	-
Vegetable protein hydrolised solution	-
Wine	-

APPENDIX

MODEL FORM OF INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Existing form of the Certificate is replaced by the following:

"INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

(Official seal)

Issued under the provisions of the

INTERNATIONAL CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (resolutions MSC.4(48) and MEPC 19(22))1/

under the authority of the Government of

.....
(full official designation of country)

by.....
(full official designation of the competent person or organization recognized by the Administration)

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage	Ship type (Code paragraph 2.1.2)2/

Date on which keel was laid or on which the ship was at a similar stage of construction or (in the case of a converted ship) date on which conversion to chemical tanker was commenced:

.....

The Certificate should be drawn up in the official language of the issuing country. If the language used is neither English nor French, the text should include a translation into one of these languages.

The ship also complies fully with the following amendments to the Code:

.....
.....

The ship is exempted from compliance with the following provisions of the Code:

.....
.....

THIS IS TO CERTIFY:

1 .1 That the ship has been surveyed in accordance with the provisions of section 1.5 of the Code;

.2 that the survey showed that the construction and equipment of the ship complied with the relevant provisions of the Code;

*.3 that the ship is an incinerator ship complying also with the supplementary and modified requirements of chapter 19;

2 That the ship has been provided with a manual in accordance with the standards for procedures and arrangements as called for by Regulation 5, 5A and 8 of Annex II of MARPOL 73/78, and that the arrangements and equipment of the ship prescribed in the manual are in all respects satisfactory and comply with the applicable requirements of the said Standards;

3 That the ship is suitable for the carriage in bulk of the following products, provided that all relevant operational provisions of the Code are observed:

Products[3/4]	Conditions of carriage[5] (tank numbers etc.)
*Continued on attachment 1, additional signed and dated sheets. Tank numbers referred to in this list are identified on attachment 2, signed and dated tank plan.	

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* Delete as appropriate.

4 That, in accordance with *1.4 and *2.8.2, the provisions of the Code are modified in respect of the ship in the following manner:
.....

5 That the ship must be loaded:

*.1 in accordance with the loading conditions provided in the approved loading manual, stamped and dated ..... and signed by a responsible officer of the Administration, or of an organization recognized by the Administration;

*.2 in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

This certificate is valid until .....
subject to surveys in accordance with 1.5 of the Code

Issued at .... 19..
(place of issue of certificate)

The undersigned declares that he is duly authorized by the said Government to issue this Certificate.

.....
(signature of official issuing the certificate and/or seal of issuing authority)

Notes on completion of Certificate:

1/ The Certificate can be issued only to ships entitled to fly the flags of States which are Parties to both SOLAS 74 and MARPOL 73/78.

2/ Ship type: Any entry under this column must relate to all relevant recommendations, e.g. an entry "type 2" should mean type 2 in all respects prescribed by the Code.

3/ Products: products listed in chapter 17 of the Code, or which have been evaluated by the Administration in accordance

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* Delete as appropriate.
** Instead of being incorporated in the Certificate, this text may be appended to the Certificate if duly signed and stamped.

with 1.1.3 of the Code, should be listed. In respect of the latter "new" products, any special requirements provisionally prescribed should be noted. It should be noted that for incinerator ships "liquid chemical waste" is to be entered in lieu of the individual product names.

4/ Products: The list of products the ship is suitable to carry should include the noxious liquid substances of Category D which are not covered by the Code and should be identified as "Chapter 18 Category D".

5/ Conditions of carriage: The limitations on the carriage of Category B or Category C substances under 16A.2 of the Code should also be indicated.

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by 1.5 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, the ship was found to comply with the relevant provisions of the Code.

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

---

* Delete as appropriate

ATTACHMENT 1 TO THE INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Continued list of products to those specified in section 3, and their conditions of carriage

Products	Conditions of carriage (tank numbers, etc.)

Date .....
(as for Certificate)

.....
(Signature of official issuing the Certificate and/or seal of issuing authority)

3352V

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ANNEX 6

Resolution MEPC 20(22)

ADOPTION OF THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK (BCH CODE)

adopted on 5 December 1985

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Committee,

NOTING resolution MEPC 16(22) by which it adopted amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973, (the 1978 Protocol), to make the provisions of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) and the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) mandatory under the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the 1978 Protocol (MARPOL 73/78),

NOTING ALSO that the BCH Code was adopted by the Assembly by resolution A.212(VII) and subsequently incorporated ten sets of amendments adopted by the Maritime Safety Committee,

HAVING CONSIDERED the proposed text of the BCH Code which incorporates amendments from the marine pollution point of view developed by the Committee in pursuance of resolution 15 of the International Conference on marine Pollution, 1973,

1. ADOPTS the BCH Code, the text of which is given in the Annex to the present resolution, for the purposes of Annex II of MARPOL 73/78;

2. REQUESTS the Secretary-General to transmit a copy of the present resolution together with the text of the BCH Code to all Members of the Organization and to all Parties to MARPOL 73/78 which are not Members of the Organization.

ANNEX

THE CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK

(The BCH Code to be annexed to the MEPC resolution will incorporate the amendments listed below)

Preamble

Paragraph 1

In the existing text, after the word "dangerous", the words "and noxious" are inserted.

Paragraph 7

Existing paragraph 7 is replaced by the following:

"7 In response to resolution 15 of the International Conference on Marine Pollution, 1973, the Marine Environment Protection Committee at its twenty-second session adopted with resolution MEPC ...(22) the BCH Code extended to cover the marine pollution prevention aspects for the implementation of Annex II to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)."

Paragraph 8

In the existing text, after the word "dangerous", the words "and noxious" are inserted.

1.1 Purpose

In the existing text, the words "or noxious" are inserted between the words

In the existing text the words "the neighbourhood" are replaced by the words "to the environment".

The following sentence is added to the existing text:

"For the purposes of MARPOL 73/78, the Code applies only to chemical tankers as defined in regulation 1(1) of Annex II thereof, which are engaged in the carriage of noxious liquid substances falling into Category A, B or C and identified as such by an entry of "A, B or C" in column b"."

1.2 Scope

1.2.1 In the existing text of the first sentence, the words "and noxious" are inserted between the words "dangerous" and "chemical" and the words "(c) products which may present a hazard to the environment, if accidentally released." are added.

1.3 Hazards

The existing text of 1.3 is designated as 1.3.1 and in the first line the words "relating to human life" are inserted between the words "substances" and "considered".

New paragraph 1.3.2 is added to the existing text as follows:

"1.3.2 Hazards of chemicals and other substances relating to the marine environment considered by this Code are:

.1 bioaccumulation with attendant risk to aquatic life or human health or cause tainting to seafood;
.2 damage to living resources;
.3 hazard to human health; and
.4 reduction of amenities."

1.4 Definitions

In the existing text of paragraph 1.4.15 after the words "propylene oxide" the words "and ethylene oxide/propylene oxide mixtures with an ethylene oxide content of not more than 30 per cent by weight" are added.

The following definitions are added to the existing text:

"1.4.16A Noxious liquid substance means any substance designated in appendix II to Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) or provisionally assessed under the provisions of regulation 3(4) of that Annex as falling into category A, B, C or D."

"1.4.16B Standards for Procedures and Arrangements means the Standards for the Procedures and Arrangements for the Discharge of Noxious Liquid Substances, called for by Annex II of MARPOL 73/78, adopted by the Marine Environment Protection Committee at its twenty-second session by resolution MEPC 18(22) and as may be amended by the Organization."

1.5 Equivalents

1.5.2 In the existing text the words "other Parties to MARPOL 73/78 and" are inserted after the words "circulate the same to".

1.6 Certification

1.6.3.1 In the existing text the words "to a chemical tanker" the words "engaged in international voyages" are added.

1.7 Effective date

1.7.2 The following sentence is added to the existing text of paragraph 1.7.2

"This conversion provision does not apply to the modification of a ship referred to in regulation 1(12) of Annex II of MARPOL 73/78."

1.8 New products

In the first line of the existing text between the words "chemicals" and "which" the following words are added:

"and noxious liquid substances of category A, B or C, either of".

2.2 Ship types

The following sentence is added to the existing texts of subparagraphs 2.2.4(a)(iii) and 2.2.4(b)(iii)

"This requirement does not apply to the tanks for diluted slops arising from the tank washing."

2.6 Cargo segregation

2.6.2 The first line of the existing text is amended to read:
"Cargoes, residues of cargoes or mixtures containing cargoes which react in a hazardous manner with other cargoes, residues or mixtures, should:"

Chapter IV - Special requirements

The existing text of section 4.7 is replaced by the following:

"4.7 Propylene oxide and mixtures of ethylene oxide/propylene oxide with an ethylene oxide content of not more than 30 per cent by weight.

4.7.1 Products transported under the provisions of this section should be acetylene free.

4.7.2 (a) Unless cargo tanks are properly cleaned, these products should not be carried in tanks which have contained as one of the three previous cargoes any products known to catalyse polymerization, such as:

(i) mineral acids (e.g. sulphuric, hydrochloric, nitric);

(ii) carboxylic acids and anhydrides (e.g. formic, acetic);

(iii) halogenated carboxylic acids (e.g. chloracetic);

(iv) sulphonic acids (e.g. benzene sulphonic);

(v) caustic alkalis (e.g. sodium hydroxide, potassium hydroxide);

(vi) ammonia and ammonia solutions;

(vii) amines and amine solutions;

(viii) oxidizing substances.

(b) Before loading, tanks should be thoroughly and effectively cleaned, to remove all traces of previous cargoes from tanks and associated pipework, except where the immediately prior cargo has been propylene oxide or ethylene oxide/propylene oxide mixtures. Particular care should be taken in the case of ammonia in tanks made of steel other than stainless steel.

(c) In all cases, the effectiveness of cleaning procedures for tanks and associated pipework should be checked by suitable testing or inspection, to ascertain that no traces of acidic or alkaline materials remain that might create a hazardous situation in the presence of these products.

(d) Tanks should be entered and inspected prior to each initial loading of these products to ensure freedom from contamination, heavy rust deposits and visible structural defects. When cargo tanks are in continuous service for these products, such inspections should be performed at intervals of not more than two years.

(e) Tanks for the carriage of these products should be of steel or stainless steel construction.

(f) Tanks for the carriage of these products may be used for other cargoes after thorough cleaning of tanks and associated pipework systems by washing or purging.

4.7.3 (a) All valves, flanges, fittings and accessory equipment should be of a type suitable for use with the products and should be constructed of steel or stainless steel or other material acceptable to the Administration. The chemical composition of all material used should be submitted to the Administration for approval prior to fabrication. Discs or disc faces, seats and other wearing parts of valves should be made of stainless steel containing not less than 11 per cent chromium.

(b) Gaskets should be constructed of materials which do not react with, dissolve in, or lower the auto-ignition temperature of, these products, and which are fire resistant and possess adequate mechanical behaviour. The surface presented to the cargo should be polytetrafluorethylene (PTFE), or materials giving a similar degree of safety by their inertness. Spirally-wound stainless steel, with a filler of PTFE or similar fluorinated polymer, may be accepted by the Administration.

(c) Insulation and packing, if used, should be of a material which does not react with, dissolve in, or lower the auto-ignition temperature of, these products.

(d) The following materials are generally found unsatisfactory for gaskets, packing and similar uses in containment systems for these products and would require testing before being approved by the Administration:

(i) Neoprene or natural rubber, if it comes into contact with the products.

(ii) Asbestos, or binders used with asbestos.

(iii) Materials containing oxides of magnesium, such as mineral wools.

4.7.4 Threaded joints should not be permitted in the cargo liquid and vapour lines.

4.7.5 Filling and discharge piping should extend to within 100 mm of the bottom of the tank or any sump pit.

4.7.6 (a) The containment system for a tank containing these products should have a valved vapour return connection.

(b) The products should be loaded and discharged in such a manner that venting of the tanks to atmosphere does not occur. If vapour return to shore is used during tank loading, the vapour return system connected to a containment system for the product should be independent of all other containment systems.

(c) During discharging operations, the pressure in the cargo tank must be maintained above 0.07 kp/cm^2 gauge.

4.7.7 The cargo may be discharged only by deepwell pumps, hydraulically operated submerged pumps, or inert gas displacement. Each cargo pump should be arranged to ensure that the product does not heat significantly if the discharge line from the pump is shut off or otherwise blocked.

4.7.8 Tanks carrying these products should be vented independently of tanks carrying other products. Facilities should be provided for sampling the tank contents without opening the tank to atmosphere.

4.7.9 Cargo hoses used for transfer of these products should be marked "FOR ALKYLENE OXIDE TRANSFER ONLY".

4.7.10 Cargo tanks, void spaces and other enclosed spaces, adjacent to an integral gravity cargo tank carrying propylene oxide, should either contain a compatible cargo (those cargoes specified in 4.7.2 are examples of substances considered incompatible) or be inerted by injection of a suitable inert gas. Any hold space in which an independent cargo tank is located should be inerted. Such inerted spaces and tanks should be monitored for these products and oxygen. The oxygen content of these spaces should be maintained below 2 per cent. Portable sampling equipment is satisfactory.

4.7.11 In no case should air be allowed to enter the cargo pump or piping system while these products are contained within the system.

4.7.12 Prior to disconnecting shore-lines, the pressure in liquid and vapour lines should be relieved through suitable valves installed at the loading header. Liquid and vapour from these lines should not be discharged to atmosphere.

4.7.13 Propylene oxide may be carried in pressure tanks or in independent or integral gravity tanks. Ethylene oxide/propylene oxide mixtures should be carried in independent gravity tanks or pressure tanks. Tanks should be designed for the maximum pressure expected to be encountered during loading, conveying and discharging cargo.

4.7.14 (a) Tanks for the carriage of propylene oxide with a design pressure less than 0.6 kp/cm^2 gauge and tanks for the carriage of ethylene oxide/propylene oxide mixtures with a design pressure less than 1.2 kp/cm^2 gauge should have a cooling system to maintain the cargo below the reference temperature.*

(b) The refrigeration requirement for tanks with a design pressure less than 0.6 kp/cm^2 gauge may be waived by the Administration for ships operating in restricted areas or on voyages of

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* See 1.4.15.

restricted duration, and account may be taken in such cases of any insulation of the tanks. The area and times of year for which such carriage would be permitted should be included in the conditions of the Certificate of Fitness.

4.7.15 (a) Any cooling system should maintain the liquid temperature below the boiling temperature at the containment pressure. At least two complete cooling plants automatically regulated by variations within the tanks should be provided. Each cooling plant should be complete with the necessary auxiliaries for proper operation. The control system should also be capable of being manually operated. An alarm should be provided to indicate malfunctioning of the temperature controls. The capacity of each cooling system should be sufficient to maintain the temperature of the liquid cargo below the reference temperature* of the system.

(b) An alternative arrangement may consist of three cooling plants, any two of which should be sufficient to maintain the liquid temperatures below the reference temperature*.

(c) Cooling media which are separated from the products by a single wall only should be non-reactive with the products.

(d) Cooling systems requiring compression of the products should not be used.

4.7.16 Pressure relief valve settings should not be less than 0.2 kp/cm^2 gauge and for pressure tanks not greater than 7.0 kp/cm^2 gauge for the carriage of propylene oxide and not greater than 5.3 kp/cm^2 gauge for carriage of propylene oxide/ethylene oxide mixtures.

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* See 1.4.15.

4.7.17 (a) The piping system for tanks to be loaded with these products should be separated (as defined in 1.4.13) from piping systems for all other tanks, including empty tanks. If the piping system for the tanks to be loaded is not independent (as defined in 1.4.14), the required piping separation should be accomplished by the removal of spool pieces, valves, or other pipe sections, and the installation of blank flanges at these locations. The required separation applies to all liquid and vapour piping, liquid and vapour vent lines and any other possible connections, such as common inert gas supply lines.

(b) These products may be transported only in accordance with cargo handling plans that have been approved by the Administration. Each intended loading arrangement should be shown on a separate cargo handling plan. Cargo handling plans should show the entire cargo piping system and the locations for installation of blank flanges needed to meet the above piping separation requirements. A copy of each approved cargo handling plan should be maintained on board the ship. The Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be endorsed to include reference to the approved cargo handling plans.

(c) Before each initial loading of these products and before every subsequent return to such service, certification verifying that the required piping separation has been achieved should be obtained from a responsible person acceptable to the Port Administration and carried on board the ship. Each connection between a blank flange and a pipeline flange should be fitted with a wire and seal by the responsible person to ensure that inadvertent removal of the blank flange is impossible.

4.7.18 (a) No cargo tanks should be more than 98 per cent liquid full at the reference temperature.*

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* See 1.4.15.

(b) The maximum volume to which a cargo tank should be loaded is:

$$V_L = 0.98\ V\ \frac{d_R}{d_L}$$

where V_L = maximum volume to which the tank may be loaded

V = volume of the tank

d_R = relative density of cargo at the reference temperature*

d_L = relative density of cargo at the loading temperature and pressure

(c) The maximum allowable tank filling limits for each cargo tank should be indicated for each loading temperature which may be applied, and for the applicable maximum reference temperature, on a list to be approved by the Administration. A copy of the list should be permanently kept on board by the master.

4.7.19 The cargo should be carried under a suitable protective padding of nitrogen gas. An automatic nitrogen make-up system should be installed to prevent the tank pressure falling below 0.07 kp/cm^2 gauge in the event of product temperature fall due to ambient conditions or maloperation of refrigeration systems. Sufficient nitrogen should be available on board to satisfy the demand of the automatic pressure control. Nitrogen of commercially pure quality (99.9 per cent by volume) should be used for padding. A battery of nitrogen bottles connected to the cargo tanks through a pressure reduction valve satisfies the intention of the expression "automatic" in this context.

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* See 1.4.15.

4.7.20 The cargo tank vapour space should be tested prior to and after loading to ensure that the oxygen content is 2 per cent by volume or less.

4.7.21 A water spray system of sufficient capacity should be provided to blanket effectively the area surrounding the loading manifold, the exposed deck piping associated with product handling, and the tank domes. The arrangement of piping and nozzles should be such as to give a uniform distribution rate of 10 $l/m^2/min$. The water spray system should be capable of both local and remote manual operation, and the arrangement should ensure that any spilled cargo is washed away. Additionally, a water hose with pressure to the nozzle, when atmospheric temperatures permit, should be connected ready for immediate use during loading and unloading operations.

4.7.22 A remotely operated, controlled closing-rate, shut-off valve should be provided at each cargo hose connection used during cargo transfer."

4.20 Hydrogen peroxide solutions over 60% but not over 70%

The existing title is amended to read "Hydrogen peroxide solutions" and a subtitle without a number is inserted to read "Hydrogen peroxide solutions over 60% but not over 70%."

4.20.1 In the existing text the words "solutions over 60% but not over 70%" are inserted between the words "peroxide" and "should".

4.20.14 The following text is added after the existing paragraph 4.20.13.

"Hydrogen peroxide solutions over 8 per cent but not over 60 per cent by weight.

4.20.15 The ship's shell plating should not form any boundaries of tanks containing this product.

4.20.16 Hydrogen peroxide should be carried in tanks thoroughly and effectively cleaned of all traces of previous cargoes and their vapours or ballast. Procedures for inspection, cleaning, passivation and loading of

tanks should be in accordance with MSC/Circ.394. A certificate should be on board the vessel indicating that the procedures in the Circular have been followed. The passivation requirement may be waived by an Administration for domestic shipments of short duration. Particular care in this respect is essential to ensure the safe carriage of hydrogen peroxide.

.1 When hydrogen peroxide is carried no other cargoes should be simultaneously carried.

.2 Tanks which have contained hydrogen peroxide may be used for other cargoes after cleaning in accordance with the procedures outlined in MSC/Circ.394.

.3 Consideration in design should provide minimum internal tank structure, free draining, no entrapment and ease of visual inspection.

4.20.17 Cargo tanks and associated equipment should be either pure aluminium (99.5%) or solid stainless steel of types suitable for use with hydrogen peroxide (e.g. 304, 304L, 316, 316L, 316Ti). Aluminium should not be used for piping on deck. All non-metallic materials of construction for the containment system should neither be attacked by hydrogen peroxide nor contribute to its decomposition.

4.20.18 Cargo tanks should be separated by a cofferdam from fuel oil tanks or any other space containing materials incompatible with hydrogen peroxide.

4.20.19 Temperature sensors should be installed at the top and bottom of the tank. Remote temperature readouts and continuous monitoring should be located on the navigating bridge. If the temperature in the tank rises above 35°C, visible and audible alarms should activate on the navigating bridge.

4.20.20 Fixed oxygen monitors (or gas sampling lines) should be provided in void spaces adjacent to tanks to detect leakage of the cargo into these spaces. The enhancement of flammability by oxygen enrichment should be recognized. Remote readouts, continuous monitoring (if gas sampling lines are

used, intermittent sampling is satisfactory) and visible and audible alarms similar to those for the temperatur· sensors should also be located on the navigating bridge. The visible and audible alarms should activate if the oxygen concentrations in these void spaces exceed 30% by volume. Two portable oxygen monitors should also be available as back-up systems.

4.20.21 As a safeguard against uncontrolled decomposition, a cargo jettisoning system should be installed to discharge the cargo overboard. The cargo should be jettisoned if the temperature rise of the cargo exceeds a rate of 2°C per hour over a five hour period or when the temperature in the tank exceeds 40°C.

4.20.22 Cargo tank venting systems with filtration should have pressure vacuum relief valves for normal controlled venting, and a device for emergency venting, should tank pressure rise rapidly as a result of an uncontrolled decomposition rate, as stipulated in 4.20.20. These venting systems should be designed in such a manner that there is no introduction of sea water into the cargo tank even under heavy sea conditions. Emergency venting should be sized on the basis of tank design pressure and tank size.

4.20.23 A fixed water spray system should be provided for diluting and washing away any concentrated solution spilled on deck. The areas covered by the waterspray should include the manifold/hose connections and the tank tops of those tanks designated for the carriage of hydrogen peroxide solutions. The minimum application rate should satisfy the following criteria:

.1 The product should be diluted from the original concentration to 35 per cent by weight within five minutes of the spill.

.2 The rate and estimated size of the spill should be based upon maximum anticipated loading and discharge rates, the time required to stop flow of cargo in the event of tank overfill or a piping/hose failure, and the time necessary to begin application of dilution water with actuation at the cargo control location or on the navigating bridge.

4.20.24 Hydrogen peroxide should be stabilized to prevent decomposition. A certificate of stabilization should be provided by the manufacturer specifying:

.1 name and amount of stabilizer added;

.2 date stabilizer was added and duration of effectiveness;

.3 any temperature limitations qualifying the stabilizer's effective lifetime;

.4 the action to be taken should the product become unstable during the voyage.

4.20.25 Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1.0 per cent per year at 25°C should be carried. Certification from the shipper that the product meets this standard should be presented to the Master and kept on board. A technical representative of the manufacturer should be on board to monitor the transfer operations and have the capability to test the stability of the hydrogen peroxide. He should certify to the Master that the cargo has been loaded in a stable condition.

4.20.26 Protective clothing that is resistant to hydrogen peroxide should be provided for each crew member involved in cargo transfer operations. Protective clothing should include coveralls that are non-flammable, suitable gloves, boots and eye protection.

4.20.27 During transfer of hydrogen peroxide the related piping system should be separate from all other systems. Cargo hoses used for transfer of hydrogen peroxide should be marked "for hydrogen peroxide transfer only"."

5.2 Cargo information

The following paragraphs 5.2.5, 5.2.6, 5.2.7 and 5.2.9 and a footnote for paragraph 5.2.7 are added to the existing text:

5.2.5 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and

if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

5.2.6 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 60 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 60 mPa.s should be specified in the shipping document.

5.2.7 Where column "k" in the table of chapter VI refers to this paragraph and the possibility exists that it will be unloaded within Special Areas*, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

5.2.8 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's melting point should be indicated in the shipping document.

VA New Chapter VA is added to the existing text as follows:

"CHAPTER VA - ADDITIONAL MEASURES FOR THE PROTECTION OF THE MARINE ENVIRONMENT

5A.1 GENERAL

5A.1.1 The requirements of this chapter apply to ships carrying products noted as category A, B or C noxious liquid substances in chapter VI.

5A.2 CONDITION OF CARRIAGE

5A.2.1 The condition of carriage for products listed in the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should reflect the requirements of regulation 5A of Annex II of MARPOL 73/78.

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* Special areas are defined in regulation 1(7) of Annex II to MARPOL 73/78".

5A.2.2 A category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

5A.3 PROCEDURES AND ARRANGEMENTS MANUAL

5A.3.1 Each ship should be provided with a Procedures and Arrangements Manual developed for the ship in accordance with the provisions of the Standards for the Procedures and Arrangements and approved by the Administration.

5A.3.2 Each ship should be fitted with equipment and arrangements identified in its Procedures and Arrangements Manual.

CHAPTER VI - SUMMARY OF MINIMUM REQUIREMENTS

Existing text of chapter VI is replaced by the following:

"EXPLANATORY NOTES

Product name (column a)*	The product names are not always identical with the names given in previous issues of the Code, or the IBC Code for explanation see index of chemicals.
UN number (column b)	This is the number relating to each product shown in the recommendations proposed by the United Nations Committee of Experts on the Transport of Dangerous Goods (the "Orange Book"), New York, 1977, ST/SG/AC.10/1/Rev.1. UN numbers are given for information only.
Pollution category (column c)	The letter A, B, C or D means the pollution category assigned to each product under Annex II of MARPOL 73/78. "III" means the product was evaluated and found to fall outside the categories A, B, C or D. Pollution Category in brackets indicates that the product is provisionally categorized and that further data are necessary to complete the evaluation of their pollution hazards. Until the hazard evaluation is completed, the Pollution Category assigned is used.
Hazards (column d)	S means that the product is included in the Code because of its safety hazards; P means that the product is included in the Code because of its pollution hazards; and S/P means that the product is included in the Code because of both its safety and pollution hazards.
Ship type (column e)	1, 2 or 3 indicates ship types I, II, or III respectively as discussed in chapter II, part A - Physical Protection.
Tank type (column f)	1: Independent tank G: Gravity tank 2: Integral tank P: Pressure tank

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* Note by the Secretariat:

References to columns a through m in other chapters of the Code will be amended according to the column designations shown here.

Tank vents (column g)	Open:	open venting
	Cont:	controlled venting
	SR:	safety relief valve
Tank environmental control (column h)	Inert:	Inerting (see 2.19.2(a))
	Pad:	Liquid or gas (2.12.2(b))
	Dry:	Drying (see 2.19.2(c))
	Vent:	Natural or forced (2.19.2(d))
Electrical requirements (column i)	St:	Standard electrical systems (products having a flashpoint exceeding 60°C (closed cup test)).
	SP:	Special requirements (products having a flashpoint not exceeding 60°C (closed cup test)).
Gauging (column j)	O:	Open
	R:	Restricted
	C:	Closed
Vapour detection (column k)	F:	Flammable vapours
	T:	Toxic vapours
Fire protection (column l)	A:	Alcohol resistant foam
	B:	Regular foam. Encompasses all non-alcohol resistant type foams including fluoroprotein and aqueous film forming foam (AFFF)
	C:	Water-spray
	D:	Dry chemical
	No:	No special requirements under this Code.
		Fire-extinguishing media considered to be suitable for certain products are listed for information in column (i) of the summary of minimum requirements.

"No" indicates nil requirement.

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a	b	c	d	e	f	g	h	i	j	k	l	m
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Electrical requirements	Gauging	Vapour detection	Fire protection	Special requirement
Acetic acid	2789	C	S/P	3	2G	Cont.	No	SP	R	F	A	4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.6, 4.17, 5.2.8
Acetic anhydride	1715	C	S/P	2	2G	Cont.	No	SP	R	F-T	A	4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.6, 4.17
Acetone cyanohydrin	1541	A	S/P	2	2G	Cont.	No	St	C	T	A	4.4, 4.9, 4.12.6, 4.13, 4.14, 4.17, 4.18
Acetonitrile	1648	III	S	2	2G	Cont.	No	SP	R	F-T	A	4.9
Acrylamide solution (50% or less)	2074	D	S	2	2G	Open	No	ST	C	No	No	4.9.3, 4.10, 4.14.1, 4.15.1, 4.18.1
Acrylic acid	2218	D	S	3	2G	Cont.	No	SP	R	F-T	A	4.10, 4.12.6, 4.18.1
Acrylonitrile	1093	B	S/P	2	2G	Cont.	No	SP	C	F-T	A	4.9, 4.10, 4.12.3, 4.13.1, 4.14, 4.17
Adiponitrile	2205	D	S	3	2G	Cont.	No	St	R	T	A	-
Alkyl acrylate - vinyl pyridine copolymer in toluene		(C)	P	3	2G	Cont.	No	SP	R	F	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
lkyl benzene ulphonic acid	2584 2586	C	S/P	3	2G	Open	No	St	O	No	B	-
llyl alcohol	1098	B	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.13.1, 4.14, 4.17
llyl chloride	1100	B	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.13.1, 4.14, 4.17
(2-Aminoethoxy) thanol	3055	D	S	3	2G	Open	No	St	O	No	A,C,D	4.12.2, 4.14.1
minoethyl ethanolamine		(D)	S	3	2G	Open	No	St	O	No	A	4.12.1
-Aminoethyl piperazine	2815	D	S	3	2G	Cont	No	St	R	T	A,C,D	4.12.2, 4.14.1
monia aqueous, 28% or less)	2672 (o)	C	S/P	3	2G	Cont	No	SP	R	T	C	4.12.4, 4.12.9, 4.17[a]
monium nitrate solution, (93% or less)	2426	D	S	2	1G	Open	No	St	O	No	No	4.8.4, 4.8.6, 4.12.10, 4.13.2, 4.14.1, 4.19
monium sulphide olution (45% or less)	2683	B	S/P	2	2G	Cont	No	SP	C	F-T	A,C	4.9, 4.11, 4.12.1, 4.13.1, 4.14, 4.15.1, 4.17, 4.18

a	b	c	d	e	f	g	h	i	j	k	l	m
n-Amyl acetate	1104	C	P	3	2G	Cont	No	SP	R	F	A	4.14.1
sec-Amyl acetate	1104	C	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Amyl acetate, commercial	1104	C	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Aniline	1547	C	S/P	2	2G	Cont	No	St	C	T	A	4.9, 4.13.1, 4.14,
Benzene and mixtures having 10% benzene or more	1114 (s)	C	S/P	3	2G	Cont	No	SP	R	F-T	B	4.9.1, 4.13.1, 5.2.8
Benzenesulphonyl chloride	2225	D	S	3	2G	Cont	No	St	R	T	B,D	4.12.1, 4.14.1
Benzyl alcohol		C	P	3	2G	Open	No	St	O	No	A	
Benzyl chloride	1738	B	S/P	2	2G	Cont	No	St	C	T	B	4.9, 4.10, 4.13.1, 4.14, 4.17
n-Butyl acetate	1123	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
n-Butyl acrylate	2368	D	S	2	2G	Cont	No	SP	R	F-T	A	4.10, 4.18.1, 4.18.2
Butylamine (all isomers)	1125 1214	C	S/P	2	2G	Cont	No	SP	R	F-T	A	4.9, 4.12.1, 4.12.2, 4.13.1, 4.14.1, 4.17
Butyl benzyl phthalate		A	P	2	2G	Open	No	St	0	No	B	4.14.1
Butyl/Decyl/Cetyl/ Eicosyl methacrylate mixture		D	S	3	2G	Cont	No	St	R	No	A,C, D	4.10, 4.18.1, 4.18.2
n-Butyl ether	1149	C	S/P	3	2G	Cont	Inert	SP	R	F-T	A,D	4.2.7, 4.9
Butyl methacrylate		D	S	3	2G	Cont	No	SP	R	F-T	A,D	4.10, 4.18.1, 4.18.2
n-Butyraldehyde	1129	B	S/P	3	2G	Cont	No	SP	0	F-T	A	4.15.1
Butyric acid	2820	B	S/P	3	2G	Cont	No	St	R	No	A	4.8.2, 4.8.3, 4.8.4, 4.8.6, 4.8.7, 4.8.8, 4.12.6

a	b	c	d	e	f	g	h	i	j	k	l	m
Calcium hypochlorite solution		B	S/P	3	2G	Cont	No	St	R	No	No	4.15.1, 4.12.5
Calcium naphthenate in mineral oil		A	P	3	2G	Open	No	St	0	No	B	
Camphor oil	1130	B	S/P	2	2G	Cont	No	SP	0	F	B	4.14.1
Carbolic oil		A	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.14
Carbon disulphide	1131	A	S/P	2	1G	Cont	Inert	Use None	C	F-T	C	4.1, 4.9, 4.14, 4.17
Carbon tetrachloride	1846	B	S/P	3	2G	Cont	No	St	C	T	No	4.9, 4.13.1, 4.14.1, 4.17
Cashew nut shell oil (untreated)		D	S	3	2G	Cont	No	St	R	T	B	
Cetyl/Eicosyl methacrylate mixture		III	S	3	2G	Open	No	St	0	No	A,C,D	4.10, 4.18.1, 4.18.2
Chloroacetic acid (80% or less)	1750	C	S/P	2	2G	Cont	No	St	C	No	No	4.8.2, 4.8.4, 4.8.6, 4.8.7, 4.8.8, 4.9.3, 4.12.6 (aluminium not permitted), 4.14, 5.2.8
Chlorobenzene	1134	B	S/P	2	2G	Cont	No	SP	R	F-T	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
loroform	1888	B	S/P	3	2G	Cont	No	St	R	T	No	4.9, 4.17
lorohydrins, crude		(D)	S	2	2G	Cont	No	SP	C	P-T	A	4.9, 4.14
or 3-Chloropropionic id	2511 (k)	(C)	S/P	3	2G	Open	No	St	0	No	A	4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.6, 5.2.8
loromulphonic acid	1754	C	S/P	1	2G	Cont	No	St	C	T	No	4.8.2 to 4.8.8, 4.9, 4.14, 4.15.2, 4.17
Chlorotoluene	2238	B	S/P	3	2G	Cont	No	SP	R	P-T	B,C	
Chlorotoluene	2238	A	S/P	3	2G	Cont	No	SP	R	P-T	B,C	
Chlorotoluene	2238	B	S/P	2	2G	Cont	No	SP	R	P-T	B,C	4.14.1, 5.2.8
lorotoluenes ixed isomers)	2238	A	S/P	2	2G	Cont	No	SP	R	P-T	B,C	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Coal tar naphtha solvent		B	S/P	3	2G	Cont	No	SP	R	F-T	A,D	
Creosote (coal tar)		(C)	S/P	3	2G	Open	No	St	O	No	B,D	
Creosote (wood)		A	S/P	2	2G	Open	No	St	O	No	B,D	4.14.1
Cresols (mixed isomers)	2076	A	S/P	2	2G	Open	No	St	O	No	B	4.14.1
Crotonaldehyde	1143	B	S/P	2	2G	Cont	No	SP	R	F-T	A	4.9, 4.13.1, 4.15.1, 4.17
Cyclohexane	1145	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1, 5.2.8
Cyclohexanol		C	P	3	2G	Open	No	St	O	No	A	5.2.6, 5.2.8
Cyclohexanone	1915	D	S	3	2G	Cont	No	SP	R	F-T	A	4.12.5
Cyclohexylamine	2357	C	S/P	3	2G	Cont	No	SP	R	F-T	A,D	4.12.1, 4.12.2
p-Cymene	2046	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Decene		B	P	3	2G	Cont	No	SP	R	F	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
ecyl acrylate		A	S/P	2	2G	Open	No	St	0	No	D,A,C	4.10, 4.12.2, 4.14.1, 4.18.1, 4.18.2
ecyl alcohol all isomers)		B	P	3	2G	Open	No	St	0	No	B	5.2.8 (p)
ibutylamine		C	S/P	3	2G	Cont	No	SP	R	P-T	B,D	4.12.4
ibutyl phthalate		A	P	2	2G	Open	No	St	0	No	B	4.14.1
-Dichlorobenzene	1591	B	S/P	2	2G	Cont	No	St	R	T	B,D	4.12.5, 4.14.1
,1-Dichloroethane	2362	B	S/P	3	2G	Cont	No	SP	R	P-T	B	4.17
ichloroethyl ether	1916	B	S/P	2	2G	Cont	No	SP	R	P-T	A	4.12.5
,2-Dichloroisopropyl ether	2490	C	S/P	2	2G	Cont	No	St	R	T	B,C,D	4.9, 4.12.5, 4.13.1, 4.14
,4-Dichlorophenol	2021	A	S/P	2	2G	Cont	Dry	St	R	T	B,C,D	4.12.1, 4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution		(A)	S/P	3	2G	Open	No	St	O	No	No	14.12.1
2,4-Dichlorophenoxyacetic acid, dimethylamine salt (70% or less) solution		(A)	S/P	3	2G	Open	No	St	O	No	No	14.12.1
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt, solution		(A)	S/P	3	2G	Open	No	St	O	No	No	14.12.1
1,2-Dichloropropane	1279	B	S/P	2	2G	Cont	No	SP	R	F-T	B	4.9
1,3-Dichloropropane		B	S/P	2	2G	Cont	No	SP	R	F-T	B	4.9
1,3-Dichloropropene	2047	B	S/P	2	2G	Cont	No	SP	C	F-T	B	4.9, 4.13, 4.14, 4.17
Dichloropropene/ Dichloropropane mixtures		B	S/P	2	2G	Cont	No	SP	C	F-T	B,C,D	4.9, 4.13, 4.14, 4.17
2,2-Dichloropropionic acid		D	S	3	2G	Cont	Dry	St	R	No	A	4.8.2, 4.8.4, 4.8.6 to 4.8.8, 4.12.6 (aluminium not permitted)
Diethanolamine		*III*	S	3	2G	Open	No	St	O	No	A	4.12.2

a	b	c	d	e	f	g	h	i	j	k	l	m
ylamine	1154	C	S/P	3	2G	Cont	No	SP	R	F-T	A	4.12.1, 4.9, 4.17
ylaminoethanol	2686	C	S/P	3	2G	Cont	No	SP	R	F-T	A,D	4.12.1, 4.12.2
ylbenzene	2049	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
ylene glycol l ether		C	P	3	2G	Open	No	St	0	No	A	
ylenetriamine	2079	(D)	S	3	2G	Open	No	St	0	No	A	4.12.2
hyl ether	1155	III	S	2	1G	Cont	Inert	SP	C	F-T	A	4.2, 4.11, 4.12.9, 4.14, 4.17
2-ethylhexyl) phoric acid	1902	C	S/P	3	2G	Open	No	St	0	No	B,C,D	4.12.2
hyl phthalate		C	P	3	2G	Open	No	St	0	No	B	
hyl sulphate	1594	(B)	S/P	2	2G	Cont	No	St	C	T	A,D	4.12.3, 4.14.1
ycidyl ether of henol A		B	P	3	2G	Open	No	St	0	No	B	5.2.8
obutylamine	2361	(C)	S/P	2	2G	Cont	No	SP	R	F-T	B,D	4.9.3, 4.12.1, 4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Diisobutylene	2050	B	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Diisobutyl phthalate		B	P	3	2G	Open	No	St	O	No	B	5.2.5
Diisopropanolamine		C	S/P	3	2G	Open	No	St	O	No	A	4.12.2, 5.2.6, 5.2.8
Diisopropylamine	1158	C	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.12.2, 4.14, 4.17
Diisopropylbenzene (all isomers)		A	P	2	2G	Open	No	St	O	No	B	4.14.1
Dimethylamine solution (45% or less)	1160	C	S/P	3	2G	Cont	No	SP	R	F-T	C,D	4.9, 4.12.1, 4.17
Dimethylamine solution (greater than 45% but not greater than 55%)	1160	C	S/P	2	2G	Cont	No	SP	C	F-T	A,C,D	4.9, 4.12.1, 4.13.1, 4.14, 4.17
Dimethylamine solution (greater than 55% but not greater than 65%)	1160	C	S/P	2	2G	Cont	No	SP	C	F-T	A,C,D	4.9, 4.11, 4.12.1, 4.13.1, 4.14, 4.17
N,N-Dimethylcyclohexyl-amine	2264	C	S/P	2	2G	Cont	No	SP	R	F-T	A,C	4.9, 4.12.1, 4.13.1, 4.14.1
Dimethylethanolamine	2051	D	S	3	2G	Cont	No	SP	R	F-T	A,D	4.12.2

a	b	c	d	e	f	g	h	i	j	k	l	m
Dimethylformamide	2265	D	S	3	2G	Cont	No	SP	R	F-T	A,D	
Dimethyl hydrogen phosphite			S	3	2G	Cont	No	St	R	T	A,D	4.9.1
Dimethyl phthalate		C	P	3	2G	Open	No	St	O	No	B	
Dinitrotoluene (molten)	1600	B	S/P	2	2G (1)	Cont	No	St	C	T	B	4.9, 4.13.1, 4.14*, 5.2.5, 5.2.8, SA.2.2 (m)
1,4-Dioxane	1165	D	S	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.14
Dipentene	2052	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Diphenyl ether		A	P	3	2G	Open	No	St	O	No	B	
Diphenylmethane diisocyanate	2489	(B)	S/P	2	2G	Cont	Dry	St[b]	C	T[b]	C[c] D	4.9, 4.12.5, 4.13.1, 4.14.1, 4.15.2, 5.2.5, 5.2.8, SA.2.2
Diphenyl oxide/Diphenyl phenyl ether mixture		A	P	3	2G	Open	No	St	O	No	B	
Di-n-propylamine	2383	C	S/P	3	2G	Cont	No	SP	R	F-T	A	4.9.3, 4.12.2, 4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Dodecene, all isomers		B	P	3	2G	Open	No	St	0	No	B	
Dodecyl alcohol		B	P	3	2G	Open	No	St	0	No	B	5.2.5, 5.2.8 5A.2.2
Dodecylbenzene		C	P	3	2G	Open	No	St	0	No	B	
Dodecyl diphenyl oxide disulphonate solution		B	S/P	3	2G	Open	No	St	0	No	No	5.2.5, 5.2.8, 5A.2.2
Dodecyl methacrylate		III	S	3	2G	Open	No	St	0	No	A,C	4.10
Dodecyl/Pentadecyl methacrylate mixture		III	S	3	2G	Open	No	St	0	No	A,C,D	4.10, 4.18.1, 4.18.2
Dodecyl phenol		A	P	1	2G	Open	No	St	0	No	B	4.14
Epichlorohydrin	2023	C	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.13.1, 4.14, 4.17
Ethanolamine	2491	D	S	3	2G	Open	No	St	0	F-T	A	4.12.2
2-Ethoxyethyl acetate	1172	C	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Ethyl acrylate	1917	B	S/P	2	2G	Cont	No	SP	R	F-T	A	4.10, 4.17, 4.18.1, 4.18.2

a	b	c	d	e	f	g	h	i	j	k	l	m
Ethylamine	1036	C	S/P	2	1G	Cont	No	SP	C	F-T	C,D	4.9, 4.11, 4.12.2, 4.17
Ethylamine solutions, (72% or less)	2270	C	S/P	2	2G	Cont	No	SP	C	F-T	A,C	4.9, 4.11, 4.12.1, 4.13.1, 4.14, 4.17
Ethyl benzene	1175	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
N-Ethylbutylamine		(C)	S/P	3	2G	Cont	No	SP	R	F-T	A	4.9.3, 4.12.1, 4.14.1
N-Ethylcyclohexylamine		D	S	3	2G	Cont	No	SP	R	F-T	A,C	4.12.1, 4.14.1
Ethylene chlorohydrin	1135	C	S/P	2	2G	Cont	No	SP	C	F-T	D	4.9, 4.13.1, 4.14, 4.17
Ethylene cyanohydrin		(D)	S	3	2G	Open	No	St	O	No	A	
Ethylenediamine	1604	C	S/P	2	2G	Cont	No	SP	R	F-T	A	4.12.2, 5.2.8
Ethylene dibromide	1605	B	S/P	2	2G	Cont	No	St	C	T	No	4.9, 4.14.1, 4.17, 5.2.8
Ethylene dichloride	1184	B	S/P	2	2G	Cont	No	SP	R	F-T	B	4.12.4, 4.14.2
Ethylene oxide/Propylene oxide mixture with an ethylene content of not more than 30% by weight	2983	D	S	2	1G	Cont	Inert	SP	C	F-T	A,C	4.7, 4.9, 4.11, 4.14

a	b	c	d	e	f	g	h	i	j	k	l	m
2-Ethylhexyl acrylate		D	S	3	2G	Open	No	St	O	No	A	4.10, 4.18.1, 4.18.2
2-Ethylhexylamine	2276	B	S/P	2	2G	Cont	No	SP	R	F-T	A	4.9, 4.12.2
Ethylidene norbornene		B	S/P	3	2G	Cont	No	SP	R	F-T	B,C D	4.9.1, 4.12.4, 4.14.1, 4.15.1
Ethyl methacrylate	2277	(D)	S	3	2G	Cont	No	SP	R	F-T	B,D	4.10, 4.18.1, 4.18.2
2-Ethyl-3-propylacrolein		B	S/P	3	2G	Cont	No	SP	R	F-T	A	5.2.8
Ethyltoluene		(B)	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Fatty alcohols(C_{12}-C_{20})		B	P	3	2G	Open	No	St	O	No	B	5.2.5, 5.2.8
Formaldehyde solutions (45% or less)	1198[d] 2209	C	S/P	3	2G	Cont	No	SP	R	F-T	A	4.15.1, 4.17[e]
Formic acid	1779	D	S	3	2G	Cont	No	SP	R	T	A	4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.7, 4.17
Fumaric adduct of rosin, water dispersion		B	P	3	2G	Open	No	St	O	No	No	5.2.5

a	b	c	d	e	f	g	h	i	j	k	l	m
rfural	1199	C	S/P	3	2G	Cont	No	SP	R	F-T	A	4.15.1
rfuryl alcohol	2874	C	P	3	2G	Open	No	St	O	No	A	
lutaraldehyde solutions (X or less)		D	S	3	2G	Open	No	St	O	No	No	4.15.1
lycidyl ester of C_{10} trialkyl acetic acid		B	P	3	2G	Open	No	St	O	No	B	
eptanol (all isomers) q)		(C)	P	3	2G	Cont	No	SP	R	F	A	4.14.1
eptene (mixed isomers)		C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
eptyl acetate		(B)	P	3	2G	Open	No	St	O	No	B	
xamethylenediamine olution	1783	C	S/P	3	2G	Cont	No	St	R	T	A	4.12.2, 4.14.1, 5.2.8
xamethyleneimine	2493	C	S/P	2	2G	Cont	No	SP	R	F-T	A,C	4.12.1, 4.12.2
1-Hexene	2370	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Hexyl acetate	1233	B	P	3	2G	Cont	No	SP	R	F	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Hydrochloric acid	1789	D	S	3	1G	Cont	No	St	R	T	No	4.8, 4.17[f]
Hydrogen peroxide solutions (over 60% but not over 70%)	2015	C	S/P	2	2G	Cont	No	St	C	No	No	4.14.1, 4.20.1 to 4.20.14
Hydrogen peroxide solutions (over 8% but not over 60%)	2014 2984	C	S/P	3	2G	Cont	No	St	C	No	No	4.13.2, 4.14.1, 4.20.15, 4.20.27
2-Hydroxyethyl acrylate		B	S/P	2	2G	Cont	No	St	C	T	A	4.9, 4.10. 4.14.1, 4.18.1, 4.18.2
Isoamyl acetate	1104	C	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Isobutyl acetate	1213	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Isobutyl acrylate	2527	D	S	2	2G	Cont	No	SP	R	F-T	A	4.10, 4.18.1, 4.18.2
Isobutyraldehyde	2045	C	S/P	3	2G	Cont	No	SP	O	F-T	A	4.15.1
Isophorone diamine	2289	D	S	3	2G	Cont	No	St	R	T	A	4.12.2
Isophorone diisocyanate	2290	B	S/P	2	2G	Cont	Dry	St	C	T	C[c] D	4.9, 4.12.5, 4.13.1, 4.14.1, 4.15.2

a	b	c	d	e	f	g	h	i	j	k	l	m
oprene	1218	C	S/P	3	2G	Cont	No	SP	R	F	B	4.10, 4.11, 4.18.1 4.18.2
opropanolamine		C	S/R	3	2G	Open	No	St	O	F-T	A	4.12.2, 5.2.7, 5.2.9
opropylamine	1221	C	S/P	2	2G	Cont	No	SP	C	F-T	C,D	4.9, 4.11, 4.12.2, 4.14, 4.17
opropylbenzene	1918	B	P	3	2G	Cont	No	SP	R	F	B	4.14.1
opropyl ether	1159	D	S	3	2G	Cont	Inert	SP	R	F	A	4.2.7, 4.10.3, 4.14.1
ovaleraldehyde	2058	C	S/P	3	2G	Cont	Inert	SP	R	F-T	A	4.2.7, 4.15.1
aleic anhydride	2215	D	S	3	2G	Cont	No	St	R	No	A[g] C	
ercaptobenzothiazol, odium salt, solution		(B)	S/P	3	2G	Open	No	St	O	No	No	4.12.1, 5.2.8
esityl oxide	1229	D	S	3	2G	Cont	No	SP	R	F-T	A	4.14.1
ethacrylic acid	2531	D	S	3	2G	Cont	No	St	R	T	A	4.10, 4.12.6, 4.18.1
ethacrylonitrile		(B)	S/P	2	2G	Cont	No	SP	C	F-T	A	4.9, 4.10, 4.12.4, 4.13.1, 4.14, 4.17

a	b	c	d	e	f	g	h	i	j	k	l	m
Methyl acrylate	1919	C	S/P	2	2G	Cont	No	SP	R	F-T	B	4.10, 4.17, 4.18.1, 4.18.2
Methylamine solutions, (42% or less)	1235	C	S/P	2	2G	Cont	No	SP	C	F-T	A,C,D	4.9, 4.12.1, 4.13.1, 4.14, 4.17
Methylamyl acetate	1233	(C)	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Methylamyl alcohol	2053	(C)	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Methyl amyl ketone	1110	(C)	P	3	2G	Cont	No	SP	R	F	A	4.14.1
Dichloromethane (move to p.23)	1593	D	S	3	2G	Cont	No	St	R	T	No	
2-Methyl-6-ethyl-aniline		C	S/P	3	2G	Open	No	St	O	No	B,C,D	
2-Methyl-5-ethyl-pyridine	2300	(B)	S/P	3	2G	Open	No	St	O	No	D	4.12.4
Methyl formate	1243	D	S	2	2G	Cont	No	SP	R	F-T	A	4.9, 4.11, 4.14, 4.17
2-Methyl-2-hydroxy-3-butyne		III	S	3	2G	Cont	No	SP	R	F-T	A,C,D	4.12.8, 4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
yl methacrylate	1247	D	S	2	2G	Cont	No	SP	R	F-T	B	4.10, 4.18.1, 4.18.2
thyl-1-pentene	2288	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
thylpyridine	2313	B	S/P	2	2G	Cont	No	SP	C	F	A,C	4.9.3, 4.12.4, 4.14 5.2.8
thylpyridine	2313	B	S/P	2	2G	Cont	No	SP	C	F-T	A,C,D	4.9.3, 4.12.4, 4.14
thyl-2-pyrrolidone		B	P	3	2G	Open	No	St	O	No	A	
yl salicylate		(B)	P	3	2G	Open	No	St	O	No	B	
-Methylstyrene	2303	A	S/P	2	2G	Cont	No	SP	R	F-T	D	4.10, 4.14.1, 4.18.1 4.18.2
holine	2054	D	S	3	2G	Cont	No	SP	R	F	A	4.12.2
r fuel anti-knock pounds	1649	A	S/P	2	1G	Cont	No	SP	C	F-T	C,B	4.6, 4.9, 4.13.2, 4.14 4.17
thalene (molten)	2304	A	S/P	2	2G	Cont	No	SP	R	No	A,D	4.14.1
decanoic acid		(B)	P	3	2G	Open	No	St	O	No	B	

a	b	c	d	e	f	g	h	i	j	k	l	m
Nitrating acid (mixture of sulphuric and nitric acid)	1796	(C)	S/P	2	2G	Cont	No	St	C	T	No	4.8, 4.13.1, 4.14, 4.15.2, 4.17
Nitric acid (70% and over)	2031, 2032[h]	C	S/P	2	2G	Cont	No	St	C	T	No	4.8, 4.14, 4.17
Nitric acid (less than 70%)	2031	C	S/P	2	2G	Cont	No	St	R	T	No	4.8, 4.14, 4.17
Nitrobenzene	1662	B	S/P	2	2G	Cont	No	St	C	T	D	4.9, 4.13, 4.14, 5.2.8
o-Chloronitrobenzene (move to p.26)	1578	B	S/P	2	2G	Cont	No	St	C	T	B,C,D	4.9, 4.13, 4.14, 5.2.5, 5.2.8, 5A.2.2
o-Nitrophenol (molten)	1663	B	S/P	2	2G	Cont	No	St	C	T	A,C,D	4.9, 4.14.1, 5.2.5 5.2.8, 5A.2.2
1- or 2-Nitropropane	2608	D	S	3	2G	Cont	No	SP	R	F-T	A	
Nitropropane (60%)/ Nitroethane (40%) mixture		D	S	3	2G	Cont	No	SP	R	F-T	A,C (n)	4.12.4
(o- and p-) Nitrotoluenes	1664	C	S/P	2	2G	Cont	No	St	C	T	B	4.9, 4.13.1, 4.14, 5.2.8

a	b	c	d	e	f	g	h	i	j	k	l	m
nene		B	P	3	2G	Cont	No	SP	R	F	B	4.14.1
nyl alcohol		C	P	3	2G	Open	No	St	O	No	B	
nylphenol		A	P	2	2G	Open	No	St	O	No	A	4.14.1
:tanol (all isomers)		C	P	3	2G	Open	No	St	O	No	B	
:tene (all isomers)		B	P	3	2G	Cont.	No	SP	R	F	B	4.14.1
lefins, straight chain ixtures		B	P	3	2G	Cont.	No	SP	R	F	B	4.14.1, 5.2.5, 5.2.8
lpha-Olefins (C_6-C_{18} ixtures)		B	P	3	2G	Cont.	No	SP	R	F	B	4.14.1, 5.2.5, 5.2.8
Oleum	1831	C	S/P	2	2G	Cont.	No	St	C	T	No	4.8.2 to 4.8.8, 4.9.1, 4.13.1, 4.14, 4.15.2, 4.17, 5.2.6
Paraldehyde	1264	C	S/P	3	2G	Cont.	No	SP	R	F	A	5.2.8
Pentachloroethane	1669	B	S/P	2	2G	Cont.	No	St	R	T	No	4.9, 4.13.1, 4.14.1
1,3-Pentadiene		C	S/P	3	2G	Cont.	No	SP	R	F-T	B	4.10, 4.18

a	b	c	d	e	f	g	h	i	j	k	l	m
n-Pentane	1265	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Pentene (all isomers)		C	P	3	2G	Cont	No	SP	R	F	B	4.14.1, 5.2.8
Perchloroethylene	1897	B	S/P	3	2G	Cont	No	St	R	T	No	4.9.1, 4.9.2
Phenol	2312	B	S/P	2	2G	Cont	No	St	C	T	A	4.9, 4.14, 5.2.5 5.2.8, 5A.2.2
1-Phenyl-1-xylyl ethane		C	P	3	2G	Open	No	St	O	No	B	
Phosphoric acid	1805	D	S	3	2G	Open	No	St	O	No	No	4.8.1 to 4.8.4, 4.8.6 to 4.8.8
Phosphorus, yellow or white	2447	A	S/P	1	1G	Cont	Pad + (vent or inert)	St	C	No	C	4.5, 4.14, 4.17
Phthalic anhydride	2214	C	S/P	3	2G	Cont	No	St	R	No	D	5.2.8
Pinene	2368	A	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Polyethylene polyamines	2734[i] 2735	C	S/P	3	2G	Open	No	St	O	No	A	4.12.2, 5.2.8
Polymethylene polyphenyl isocyanate	2206[i] 2207	D	S	2	2G	Cont	Dry	St[b]	C	T[b]	C[c] D	4.9, 4.12.5, 4.14.1, 4.15.2

a	b	c	d	e	f	g	h	i	j	k	l	m
:assium hydroxide lution	1814	C	S/P	3	2G	Open	No	St	O	No	No	4.12.1 Copper, brass and bronze may be used, 5.2.8
Propanolamine		C	S/P	3	2G	Open	No	St	O	No	A,D	4.12.2, 5.2.8
ta-Propiolactone		D	S	2	2G	Cont	No	St	R	T	A	
opionaldehyde	1275	D	S	3	2G	Cont	No	SP	R	F-T	A	4.13.1, 4.15.1, 4.17
opionic acid	1848	D	S	3	2G	Cont	No	SP	R	F	A	4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.6, 4.17
opionic anhydride	2496	C	S/P	3	2G	Cont	No	St	R	T	A	4.12.6
opionitrile	2404	C	S/P	2	1G	Cont	No	SP	C	F-T	A,D	4.9, 4.13, 4.14, 4.17
Propylamine	1277	C	S/P	2	2G	Cont	Inert	SP	C	F-T	C,D	4.9, 4.12.2, 4.14, 4.17
opylene dimer		(C)	P	3	2G	Cont	No	SP	R	F	B	4.14.1
opylene oxide	1280	D	S	2	2G	Cont	Inert	SP	C	F-T	A,C	4.7, 4.9.1, 4.11, 4.14
opylene trimer	2057	B	P	3	2G	Cont	No	SP	R	F	B	4.14.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Pyridine	1282	B	S/P	3	2G	Cont	No	SP	R	F	A	4.12.4
Rosin		A	P	3	2G	Open	No	St	O	No	B	
Rosin soap (disproportionated solution)		B	P	3	2G	Open	No	St	O	No	A	
Sodium borohydride, (15% or less)/Sodium hydroxide solution		C	S/P	3	2G	Open	No	St	O	No	No	4.12.1, 5.2.6
Sodium chlorate solution (50% or less)		III	S	3	2G	Open	No	St	O	No	No	4.14.1, 4.15.1, 4.21
Sodium dichromate solution, (70% or less)		B	S/P	2	2G	Open	No	St	C	No	No	4.9.3, 4.12.2, 4.14
Sodium hydrosulphide solution, (45% or less)	2949	B	S/P	3	2G	Cont	Vent or pad (gas)	St	R	T	No	4.15.1, 5.2.8
Sodium hydrosulphide Ammonium sulphide solution		B	S/P	2	2G	Cont	No	SP	C	F-T	A,C	4.9, 4.11, 4.12.1, 4.13.1, 4.14, 4.15.1, 4.17, 4.18,

a	b	c	d	e	f	g	h	i	j	k	l	m
lium hydroxide ution	1824	D	S	3	2G	Open	No	St	O	No	No	4.12.1, Copper, brass and bronze may be used
lium hypochlorite lution, (15% or less)	1791	B	S/P	3	2G	Cont	No	St	R	No	No	4.12.5, 4.15.1
tyrene monomer	2055	B	S/P	3	2G	Cont	No	SP	O	F	B	4.10, 4.12.4, 4.18.1, 4.18.2
ulphur (molten)	2448	III	S	3	1G	Open	Vent or pad (gas)	SP	O	F-T	No	4.3
ulphuric acid	1830	C	S/P	3	2G	Open	No	St	O	No	No	4.8, 4.15.2, 5.2.7, 5.2.8
ulphuric acid, spent	1832	C	S/P	3	2G	Open	No	St	O	No	No	4.8, 4.15.2, 5.2.7, 5.2.8
all oil, crude and listilled		A	P	3	2G	Open	No	St	O	No	B	
all oil fatty acid (resin acids less than 20%)		(C)	P	3	2G	Open	No	St	O	No	B	
all oil soap (disproportionated solution)		B	P	3	2G	Open	No	St	O	No	A	5.2.5, 5.2.9

a	b	c	d	e	f	g	h	i	j	k	l	m
Tetrachloroethane	1702	B	S/P	3	2G	Cont	No	St	R	T	No	4.9, 4.13.1
Tetraethylenepentamine	2320	D	S	3	2G	Open	No	St	O	No	A	4.12.1
Tetrahydrofuran	2056	D	S	3	2G	Cont	No	SP	R	F-T	A,D	
Tetrahydronaphthalene		C	P	3	2G	Open	No	St	O	No	B	
Toluene	1294	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Toluenediamine	1709	C	S/P	2	2G	Cont	No	St	C	T	B,C,D	4.9, 4.12.1, 4.13.1, 4.14, 4.17, 5.2.9
Toluene diisocyanate	2078	C	S/P	2	2G	Cont	Dry	St	C	F-T	C[c] D	4.9, 4.12.4, 4.13.1, 4.14, 4.15.2, 4.17, 5.2.8
o-Toluidine	1708	C	S/P	2	2G	Cont	No	St	C	T	A,C	4.9, 4.13.1, 4.14
Tributyl phosphate*		B	P	3	2G	Open	No	St	O	No	B	

a	b	c	d	e	f	g	h	i	j	k	l	m
1,2,4-Trichlorobenzene	2321	B	S/P	2	2G	Cont	No	St	R	T	C	4.14.1, 5.2.8, 5A.2.2
1,1,1-Trichloroethane	2831	B	P	3	2G	Open	No	St	O	No	B	
1,1,2-Trichloroethane		B	S/P	3	2G	Cont	No	St	R	T	No	4.9.1
Trichloroethylene	1710	B	S/P	3	2G	Cont	No	St	R	T	No	4.9, 4.13.1, 4.15.1
1,2,3-Trichloropropane		B	S/P	2	2G	Cont	No	St	C	T	B,C,D	4.9, 4.13.1, 4.14
1,1,2-Trichloro-1,2,2-trifluoroethane		C	P	3	2G	Open	No	St	O	No	No	
Triethanolamine		D	S	3	2G	Open	No	St	O	No	A	4.12.1
Triethylamine	1296	C	S/P	2	2G	Cont	No	SP	R	F-T	B	4.9, 4.12.2, 4.17
Triethylbenzene		A	P	2	2G	Open	No	St	O	No	B	4.14.1
Triethylene tetramine	2259	D	S	3	2G	Open	No	St	O	No	A	4.12.1
Triethyl phosphite	2323		S	3	2G	Cont	No	SP	R	F-T	A,D	4.9.1

a	b	c	d	e	f	g	h	i	j	k	l	m
Trimethylacetic acid		D	S	3	2G	Cont	No	St	R	No	A,C	4.8.2 to 4.8.8, 4.12.6
1,2,4-Trimethylbenzene		B	P	3	2G	Cont	No	SP	R	F	B	4.14.1
Trimethylhexamethylene diamine (2,2,4- and 2,4,4-isomers)	2327	(D)	S	3	2G	Open	No	St	O	No	A,C	4.12.1, 4.14.1
Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4-isomers)	2328	B	S/P	2	2G	Cont	Dry	St	C	T	A,C[c]	4.9, 4.13.1, 4.14.1, 4.15.2
2,2,4-Trimethyl-1, 3-Pentanediol-1-isobutyrate		C	P	3	2G	Open	No	St	O	No	B	
Trimethyl phosphite	2329		S	3	2G	Cont	No	SP	R	F-T	A,D	4.9.1, 4.14.1, 4.15.2
Tricresyl phosphate (containing less than 1% ortho-isomer) (move to p.48)		A	P	2	2G	Open	No	St	O	No	B	4.14.1
Tricresyl phosphate, (containing 1% or more ortho-isomer) (move to p.48)	2574[j]	A	S/P	1	2G	Cont	No	St	C	No	B	4.9.3, 4.14
Trixylyl phosphate		A	P	1	2G	Open	No	St	O	No	B	4.14

a	b	c	d	e	f	g	h	i	j	k	l	m
urpentine	1299	B	P	3	2G	Cont	No	SP	R	F	B	4.14.1
-Undecene		B	P	3	2G	Open	No	St	O	No	B	
ndecyl alcohol		B	P	3	2G	Open	No	St	O	No	B	5.2.8, 5A.2.2[1]
ea, ammonium nitrate olution, (containing qua ammonia)		C	S/P	3	2G	Cont	No	SP	R	T	A	4.12.4, 4.12.9
-Valeraldehyde	2058	D	S	3	2G	Cont	Inert	SP	R	F-T	A	4.2.7, 4.15.1
inyl acetate	1301	C	S/P	3	2G	Cont	No	SP	O	F	A	4.10, 4.18.1, 4.18.2
inyl ethyl ether	1302	C	S/P	2	1G	Cont	Inert	SP	C	F-T	A	4.2, 4.10, 4.11, 4.12.8, 4.14, 4.17, 4.18.1, 4.18.2
Vinylidene chloride	1303	B	S/P	2	2G	Cont	Inert	SP	R	F-T	B	4.10, 4.11, 4.12.5 4.17, 4.18.1, 4.18.2
inyl neodecanoate		C	S/P	3	2G	Open	No	St	O	No	B	4.10, 4.15.1, 4.18.1, 4.18.2
inyl toluene	2618	A	S/P	3	2G	Cont	No	SP	R	F	D	4.10, 4.12.1, 4.14.1, 4.18.1, 4.18.2

a	b	c	d	e	f	g	h	i	j	k	l	m
White spirit, low (15-20%) aromatic	1300	(B)	P	2	2G	Cont	No	SP	R	F	B	4.14.1
Xylene	1307	C	P	3	2G	Cont	No	SP	R	F	B	4.14.1, 5.2.8
Xylenol	2261	B	S/P	3	2G	Open	No	St	O	No	B	5.2.8, 5A.2.2

a Provision 4.17 applies to ammonia aqueous, 28% or less but not below 10%.

b If the product carried contains flammable solvents such that the flashpoint is not exceeding 60°C, then special electrical systems and a flammable vapour detector are to be provided.

c Although water is suitable for extinguishing open air fires involving chemicals to which this footnote applies, water should not be allowed to contaminate closed tanks containing these chemicals because of the risk of hazardous gas generation.

d UN number 1198 only applies if flashpoint is below 60°C c.c.

e Provision 4.17 applies to formaldehyde solutions 45% or less, but not below 5%.

f Provision 4.17 applies to hydrochloric acid not below 10%.

g Dry chemical cannot be used because of the possibility of an explosion.

h UN number 2032 assigned to red fuming nitric acid.

i UN number depends on boiling point of substance.

j UN number assigned to this substance containing more than 3% of ortho-isomer.

k UN number only applies to 2-chloropropionic acid

l Dinitrotoluene should not be carried in deck tanks.

m Temperature sensors should be used to monitor the cargo pump temperature to detect overheating due to pump failures.

n Dry chemical should not be used as a fire-fighting medium

o UN number 2672 refers to 10-35% ammonium solution.

p Applies to n-Decyl alcohol only.

q Requirements are based on those isomers having a flashpoint of 60°C or less, some isomers have a flashpoint greater than 60°C, and therefore the requirements based on flammability would not apply to such isomers.

r Provision 5A.2.2 applies to 1-undecyl alcohol only.

s UN number 1114 applies to Benzene.

CHAPTER VII - LIST OF CHEMICALS TO WHICH THE CODE DOES NOT APPLY*

The existing text of chapter VII is replaced by the following:

1 The following are products which are not considered to come within the scope of the Code. This list may be used as a guide in considering bulk carriage of products whose hazards have not yet been evaluated.

2 Although the products listed in this chapter fall outside the scope of the Code, the attention of Administrations is drawn to the fact that some safety precautions may be needed for their safe transportation. Accordingly Administrations should prescribe appropriate safety requirements.

Chapter VII	UN number
Acetone	1090
Alcohols (C_{13} and above)	-
Alkyl (C_9-C_{17}) benzenes	-
Aluminium sulphate solution	
Aminoethyl dietnanolamine/ Aminoethyl ethanolamine, water solution	
n-Amyl alcohol	1105
sec-Amyl alcohol	1105
tert-Amyl alcohol	1105
Amyl alcohol, primary	1105
Butene Oligomer	
sec-Butyl acetate	1123
n-Butyl alcohol	1120
sec-Butyl alcohol	1120
tert-Butyl alcohol	1120

* The product names are not always identical with the names given in the various editions of the Bulk Chemical Code (resolution A.212(VII)) or the International Bulk Chemical Code (resolution MSC.4(48)).

Chapter VII	UN number
Butylene glycol	-
γ-Butyrolactone	-
Butyl stearate	-
Calcium alkyl salicylate	-
Calcium bromide solution	-
Calcium chloride solution	-
Caprolactam (molten or aqueous solutions)	-
Choline chloride solutions	-
Coconut oil fatty acid methyl ester	-
Dextrose solution	-
Diacetone alcohol	1148
Dialkyl (C_7-C_{13}) phthalates	-
Dicyclopentadiene	2048
Diethylene glycol	-
Diethylene glycol butyl ether	-
Diethylene glycol butyl ether acetate	-
Diethylene glycol dibutyl ether	-
Diethylene glycol diethyl ether	-
Diethylene glycol ethyl ether	-
Diethylene glycol ethyl ether acetate	-
Diethylene glycol methyl ether acetate	-
Diethylenetriamine pentaacetic acid pentasodium salt solution	-
Di-(2-ethyl hexyl) adipate	-
Di-(2-ethyl hexyl) phthalate	-
Diheptyl phthalate	-
Dihexyl phthalate	-

Chapter VII	UN number
Diisobutyl ketone	1157
Diisodecyl phthalate	-
Diisononyl adipate	-
Dinonyl phthalate	-
Diisooctyl phthalate	-
Diisopropyl naphthalene	-
2,2-Dimethyloctanoic acid	-
Dioctyl phthalate	-
Dipropylene glycol	-
Dipropylene glycol methyl ether	-
Diundecyl phthalate	-
Dodecane	-
2-Ethoxyethanol	1171
Ethyl acetate	1173
Ethyl acetoacetate	-
Ethyl alcohol	1170
Ethylcyclohexane	-
Ethylene carbonate	-
Ethylenediamine tetraacetic acid tetrasodium salt solution	-
Ethylene glycol	-
Ethylene glycol butyl ether	2369
Ethylene glycol butyl ether acetate	-
Ethylene glycol methyl butyl ether	-
Ethylene glycol methyl ether	1188
Ethylene glycol methyl ether acetate	1189
Ethylene glycol phenyl ether	-

Chapter VII	UN number
Ethylene glycol tert-butyl ether	-
Ethylene glycol phenyl ether/ Diethylene glycol phenyl ether mixture	-
2-Ethylhexanoic acid	-
Formamide	-
Ethylene/Vinyl acetate copolymer (emulsion)	-
Glycerin	-
Glycine, sodium salt, solution	-
Ground nut oil	-
n-Heptane	1206
Hexamethylene diamine adipate, (50% in water)	-
n-Hexane	1208
1-Hexanol	2282
Hexylene glycol	-
N-(Hydroxyethyl) ethylenediamine triacedic acid, trisodium salt, solution	-
Isoamyl alcohol	1105
Isobutyl alcohol	1212
Isobutyl formate	2393
Isododecane	-
Isopentane	1265
Isopentene	2371
Isophorone	-
Isopropyl acetate	1220
Isopropyl alcohol	1219
Lactic acid	-

Chapter VII	UN number
Latex: Styrene butadiene rubber latex Carboxylated styrene-butadiene copolymer	-
Lignin sulphonic acid, salt (low COD)	-
Magnesium chloride solution	-
Magnesium hydroxide slurry	-
3-Methoxy-1-butanol	-
3-Methoxyl butyl acetate	-
Methyl acetate	1231
Methyl alcohol	1230
Methyl tert-butyl ether	2398
Methyl ethyl ketone	1193
Methyl isobutyl ketone	1245
3-Methyl-3-methoxy butanol	-
3-Methyl-3-methoxy butyl acetate	-
Molasses	-
Nonane	1920
Oleic acid	-
Octane	1262
Olefins (C_{13} and above, all isomers)	-
alpha-Olefins (C_{16}-C_{18})	-
n-Paraffins (C_{10}-C_{20})	-
Paraffin wax	-
Petrolatum	-
Petroleum naphtha	1255
Polyaluminium chloride solution	-
Polybutene	-
Polyethylene glycol	-

Chapter VII	UN number
Polyethylene glycol dimethyl ether	-
Polypropylene glycol	-
Polypropylene glycol methyl ether	-
Polysiloxane	-
n-Propyl acetate	1276
n-Propyl alcohol	1274
Propylene glycol	-
Propylene glycol ethyl ether	-
Propylene glycol methyl ether	-
Propylene tetramer	2580
Sodium aluminosilicate slurry	-
Sulpholane	-
Tridecanol	-
Triethylene glycol	-
Triethylene glycol butyl ether	-
Triisopropanolamine	-
Trimethylol propane polyethoxylate	-
Tripropylene glycol	-
Tripropylene glycol monomethyl ether	-
Urea solution	
Urea, ammonium nitrate solution	-
Urea, ammonium phosphate solution	-
Urea resin solution	-
Vegetable oil (those not otherwise listed)	-
Vegetable protein hydrolized solution	-
Wine	-

APPENDIX

MODEL FORM OF CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Existing form of the Certificate is replaced by the following:

CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

(Official seal)

Issued in pursuance of the

IMO CODE FOR THE CONSTRUCTION AND EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK

(resolution MEPC 20(22))1/

under the authority of the Government of

.....

(full official designation of country)

by .....

(full official designation of the competent person or organization recognized by the Administration)

Name of ship	Distinctive number or letters	Port of registry	Gross tonnage	Ship type (Code paragraph 2.2.4)2/

Date on which keel was laid or on which the ship was at a similar stage of construction, or (in the case of a converted ship) date on which conversion to chemical tanker was commenced: .....

Date on which the building contract was placed: .....

The Certificate should be drawn up in the official language of the issuing country. If the language used is neither English nor French, the

THIS IS TO CERTIFY:

1 (i) That the ship has been surveyed in accordance with the provisions of section 1.6 of the Code;

(ii) that the survey showed that the construction and equipment of the ship:

*(a) complied with the relevant provisions of the Code applicable to ships referred to in 1.7.2;

*(b) complied with the provisions of the Code applicable to ships referred to in 1.7.3.

2 That the ship has been provided with a manual in accordance with the standards for procedures and arrangements as called for by Regulation 5, 5A and 8 of Annex II of MARPOL 73/78, and that the arrangements and equipment of the ship prescribed in the manual are in all respects satisfactory and comply with the applicable requirements of the said Standards;

3 That the ship is suitable for the carriage in bulk of the following products provided that all relevant operational provisions of the Code are observed

Products[3/4/]	Conditions of carriage[5/6/] (tank numbers etc.)

* Continued on the annexed signed and dated sheet(s) numbered 1A

* Tank numbers referred to in this list are identified on the annexed signed and dated tank plan numbered 2A

4 That, in accordance with 1.7.3/2.2.5* the provisions of the Code are modified in respect of the ship in the following manner:

5 That the ship must be loaded:

*(a) in accordance with the loading conditions provided in the approved loading manual, stamped and dated
.....
and signed by a responsible officer of the Administration, or of an organization recognized by the Administration;

*(b) in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.**

6 This certificate is valid until .....
subject to surveys in accordance with 1.6 of the Code

Issued at .... 19..
(place of issue of Certificate)

The undersigned declares that he is duly authorized by the said Government to issue this Certificate.

.....
(signature of official issuing the certificate and/or seal of issuing authority)

Notes on completion of Certificate:

1/ The Certificate can be issued only to ships entitled to fly the flags of States which are Parties to MARPOL 73/78.

2/ Ship type: Any entry under this column must relate to all relevant recommendations, e.g. an entry "Type II" should mean Type II in all respects prescribed by the Code. This column would not usually apply in the case of an existing ship and in such a case should be noted "See paragraph 1(ii)(b)."

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* Delete as appropriate.
** Instead of being incorporated in the Certificate, this text may be appended to the Certificate if duly signed and stamped.

3/ Products: Products listed in Chapter VI of the Code, or which have been evaluated by the Administration in accordance with 1.8 of the Code, should be listed. In respect of the latter "new" products, any special requirements provisionally prescribed should be noted.

4/ Products: The list of products the ship is suitable to carry should include the noxious liquid substances of Category D which are not covered by the Code and should be identified as "Chapter VII Category D".

5/ Conditions of carriage: The limitations on the carriage of Category B or Category C substances under 5A.2 of the Code should also be indicated.

6/ Conditions of carriage: If a Certificate is issued to a ship which is modified in accordance with the provision of Regulation 1(12) of Annex II to MARPOL 73/78 the Certificate should indicate in the top of the table of products and conditions of carriage the following statement: "This ship is certificated to carry only pollution hazard chemicals"

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by 1.6 of the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, the ship was found to comply with the relevant provisions of the Code.

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual*/Intermediate* survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

Annual survey: Signed: .....
(signature of duly authorized official)

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

---

* Delete as appropriate

ATTACHMENT 1A TO THE CERTIFICATE OF FITNESS
FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Continued list of products to those specified in Section 3, and their conditions of carriage

Products	Conditions of carriage (tank numbers, etc.)

Date .....
(as for Certificate)

.....
(Signature of official issuing the Certificate and/or seal of issuing authority)

***

ANNEX 7

TEXTS OF THE AGREED UNIFIED INTERPRETATIONS
OF ANNEX II OF MARPOL 73/78

(Unless specified, Regulations referred to are those of Annex II)

1 DEFINITIONS

Reg.1(12) 1.1 Conversion and modification of ships built before 1 July 1986

1.1.1 An oil tanker or a chemical tanker previously not certified to carry safety hazard chemicals but which changes to a service of carrying these cargoes should be considered as having undergone a conversion. Safety hazard cargoes are identified in Chapter 6 of the Bulk Chemical Code or Chapter 17 of the International Bulk Chemical Code.

1.1.2 The last sentence of Regulation 1(12) should apply only to modifications made on oil tankers and chemical tankers and the expression "modification" referred thereto should generally be those changes necessary to comply with Annex II and include the fitting of improved stripping systems and underwater discharge arrangements but do not include major structural changes such as those which might be necessary to comply with ship type requirements.

2 APPLICATION

Reg. 2(5) & 2(6)

2.1 Equivalency for gas carriers

2.1.1 With respect to liquefied gas carriers carrying Annex II substances listed in the Gas Carrier Code, equivalency may be permitted under the terms of Regulation 2(5) on construction and equipment requirements contained in Regulations 5, 5A and 13 when a gas carrier meets all the following conditions:

.1 hold a Certificate of Fitness in accordance with the appropriate Gas Carrier Code for ships carrying liquefied gases in bulk;

.2 hold an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk (NLS Certificate);

.3 be provided with segregated ballast arrangements;

.4 be provided with deep well pumps and arrangements which minimize the amount of cargo residue remaining after discharge, to the extent that the Administration is satisfied on the basis of the design that the stripping requirements of Regulation 5A(2)(b) or 5A(4)(b), without regard to the limiting date, are met and the cargo residue can be vented to the atmosphere through the approved venting arrangements;

.5 be provided with a Procedures and Arrangements Manual approved by the Administration. This Manual should ensure that no operational mixing of cargo residues and water will occur and, after venting, no cargo residues will remain; and

.6 be certified in an NLS Certificate to carry only those Annex II noxious liquid substances listed in the appropriate Gas Carrier Code.

When such equivalency is granted, notification required by Regulation 2(6) need not be made.

3 DISCHARGE OF RESIDUE

3.1 En route

Reg.5

3.1.1 The term "en route" is taken to mean that the ship is underway at sea on a course, or courses, which so far as practicable for navigational purposes, will cause any discharge to be spread over as great an area of the sea as is reasonably practicable.

4 PUMPING, PIPING AND UNLOADING ARRANGEMENT

Reg. 5A(6)(b) iv) & (7)(e)

4.1 Appropriate action in case of exemption

4.1.1 With regard to the term "appropriate action, if any", any Party to the Convention that has an objection to the particulars of an exemption submitted by another Party should communicate this objection to the Organization and to the Party which issued the exemption within one year after the Organization circulates the particulars of the exemption to the Parties.

5 RECEPTION FACILITIES

Reg.7(1)(b) 5.1 Reception facilities in repair ports

5.1.1 This regulation is taken to mean that ship repair ports undertaking repairs to chemical tankers should have facilities adequate for the reception of residues and mixtures containing noxious liquid substances as would remain for disposal from ships carrying them as a result of the application of this Annex.

6 SURVEY AND CERTIFICATION

6.1 Intermediate and annual surveys for ships not required to hold NLS Certificate

Reg.10(1)(c) and (d) 6.1.1 The applicability of Regulation 10(1)(c) and (d) or and corresponding requirements of the IBC and BCH Codes under Regulation 12A, to ships which are not required to hold an International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk by virtue of Regulation 11 should be determined by the Administration.

7 OIL-LIKE SUBSTANCES

Reg.14 7.1 List of Oil-like Substances

Category C Substances

Cyclohexane
p-Cymene
Diethyl benzene
Dipentene
Dodecyl benzene
Ethyl benzene
Heptene (mixed isomers)
1-Hexene
2-Methyl-1-pentene
n-Pentane
Pentenes, all isomers
Phenylxylylethane
Propylene dimer
Tetrahydro naphthalene
Toluene
Xylene

Category D Substances

Alkyl (C9-C17) benzene straight or branched
Butene oligomer
Diisopropyl naphthalene
Dodecane
Ethylcyclohexane
Isopentane
Nonane
Octane
n-Paraffins C10-C20

For each of the above substances, compliance with the oil-like substance criterion 7.2.1.4 given below has to be demonstrated for the particular oil content meter installed.

7.2 Selection criteria

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

.1 the substance's mass density (specific gravity) is less than 1.0 at 20°C;

.2 the substance's solubility in seawater at 20°C is less than 0.1 per cent;

.3 the substance is a hydrocarbon;

.4 the substance can be monitored by an oil content meter required by Regulation 15 of Annex I of MARPOL 73/78;*

.5 in the case of Category C substances, ship type requirement, as specified by the Bulk Chemical or International Bulk Chemical Codes, is type 3; and

.6 the substance is not regulated by the Bulk Chemical or International Bulk Chemical Codes for safety purposes as indicated in Chapters VI and 17 of the Codes.

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* In approving an oil discharge monitoring and control system for the purpose of this Regulation, the Administration should ensure through tests that the system can monitor concentrations of each oil-like substance in conformity with the Recommendation on International Performance Specifications for Oily-Water Separating Equipment and Oil Content Meters adopted by the Organization by resolution A.393(X) or Revised Guidelines and Specifications for Oil Discharge Monitoring and Control Systems for Oil Tankers, resolution A.586(14). If it is necessary to readjust the monitor when changing from oil products to oil-like noxious substances, information on the readjustment should be provided and special operating procedures ensuring that discharges of oil-like noxious substances are measured accurately should be approved by the Administration. When the oil content meter is readjusted an entry should be made in the Oil Record Book.

Reg.14(c) 7.3 Damage stability calculation

7.3.1 A new ship of 150 metres or greater in length under Annex I should be considered to comply with the requirements of Regulation 14(c), if compliance with Regulation 25 of Annex I has been demonstrated.

***

ANNEX 8

REVISED GUIDELINES ON THE PROVISION OF ADEQUATE RECEPTION FACILITIES IN PORTS

PART II

Residues and Mixtures Containing Noxious Liquid Substances

PREAMBLE

Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the protocol of 1978 relating thereto (MARPOL 73/78) and as further amended by the Organization (hereafter referred to as Annex II) inter alia provides for the control of operational discharges of noxious liquid substances carried in bulk by ships. Operational discharges in this context mean the discharges of noxious liquid substances or water contaminated by these substances which are the result of cargo tank and line washing, deballasting of unwashed cargo tanks or cargo pump room bilge slops.

Annex II prohibits the discharge into the sea of noxious liquid substances except when the discharge is made under specified conditions. These conditions vary according to the degree of hazard a noxious liquid substance poses to the marine environment. For this purpose the noxious liquid substances have been divided into four Categories, A, B, C and D.

Regulation 5 of Annex II specifies the conditions under which discharge of residues of Categories A, B, C and D substances may take place. These conditions, which are not reproduced in this document, include such parameters as: the maximum quantity which may be discharged into the sea, speed of ship, distance from nearest land, depth of water, maximum concentration of substance in ship's wake or dilution of substance prior to discharge. In relation to the above conditions

reference is also made to the discharge provisions contained in the Standards for Procedures and Arrangements (Resolution MEPC 18(22)) (hereinafter referred to as "the Standards)".

For certain sea areas, referred to as "Special Areas," more stringent discharge criteria apply.

The Guidelines on the Provision of Adequate Reception Facilities in Ports for Annex II Noxious Liquid Substances have been prepared for the purpose of assisting governments to implement the provisions for reception facilities in Regulation 7 of Annex II. These Guidelines replace the original Guidelines published in 1980 to reflect the amendments to Annex II (Resolution MEPC 16(22)). The amended Annex II, through provisions for vessel construction, equipment and operations, reduced the quantities of residues of noxious liquid substances, thereby preventing marine pollution and at the same time significantly reducing the demand for reception facilities in ports.

The Guidelines may be used to assess the demand for reception facilities to meet the needs of the ships without causing undue delay to these ships. Also included are estimates of the quantities of mixtures of water and noxious liquid substance residues expected to be generated by ships prewashing their cargo tanks in accordance with Annex II and the Standards and which are required to be discharged to a reception facility. These Guidelines, together with a full knowledge of details of the bulk chemical trade in individual ports will allow Administrations to better perform their responsibilities of ensuring the adequacy of reception facilities.

1 INTRODUCTION

1.1 The purpose of the Guidelines is to provide a means to determine the adequacy of reception facilities for compliance with Regulation 7 of Annex II of MARPOL 73/78 to meet the needs of ships without causing undue delay. The Guidelines amplify the Annex II general requirements for reception facilities and provide estimates of the quantities of mixtures of water and noxious liquid substance residues expected to be generated

by ships prewashing cargo tanks in accordance with Annex II including the Standards and which are required to be discharged to a reception facility.

1.2 These Guidelines are based on Regulation 7 and take into account Regulations 5, 5A, and 8 of Annex II and the Standards which require that ships unloading certain chemical cargoes use equipment and procedures to reduce the quantity of noxious liquid substance residues to amounts not requiring the use of reception facilities. This allows for the discharge of these residues at sea witnout harm to the marine environment or, in the case of those noxious liquid substance residues which must be transferred ashore, it minimizes the mandatory requirements for reception facilities. For Category A substances and Category B and C high viscosity or solidifying substances,[1/] a mandatory prewash of the cargo tank and transfer of the residues ashore, generally in the unloading port, is required. By clearly identifying the noxious liquid substances and circumstances which require prewashing and discharge to a reception facility, it is possible for each port or terminal to determine the need for facilities.

1.3 Residues and mixtures to be discharged to reception facilities will primarily result from prewash tank cleaning and to a much lesser extent from cargo pump room bilge slops.

1.4 No port or terminal is required to receive residue/water mixtures containing substances other than those handled by the port or terminal.

1.5 The term "adequacy" can generally be defined as follows:

.1 that as a minimum, the capacity of reception facilities at cargo unloading, loading, and repair ports and terminals should be capable of receiving those residues and mixtures which are handled with in that port and are required by Annex II and the Standards to be discharged to reception facilities, bearing in mind section 2 of these Guidelines;

1/ For the definition of high viscosity or solidifying substances, refer to the Standards.

.2 that the receiving capability be at least appropriate in time and availability to respond to the continuing needs of ships using the port; and

.3 that arrangements, needed to permit discharge of residues and mixtures without causing undue delay to ships, are made between the ship and the reception facility, such as prior notification of substances and quantities expected for discharge, piping or equipment required for discharge, etc.

1.6 To better identify the reception facility needs of ports and terminals, separate sections of these Guidelines provide the requirements for unloading ports, repair ports, and loading ports, since different considerations may apply to each type of port or terminal. In addition a section of the Guidelines addresses the provision of reception facilities which are not required by Annex II, but which a port may wish to provide to improve their service to ships.

1.7 Reception facilities in unloading ports should have the capability to receive the residues from the prewashing of tanks containing Category B and C substances listed in Appendix 1 of these Guidelines. This is necessary since the temperature of the substance during unloading is dependent on the ship's heating equipment or conditions imposed by the shipper or cargo owner. Whether a reception facility will be needed to receive residue/water mixtures of a prewash of tanks containing Category B or C substance listed in Appendix 1 will depend on the temperature of the substance during unloading. The mandatory prewash specified in Regulation 8 of Annex II and the Standards require tanks containing Category B or C solidifying or high viscosity substances to be prewashed after unloading with subsequent discharge of the prewash residues to reception facilities. Whether a noxious liquid substance is solidifying or highly viscous depends upon the relationship between the substances melting point or viscosity and the unloading temperature of the substance. It is assumed that Category B and C substances, listed in Appendix 1 of these Guidelines, cannot always be stripped to the required minimum quantities.

1.8 Certain ports or terminals, situated in regions where the minimum air and sea temperatures will normally be above the temperature at which Category B and C substances listed in Appendix 1 of these Guidelines can be treated as non-solidifying or as low viscosity substances, will not need reception facilities for these substances.

2 RECEPTION FACILITIES FOR NOXIOUS LIQUID SUBSTANCES REQUIRED AS A CONSEQUENCE OF THE APPLICATION OF ANNEX II

2.1 This section provides specific guidance for compliance with the requirements for reception facilities and provides estimates of the average quantities of residues and mixtures generated on chemical tankers. The estimates are based on the provisions contained in the Standards, and take into account the substances carried, areas of vessel operation, and the port or terminal activity.

2.2 Assumptions

2.2.1 In estimating the quantities required to be received by reception facilities the following assumptions are made:

.1 the ship will be operated in a manner which will ensure that residues of substances remaining after cargo unloading are the minimum consistent with the design of the ship and the physical properties of the substance and that the ship complies with cargo unloading procedures of its Procedures and Arrangements Manual;

.2 when determining the capacity of reception facilities, no allowance need be made for providing excess capacity to account for the operational efficiency of ships or unusual situations where, through vessel equipment malfunctions or operational difficulties, unexpected quantities of residues of noxious liquid substances may result;

.3 reception facility capacity determinations do not include the capacity needed for ships which have oeen issued an exemption to the mandatory prewash requirements in Regulations 5A(6) and 5A(7) of Annex II;

.4 Regulation 8 requires that any residue/water mixtures should be discharged in the unloading port, unless in accordance with Regulations 8(2)(b)(ii), 8(5)(b)ii), 8(6)(c)(ii), 8(7)(c)(ii), the residue/water mixtures are discharged in another port;

.5 the unloading terminal will provide arrangements to facilitate stripping in accordance with Regulation 7(3); and

.6 cargo pump room bilge quantities will be negligible when compared to other capacity requirements.

2.3 Unloading Port and Terminal Requirements

2.3.1 Reception Facility Requirements for Ports and Terminals Outside Special Areas

2.3.1.1 Except when one of the exemption provisions of Regulation 8 applies, reception facilities outside special areas should be available[1/] at unloading ports receiving the following substances:

.1 Category A substances;

.2 Category B substances with a viscosity equal to or greater than 25 mPa.s at 20°C;

.3 Category B substances with melting points equal to or greater than 0°C;

1/ for availability of reception facilities see paragraphs 1.5.2 and 1.5.3.

.4 Category C substances with a viscosity equal to or greater than 60 mPa.s at 20°C; and

.5 Category C substances with melting points equal to or greater than 0°C.

Whether a reception facility need be used to receive a residue/water mixture of a prewash of a tank having contained one of the above listed substances may depend on such conditions as unloading temperature or whether one of the exemption provisions of Regulation 8 is complied with.

2.3.2 Reception Facility Requirements for Ports and Terminals Within Special Areas

2.3.2.1 Except when one of the exemption provisions of Regulation 8 applies, reception facilities within special areas should be available at unloading ports receiving the following substances:

.1 Category A substances;

.2 Category B substances;

.3 Category C substances with a viscosity equal to or greater than 25 mPa.s at 20°C;

.4 Category C substances with melting points equal to or greater than 0°C; and

.5 Category C substances carried in tanks not fitted with a stripping system meeting the 0.3 m^3 requirement of Regulation 5(A)(3).

Whether a reception facility need be used to receive a residue/water mixture of a prewash of a tank having contained one of the above listed substances may depend on such conditions as unloading temperature or whether one of the exemption provisions of Regulation 8 is complied with.

2.3.3 With respect to those Category B and C substances outside special areas and Category C substances within special areas with melting points greater than or equal to 0°C, an Administration, bearing in mind the minimum air and water temperatures in a particular port, may select a different melting point temperature than 0°C in determining which substances require the provision of reception facilities. It is recommended that in no case should the temperature selected exceed 20°C.

2.3.4 The requirements for discharging residues of those Category B and C substances outside special areas and Category C substances within special areas listed in Appendix 1 of these Guidelines depends upon the temperature of the cargo at the time of unloading. If the temperature of the cargo is sufficiently above the substances' melting point to not be considered a "solidifying substance" as defined in the Standards, paragraph 1.3.7 or sufficiently above the temperature to not be considered a "high viscosity substance" as defined by the Standards, paragraph 1.3.9 then the substance is treated as a "non-solidifying" or a "low viscosity" substance and a prewash and discharge of residue/water mixtures to a reception facility is not required. For the high melting point substances listed the melting point is required to be indicated on the shipping document by BCH Code*, paragraph 5.2.8 or IBC Code**, paragraph 16.2.9. For the high viscosity substances listed the temperature at which the substance is not considered a "high viscosity substance", is required to be indicated on the shipping document by BCH Code, paragraphs 5.2.5 to 5.2.7 or IBC Code paragraphs 16.2.6 to 16.2.8.

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* Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) adopted by the Organization by resolution MEPC 20(22) on 5 December 1985.

** International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) adopted by the Organization by resolution MEPC 19(22) on 5 December 1985.

2.3.5 Certain substances which are water reactive, e.g. toluene diisocyanate, cannot be removed from a tank by means of water washing; instead a solvent must be used. Therefore, the washing of these substances from a cargo tank may require additional reception facility capacity.

2.3.6 Regulation 7(3) requires unloading terminals to provide arrangements to facilitate efficient stripping. Depending on the types of efficient stripping systems fitted on ships visiting the unloading terminal, compliance with this requirement may necessitate the capability to reduce the backpressure in the shoreline where it connects to the ship's manifold to 1 bar. This is due to requirements of the Standards for ships to be able to effect efficient stripping, as a minimum, at a pressure of 1 bar.

2.3.7 Unloading ports and terminals are reminded that according to Regulation 7(3) hoses and pipeline systems shall not be drained back to the ship.

2.4 Methodology for Estimating the Volume of Residues/Water Mixtures Generated by Prewash Tank Cleaning

2.4.1 Methodology Parameters

2.4.1.1 Estimated volumes of residue/water mixtures required to be discharged to reception facilities should be based on the following parameters:

.1 category of substance (A, B, C and D);

.2 physical properties of the substance (melting point, viscosity, etc.);

.3 ship operating route;

.4 requirements for Special Areas; and

.5 the types of ports and terminals referred to in Regulation 7.

2.4.2 Capacity Assessment Parameters

2.4.2.1 The methodology for estimating the capacity of reception facilities in a particular port or terminal should be based on the quantities of residue/water mixtures which must be discharged to meet the provisions of the Annex II of the Convention. The capacity assessment parameters include the numbers of chemical tankers, and the substances anticipated to be handled by that port or terminal. The following parameters should be considered in determining the total quantity of residues and mixtures to be received by a reception facility at a particular port or terminal:

.1 the number, categories, and types of substances handled by the port in a given period of time;

.2 the number of ships' tanks in which these substances are carried; and

.3 the quantity of tank washings which must be discharged to a reception facility.

2.5 Estimates of the Volume of Residue/Water Mixtures Generated by Prewash Tank Cleaning Requirements Outside Special Areas

2.5.1 The following sub-paragraphs provide estimates of the volume of residue/water mixtures generated by a prewash of a tank in accordance with Annex II and the Standards. The estimated volumes have been calculated from the requirements in the Standards as to the amount of residue/water mixtures generated during tank washing, plus an additional amount of water to flush pipelines, pumps, filters and piping. These figures represent average conditions and therefore present only estimates. Deviations will exist particularily when special washing procedures are required (e.g., substances which cannot be washed with water). The substances and their assigned categories are given in Appendix II to Annex II. For the definition of solidifying substances, refer to the Standards. The lower estimated volume of residue/water mixtures applies to tanks of 500 m^3 and the higher estimated volume

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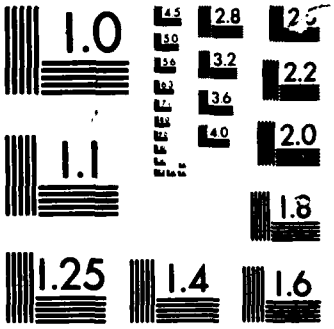

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applies to tanks of 3,000 m^3 or more. For tank sizes between the range limits, a proportional volume of residue/water mixture may be expected. For tank sizes significantly less than 500 m^3, a smaller volume of residue/water mixtures may be expected.

2.5.1.1 Category A Substances where the final effluent concentration must be equal to or less than 0.10% by weight.

Estimated Volume of residue/water mixtures per tank:

Non-solidifying substances:	10 m^3 to 25 m^3
Solidifying substances:	20 m^3 to 50 m^3

2.5.1.2 Category A Substances where the final effluent concentration must be equal to or less than 0.01% by weight.

Estimated Volume of residue/water mixtures per tank:

Non-solidifying substances:	20 m^3 to 50 m^3
Solidifying substances:	30 m^3 to 75 m^3

2.5.1.3 Category B substances with a viscosity equal to or greater than 25 mPa.s at 20°C.

Estimated Volume of residue/water mixtures per tank: 5 m^3 to 10 m^3

2.5.1.4 Category B substances with a melting point equal to or greater than 0°C

Estimated Volume of residue/water mixtures per tank: 10 m^3 to 20 m^3

2.5.1.5 Category C substances with a viscosity equal to or greater than 60 mPa.s at 20°C.

Estimated Volume of residue/water mixtures per tank: 5 m^3 to 10 m^3

2.5.1.6 Category C substances with a melting point equal to or greater than 0°C.

Estimated Volume of residue/water mixtures per tank: 10 m^3 to 20 m^3

2.6 Estimates of the Volume of Residue/Water Mixtures Generated by Prewash Tank Cleaning Requirements Within Special Areas

2.6.1 The following sub-paragraphs provide estimates of the volume of residue/water mixtures generated by a prewash of a tank in accordance with Annex II and the Standards. The estimated volumes have been calculated from the requirements in the Standards as to the amount of residue/water mixtures generated during tank washing, plus an additional amount of water to flush pipelines, pumps, filters and piping. These figures represent average conditions and therefore present only estimates. Deviations will exist particularly when special washing procedures are required (e.g., substances which cannot be washed with water). The substances and their assigned categories are given in Appendix II to Annex II. For the definition of solidifying substances, refer to the Standards. The lower estimated volume of redisue/water mixtures applies to tanks of 500 m^3 and the higher estimated volume applies to tanks of 3,000 m^3 or more. For tank sizes between the range limits, a proportional volume of residue/water mixtures may be expected. For tank sizes significantly smaller than 500 m^3 a smaller volume of residue/water mixtures may be expected.

2.6.1.1 Category A Substances where the final effluent concentration must be equal to or less than 0.05% by weight.

Estimated Volume of residue/water mixtures per tank:

Non-solidifying substances:	10 m^3 to 25 m^3
Solidifying substances:	20 m^3 to 50 m^3

2.6.1.2 Category A Substances where the final effluent concentration must be equal to or less than 0.005% by weight.

Estimated Volume of residue/water mixtures per tank:

Non-solidifying substances:	20 m^3 to 50 m^3
Solidifying substances:	30 m^3 to 75 m^3

2.6.1.3 Category B substances.

Estimated Volume of residue/water mixtures per tank:

Non-solidifying substances:	5 m^3 to 10 m^3
Solidifying substances:	10 m^3 to 20 m^3

2.6.1.4 Category C substances with a viscosity equal to or greater than 25 mPa.s at 20°C.

Estimated Volume of residue/water mixtures per tank: 5 m^3 to 10 m^3

2.6.1.5 Category C substances with a melting point equal to or greater than 0°C.

Estimated Volume of residue/water mixtures per tank: 10 m^3 to 20 m^3

2.6.7 Category C substances when the tank of an existing ship is not fitted with a pumping system meeting the 0.3 m^3 requirement in Regulation 5A(3).

Estimated Volume of residue/water mixtures per tank: 5 m^3 to 10 m^3

2.7 Ship Repair Ports Requirements

2.7.1 Ship repair ports undertaking repairs to chemical tankers need as a consequence of the application of Annex II to provide adequate reception facilities for residues of noxious liquid substances.

2.7.2 The substances involved could include Category A, B, C and D substances. The standard of cleanliness would depend on the previous cargo and on the need for tank entry and work to be done.

2.7.3 Owing to the various parameters involved it is not possible to give general guidance on the quantities involved. Chemical tankers may have had the opportunity to effect tank cleaning before calling at a repair port.

2.8 Loading Port and Terminal Requirements

2.8.1 For ports where chemical tankers load, there would, as a consequence of the operational requirements of Regulation 8, ordinarily be no demand to provide for reception facilities. For normal circumstances, a chemical tanker will either conduct a mandatory prewash and discharge the residue/water mixtures to reception facilities in the unloading port, or, as allowed, discharge other residue/water mixtures into the sea.

2.8.1.1 An exception would be where it has been confirmed in writing that the loading port will and can receive residue/water mixtures containing noxious liquid substances from certain ships in accordance with Regulation 8(2)(ii), 8(5)(b)(ii), 8(6)(c)(ii) and 8(7)(c)(ii).

2.8.1.2 Residues expected in such port may be of those substances listed in Appendix 1 of these Guidelines. Volumes of residue/water mixtures may be expected to be in excess of that of residue/water mixtures generated by prewash since the ships may wish to clean at least some of their cargo tanks to commercial standards.

2.8.2 Owing to the varying parameters involved it is not possible to give general guidance on the quantities or substances involved. Since the procedure depends on the loading port's agreement such ships may be considered on an ad hoc basis.

3 OPTIONAL RECEPTION FACILITIES FOR NOXIOUS LIQUID SUBSTANCES

3.1 Loading, unloading, and repair ports may wish to provide reception facilities for residues of noxious liquid substances over and above those which are required as a consequence of the application of Annex II. The reasons for a port doing so may be several, as for example, the extension of an efficient service to ships.

3.2 Ships needing such extra facilities could include:

.1 chemical tankers which would have to load a full, or nearly full cargo after unloading in that port. The ship would in most cases be required to clean its tanks to commercial requirements. Residues being discharged would not only consist of substances listed in Appendix 1 of these Guidelines, but could include all noxious liquid substances, irrespective of category and physical properties;

.2 chemical tankers arriving at a repair port, subsequent to visiting an unloading port, which have had no opportunity to clean their tanks and dispose of their residues at sea. Since it may be expected that on such ships cargo tanks having contained solidifying

or high viscosity substances will have been prewashed in the unloading ports, the residue/water mixtures remaining for disposal are the so-called subsequent tank washings from all cargo tanks, which may include noxious liquid substances of Category A, B, C and D;

.3 chemical tankers arriving at a port after a coastal passage preventing them from discharging their residue/water mixtures at sea. Similar residues as set out for the repair ports above;

.4 chemical tankers which due to equipment malfunction, structural damage or other difficulties may need additional reception facility capacity due to being unable to unload and efficiently strip cargo in accordance with Annex II and the Standards or due to incidents which create waste such as through cargo or ballast contamination.

3.3 Owing to the different parameters involved, it is not possible to give general guidance on the quantities or substances involved. However, most ports which contemplate the provisions of reception facilities to cater for such ships will probably be able to draw upon their own expertise.

3.4 It must be noted that although no guidance is given on the quantities of residue/water mixtures involved, it may be anticipated that these would be in excess of those referred to under section 2 above. Not only the prewash water would have to come ashore, but also all subsequent washings necessary for commercial (back loading) and safety (repair ports) considerations. A backloading port may only expect residues of substances normally handled within the port. This is not the case, however, for a repair port a solution may be the temporary storage of all residue/water mixtures ashore. After effecting the necessary repairs the ship could reload these mixtures for disposal under the general provisions at sea.

4 TECHNOLOGY OF THE RECEPTION/DISPOSAL PROCESS

4.1 Governments, in assessing the adequacy of reception facilities, should also consider the technological problems associated with the reception and/or treatment of the residue/water mixtures received from ships and their ultimate

disposal from the reception facility taking into account also residue/water mixtures which are incompatible with each other. Although the establishment of standards for effluent from the shore or for the means of disposal is not within the scope of the Convention, nevertheless Administrations should take responsible action within their national programmes to consider such effluent standards and means of disposal along with other shore-generated residues.

4.2 It may be noted that in unloading ports and terminals the residue/water mixtures may be discharged separately rather than as a mixture of different residue/water mixtures, thus easing the burden of ultimate disposal.

4.3 The time taken for the ultimate disposal of the residue/water mixtures from a reception facility is significant in determining its adequacy.

5 CONCLUSION

5.1 As the implementation of Annex II of the Convention cannot be accomplished without the provision of adequate reception facilities, governments are urged to implement and enforce the provisions for reception facilities at ports and terminals in their respective countries at the earliest possible date.

5.2 In drafting these Guidelines great care has been taken to cover all aspects of the disposal of noxious liquid substances to reception facilities, especially where this is required under Regulations 5 and 8 of Annex II. It is emphasized, however, that these are only Guidelines. The whole concept is new and needs close monitoring to assess its effectiveness. Governments which find that as a result of the application of these Guidelines their reception facilities are inadequate are urged to adjust upwards the estimated volumes of residue/water mixtures for which facilities should be provided and to forward this information to the Organization in order that consideration may be given to the eventual revision of these Guidelines.

APPENDIX

MARPOL 73/78 ANNEX II CATEGORY A SUBSTANCES AND SOLIDIFYING AND HIGH VISCOSITY CATEGORY B AND C SUBSTANCES CARRIED IN BULK
(as at 6 December 1985)

CATEGORY A SUBSTANCES*

Substance	UN Number
Acetone cyanohydrin	1541
Butyl benzyl phthalate	
Calcium naphthenate in mineral oil	
Carbolic oil	
Carbon disulphide	1131
o-Chlorotoluene	2238
Chlorotoluenes (mixed isomers)	2238
Creosote (wood)	
Cresols, mixed isomers	2076
Decyl acrylate	
Dibutyl phthalate	
2,4-Dichlorophenol	2021
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution	
2,4-Dichlorophenoxyacetic acid, dimethylamine salt (70% or less) solution	
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution	
Diisopropylbenzene (all isomers)	
Diphenyl ether	
Diphenyl oxide/Biphenyl phenyl ether mixture	
Dodecylphenol	
alpha-Methylstyrene	2303
Motor fuel anti-knock compounds	1649
Naphthalene (molten)	2304
Nonylphenol	

* Which are listed in chapter VI of the BCH Code and chapter 17 of the IBC Code.

Substance	UN Number
Phosphorus, yellow or white	2447
Pinene	2368
Rosin	
Tall oil, crude and distilled	
Triethylbenzene	
Tricresyl phosphate (containing less than 1% ortho-isomer)	
Tricresyl phosphate (containing 1% or more ortho-isomer)	
Trixylyl phosphate	
Vinyl toluene	2618

Note: The viscosity or melting point data are provided as a guide. The viscosity and melting point of a particular cargo containing one of the following substances may be different from that given. For viscosity or melting point data for a particular cargo, the shipping document should be referred to (see paragraph 2.3.4 of these Guidelines).

CATEGORY B SUBSTANCES

Substance	UN Number	High viscosity/ Solidification	Melting point and/or Viscosity at 20°C or as specified
p-Chlorotoluene	2238	Solidifying	7.5°C
n-Decyl alcohol		Solidifying	7°C
Diglycidyl ether of Bisphenol A		Solidifying*	
Diisobutyl phthalate		High viscosity	40 mPa.s
Dinitrotoluene (molten)		Solidifying	55°C
Diphenylmethane diisocyanate	2489	Solidifying	37°C
Dodecyl alcohol		Solidifying	24°C
Dodecyl diphenyloxide disulphonate solution		Solidifying	25°C
Ethylene dibromide	1605	Solidifying	10°C
2-Ethyl-3-propylacrolein		Solidifying	3.2°C
Fatty alcohols C_{12}-C_{20}		Solidifying	-20°C to +60°C
Fumaric adduct of rosin		High viscosity	20-30 mPa.s
Mercaptobenzothiazol, sodium salt solution		Solidifying	0°C
4-Methylpyridine		Solidifying	4°C
Nitrobenzene	1662	Solidifying	5.4°C
o-Chloronitro benzene	1578	High viscosity & Solidifying	32°C
o-Nitrophenol (molten)	1663	High viscosity & Solidifying	1.35 mPa.s (80°C) 44°C

* Concentrated cargo may crystallize or precipitate above 0°C

Substance	UN Number	High viscosity/ Solidification	Melting point and/or Viscosity at 20°C or as specified
Olefins, straight chain		High viscosity & Solidifying	
alpha-Olefins (C_6-C_{18}) mixtures		High viscosity & Solidifying	
Phenol	2312	Solidifying	40.9°C
Sodium hydrosulphide solution (45% or less)		Solidifying	40°C*
1,2,4 Trichlorobenzene	2321	Solidifying	18°C
Undecyl alcohol		Solidifying	about 20°C
Xylenol	2261	Solidifying	-10°C to 70°C
Tall oil soap (disproportionated) solution		High viscosity & solidifying	50-55 mPa.s at 0°C

* Concentrated solution may crystallize or precipitate above 0°C.

CATEGORY C SUBSTANCES

Substance	UN Number	High viscosity/ Solidification	Melting point and/or Viscosity at 20°C or as specified
Acetic acid	2789	Solidifying	16.6°C
Benzene	1114	Solidifying	5.5°C
Chloroacetic acid	1750	Solidifying	15°C
2- or 3- Chloropropionic acid	2511 *	Solidifying	about 40°C
Cyclohexane	1145	Solidifying	6.6°C
Cyclohexanol		Solidifying	25.2°C
Diisopropanolamine		High viscosity & Solidifying	197.8 mPa.s (45°C) 44°C
Ethylenediamine	1604	Solidifying	11°C
Hexamethylene diamine solution	1783	Solidifying	41°C
Isopropanolamine		High viscosity & Solidifying	above 50 mPa.s 1.7°C
p-Nitrotoluene	1664	Solidifying	51.7°C
Oleum	1831	High viscosity	approx. 100 mPa.s
Paraldehyde	1264	Solidifying	12.6°C
Pentene (all isomers)		Solidifying	152°C to 165°C
Phthalic anhydride	2214	Solidifying	131.6°C
Polyethylene polyamines		Solidifying	0°C
Potassium hydroxide solution	1814	Solidifying	-33°C to 29°C**
Propanolamine	1277	Solidifying	12°C
Sodium boronydride (15% or less)/Sodium hydroxide soln.		High viscosity	about 80 mPa.s

* UN number 2511 applies to 2- Chloropropionic acid only.

** Concentrated solution may crystallize or precipitate above 0°C

Substance	UN Number	High viscosity/ Solidification	Melting point and/or Viscosity at 20°C or as specified
Sulphuric acid	1830	High viscosity & Solidifying	15 to 30 mPa.s -15°C to 10°C
Sulphuric acid, spent	1832	Solidifying	about 0°C
Toluene diamine	1709	Solidifying	88°C to 96°C
Toluene diisocyanate	2078	Solidifying	6°C to 14°C
Xylenes	1307	Solidifying	-48°C to 13°C

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