Contents

Preamble

1 The purpose of this Code is to provide an international standard for the safe carriage by sea in bulk of dangerous and noxious liquid chemicals listed in chapter 17 of the Code by prescribing the design and construction standards of ships, regardless of tonnage, involved in such carriage and the equipment they should carry so as to minimize the risk to the ship, to its crew and to the environment, having regard to the nature of the products involved.

2 The basic philosophy is to assign to each chemical tanker one of the ship types according to the degree of the hazards of the products carried by such ship. Each of the products may have one or more hazard properties, which include flammability, toxicity, corrosivity and reactivity, as well as the hazard they may present to the environment if accidentally released.

3 Throughout the development of the Code it was recognized that it must be based upon sound naval architectural and engineering principles and the best understanding available as to the hazards of the various products covered ; furthermore that chemical tanker design technology is not only a complex technology but is rapidly evolving and that the Code should not remain static. Therefore the Organization will periodically review the Code, taking into account both experience and technical development.

4 Amendments to the Code involving requirements for new products and their conditions of carriage will be circulated as recommendations, on an interim basis, when adopted by the Maritime Safety Committee (MSC) and the Marine Environment Protection Committee (MEPC) of the Organization, in accordance with the provisions of article VIII of the International Convention for the Safety of Life at Sea, 1974 (SOLAS 74), and article 16 of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol relating thereto (MARPOL 73/78), respectively, pending the entry into force of these amendments.

5 The Code primarily deals with ship design and equipment. In order to ensure the safe transport of the products, the total system must, however, be appraised. Other important facets of the safe transport of the products, such as training, operation, traffic control and handling in port, are being or will be examined further by the Organization.

6 The development of the Code has been greatly assisted by relevant work of the International Association of Classification Societies (IACS) and of the International Electrotechnical Commission (IEC).

7 chapter 16 of the Code, dealing with operational requirements of chemical tankers, highlights the regulations in other chapters that are operational in nature and mentions those other important safety features that are peculiar to chemical tanker operation.

8 The layout of the Code is in line with the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), adopted by the Maritime Safety Committee

at its forty-eight session. Gas carriers may also carry in bulk liquid chemicals covered by this Code, as prescribed in the IGC Code.

9 The 1998 edition of the Code is based on the original text as adopted by MSC resolution MSC.4(48). In response to resolution 15 of the International Conference on Marine Pollution, 1973, the MEPC, at its twenty-second session, adopted, by resolution MEPC.19(22), the IBC Code extended to cover marine pollution prevention aspects for the implementation of Annex II to MARPOL 73/78.

10 Subsequent to this, the 1998 edition of the Code includes amendments adopted by the following resolutions :*

	Resolution	Adoption	Deemed acceptance	Entry into force
1	MSC.10(54)	29 April 1987	29 April 1988	30 October 1988
2	MSC.14(57) MEPC.32(27)	11 April 1989 17 March 1989	12 April 1990 12 April 1990	13 October 1990 13 October 1990
3	MSC.28(61) MEPC.55(33)	11 December 1992 30 October 1992	1 January 1994 1 January 1994	1 July 1994 1 July 1994
4	MSC.50(66) MEPC.69(38)	4 June 1996 10 July 1996	1 January 1998 1 January 1998	1 July 1998 1 July 1998
5	MSC.58(67) MEPC.73(39)	5 December 1996 10 March 1997	1 January 1998 10 January 1998	1 July 1998 10 July 1998*
* Note : Parties invited to implement on 1 July 1998				

11 As from the date of entry into force of the 1983 amendments to SOLAS 74 (i.e. 1 July 1986) and the date of implementation of Annex II of MARPOL 73/78, this Code became subject to mandatory requirements under these Conventions. Amendments to the Code, whether from the point of view of safety or of marine pollution, must therefore 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.

* (Note of the Society): In respect of the IMO 1998 Edition this text of the IBC Code includes the amendments adopted with Resolutions MSC.16(58) on 24 May 1990 and MEPC.40(29) on 16 March 1990 which entered into force on 3 February 2000 (application of Harmonized System of Survey and Certification to the IBC Code) and the amendments adopted by Resolution MSC.102(73) on 5 December 2000 (and Resolution MEPC.79(43) on 1 July 1999 and MEPC.90(45) on 5 October 2000), which entered into force on 1 July 2002.
The Appendix “Model Form of International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk” has not been reproduced.

Chapter 1
General

1.1 Application

1.1.1 The Code applies to ships regardless of size, including those of less than 500 tons gross tonnage, engaged in the carriage of bulk cargoes of dangerous or noxious liquid chemical substances, other than petroleum or similar flammable products as follows :

.1 products having significant fire hazards in excess of those of petroleum products and similar flammable products ;

.2 products having significant hazards in addition to or other than flammability.

Products that have been reviewed and determined not to present safety and pollution hazards to such an extent as to warrant the application of the Code are found in chapter 18.

1.1.2 Liquids covered by the Code are those having a vapour pressure not exceeding 2.8 bar absolute at a temperature of 37.8° C.

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 d.

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 c.

1.1.3 For a product proposed for carriage in bulk, but not listed in chapter 17 or 18, the Administration and port Administrations involved in such carriage should prescribe the preliminary suitable conditions for the carriage, having regard to the criteria for hazard evaluation of bulk chemicals. The Organization should be notified of the conditions for consideration for inclusion of the product in the Code. For the evaluation of the pollution hazard of such a product and assignment of its pollution category, the procedure specified in regulation 3(4) of Annex II of MARPOL 73/78 must be followed.

1.1.4 Unless expressly provided otherwise, the Code applies to ships the keels of which are laid or which are at a stage at which :

.1 construction identifiable with the ship begins ; and

.2 assembly has commenced comprising at least 50 tonnes or 1% of the estimated mass of all structural material, whichever is less ;

on or after 1 July 1986.

1.1.5 A ship, irrespective of the date of construction, which is converted to a chemical tanker on or after 1 July 1986 should be treated as a chemical tanker constructed on the date on which such conversion commences. This conversion provision does not apply to the modification of a ship referred to in regulation 1(12) of Annex II of MARPOL 73/78.

1.1.6 Where reference is made in the Code to a paragraph, all the provisions of the subparagraphs of that designation should apply.

1.2 Hazards

Hazards of products covered by the Code include :

1.2.1 *Fire hazard*, defined by flashpoint, boiling point, flammability limits and autoignition temperature of the chemical.

1.2.2 *Health hazard*, defined by :

.1 irritant or toxic effect on the skin or on the mucous membranes of the eyes, nose, throat and lungs in the gas or vapour state combined with vapour pressure ; or

.2 irritational effects on the skin in the liquid state ; or

.3 toxic effect, taking into account values of
LD_{50} (oral) : a dose which is lethal to 50% of the test subjects when administered orally ;
LD_{50} (skin) : a dose which is lethal to 50% of the test subjects when administered to the skin ;
LC_{50} : the concentration which is lethal by inhalation to 50% of the test subjects.

1.2.3 *Water pollution hazard*, defined by human toxicity, water solubility, volatility, odour or taste, and relative density.

1.2.4 *Air pollution hazard*, defined by :

.1 emergency exposure limit (E.E.L.) or LC_{50} ;

.2 vapour pressure ;

.3 solubility in water ;

.4 relative density of liquid ;

.5 vapour density.

1.2.5 *Reactivity hazard*, defined by reactivity with :

.1 other products ; or

.2 water ; or

.3 the product itself (including polymerization).

1.2.6 *Marine pollution hazard*, as defined by :

.1 bioaccumulation with attendant risk to aquatic life or human health or causing tainting to seafood ;

.2 damage to living resources ;

.3 hazard to human health ; and

.4 reduction of amenities.

1.3 Definitions

The following definitions apply unless expressly provided otherwise. (Additional definitions are given in individual chapters.)

1.3.1 *Accommodation spaces* are those spaces used for public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, barber shops, pantries containing no cooking appliances and similar spaces. *Public spaces* are those portions of the accommodation spaces which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

1.3.2.1 *Administration* means the Government of the State whose flag the ship is entitled to fly.

1.3.2.2 *Port administration* means the appropriate authority of the country in the port of which the ship is loading or unloading.

1.3.2.3 *Anniversary date* means the day and the month of each year which will correspond to the date of expiry of the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

1.3.3 *Boiling point* is the temperature at which a product exhibits a vapour pressure equal to the atmospheric pressure.

1.3.4 *Breadth (B)* means the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material. The breadth (B) should be measured in metres.

1.3.5 *Cargo area* is that part of the ship that contains cargo tanks, slop tanks, cargo pump-rooms including pump-rooms, cofferdams, ballast or void spaces adjacent to cargo tanks or slop tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces. Where independent tanks are installed in hold spaces, cofferdams, ballast or void spaces at the after end of the aftermost hold space or at the forward end of the forwardmost hold space are excluded from the cargo area.

1.3.6 *Cargo pump-room* is a space containing pumps and their accessories for the handling of the products covered by the Code.

1.3.7 *Cargo service spaces* are spaces within the cargo area used for workshops, lockers and store-rooms of more than 2 m^2 in area, used for cargo-handling equipment.

1.3.8 *Cargo tank* is the envelope designed to contain the cargo.

1.3.9 *Chemical tanker* is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in chapter 17.

1.3.10 *Cofferdam* is the isolating space between two adjacent steel bulkheads or decks. This space may be a void space or a ballast space.

1.3.11 *Control stations* are those spaces in which ship's radio or main navigating equipment or the emergency source of power is located or where the fire-recording or fire-control equipment is centralized. This does not include special fire-control equipment which can be most practically located in the cargo area.

1.3.12 *Flammability limits* are the conditions defining the state of fuel-oxidant mixture at which application of an adequately strong external ignition source is only just capable of producing flammability in a given test apparatus.

1.3.13 *Flashpoint* is the temperature in degrees Celsius at which a product will give off enough flammable vapour to be ignited. Values given in the Code are those of “closed-cup test” determined by an approved flashpoint apparatus.

1.3.14 *Hold space* is the space enclosed by the ship's structure in which an independent cargo tank is situated.

1.3.15 *Independent* means that a piping or venting system, for example, is in no way connected to another system and that there are no provisions available for the potential connection to other systems.

1.3.16 *Length (L)* means 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel, or the length from the foreside of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with a rake of keel, the waterline on which

this length is measured should be parallel to the designed waterline. The length (*L*) should be measured in metres.

1.3.17 *Machinery spaces of category A* are those spaces and trunks to such spaces which contain :

.1 internal-combustion machinery used for main propulsion ; or

.2 internal-combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW ; or

.3 any oil-fired boiler or oil fuel unit.

1.3.18 *Machinery spaces* are all machinery spaces of category A and all other spaces containing propelling machinery, boilers, oil fuel units, steam and internal-combustion engines, generators and major electrical machinery, oil filling station, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces.

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.

1.3.19 *Oil fuel unit* is the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler, or equipment used for the preparation for delivery of heated oil to an internal-combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure of more than 1.8 bar gauge.

1.3.20 *Organization* is the International Maritime Organization (IMO).

1.3.21 *Permeability* of a space means the ratio of the volume within that space which is assumed to be occupied by water to the total volume of that space.

1.3.22 *Pump-room* is a space, located in the cargo area, containing pumps and their accessories for the handling of ballast and oil fuel.

1.3.22A *Recognized standards* are applicable international or national standards acceptable to the Administration or standards laid down and maintained by an organization which complies with the standards adopted by the Organization* and which is recognized by the Administration.

* Refer to the Minimum standards for recognized organizations acting on behalf of the Administration, set out in appendix 1 to the Guidelines for the authorization of organizations acting on behalf of the Administration adopted by the Organization by resolution A.739(18).

1.3.23 *Relative density* of liquid is the ratio of the mass of a volume of a product to the mass of an equal volume of fresh water. For a product of limited solubility, the relative density indicates whether it floats on water or sinks.

1.3.24 *Separate* means that a cargo piping system or cargo vent system, for example, is not connected to another cargo piping or cargo vent system. This separation may be achieved by the use of design or operational methods. Operational methods should not be used within a cargo tank and should consist of one of the following types :

.1 removing spool-pieces or valves and blanking the pipe ends ;

.2 arrangement of two spectacle flanges in series, with provisions for detecting leakage into the pipe between the two spectacle flanges.

1.3.25 *Service spaces* are those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, store-rooms, workshops other than those forming part of the machinery spaces and similar spaces and trunks to such spaces.

1.3.26 1974 SOLAS Convention means the International Convention for the Safety of Life at Sea, 1974.

1.3.27 1983 SOLAS amendments means the amendments to the 1974 SOLAS Convention adopted by the Maritime Safety Committee of the Organization at its forty-eighth session on 17 June 1983 by resolution MSC.6(48).

1.3.27A *Standards for Procedures and Arrangements* means the Standards for 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.

1.3.28 *Vapour density* or the *relative density of vapour* is the ratio of the mass of a volume of vapour or gas (with no air present) to the mass of an equal volume of air at the same pressure and temperature. Vapour density below or above 1 indicates whether the vapour or gas is lighter or heavier than air.

1.3.29 *Vapour pressure* is the equilibrium pressure of the saturated vapour above a liquid expressed in bars absolute at a specified temperature.

1.3.30 *Void space* is an enclosed space in the cargo area external to a cargo tank, other than a hold space, ballast space, oil fuel tank, cargo pump-room, pump-room, or any space in normal use by personnel.

1.4 Equivalents

1.4.1 Where the Code requires that a particular fitting, material, appliance, apparatus, item of equipment or type thereof should be fitted or carried in a ship, or that any particular provision should be made, or any procedure or arrangement should be complied with, the Administration may allow any other fitting, material, appliance, apparatus, item of equipment or type thereof to be fitted or carried, or any other provision, procedure or arrangement to be made in that ship, if it is satisfied by trial thereof or otherwise that such fitting, material, appliance, apparatus, item of equipment or type thereof or that any particular provision, procedure or arrangement is at least as effective as that required by the Code. However, the Administration may not allow operational methods or procedures to be made an alternative to a particular fitting, material, appliance, apparatus, item of equipment, or type thereof, which are prescribed by the Code, unless such substitution is specifically allowed by the Code.

1.4.2 When the Administration so allows any fitting, material, appliance, apparatus, item of equipment, or type thereof, or provision, procedure, or arrangement, or novel design or application to be substituted thereafter, it should communicate to the Organization the particulars thereof, together with a report on the evidence submitted, so that the Organization may circulate the same to other Contracting Governments to the 1974 SOLAS Convention and Parties to MARPOL 73/78 for the information of their officers.

1.5 Survey and Certification

1.5.1 *Survey procedure*

1.5.1.1 The survey of ships, so far as regards the enforcement of the provisions of the regulations and granting of exemptions therefrom, should 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.

1.5.1.2 The Administration nominating surveyors or recognizing organizations to conduct surveys should, as a minimum, empower any nominated surveyor or recognized organization to:

.1 require repairs to a ship ; and

.2 carry out surveys if requested by the appropriate authorities of a port State.

The Administration should notify the Organization of the specific responsibilities and conditions of the authority delegated to nominated surveyors or recognized organizations for circulation to the Contracting Governments.

1.5.1.3 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 International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, or is such that the ship is not fit to proceed to sea without danger to the ship, or persons on board, or without presenting unreasonable

threat of harm to the marine environment, such surveyor or organization should immediately ensure that corrective action is taken and should in due course notify the Administration. If such corrective action is not taken the Certificate should be withdrawn and the Administration should be notified immediately; and, if the ship is in a port of another Contracting Government, the appropriate authorities of the port State should also be notified immediately. When an officer of the Administration, a nominated surveyor or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned should give such officer, surveyor or organization any necessary assistance to carry out their obligations under this paragraph. When applicable, the Government of the port State concerned should take such steps as will ensure that the ship does 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 danger to the ship or persons on board or without presenting an unreasonable threat of harm to the marine environment.

1.5.1.4 In every case, the Administration should guarantee the completeness and efficiency of the survey, and should undertake to ensure the necessary arrangements to satisfy this obligation.

1.5.2 *Survey requirements*

1.5.2.1 The structure, equipment, fittings, arrangements and material (other than items in respect of which a Cargo Ship Safety Construction Certificate, Cargo Ship Safety Equipment Certificate and Cargo Ship Safety Radio Certificate or Cargo Ship Safety Certificate are issued) of a chemical tanker should be subjected to the following surveys:

.1 An initial survey before the ship is put in service or before the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk is issued for the first time, which should include a complete examination of its structure, equipment, fittings, arrangements and material in so far as the ship is covered by the Code. This survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code.

.2 A renewal survey at intervals specified by the Administration, but not exceeding 5 years, except where 1.5.6.2.2, 1.5.6.5, 1.5.6.6 or 1.5.6.7 is applicable. The renewal survey should be such as to ensure that the structure, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code.

.3 An intermediate survey within 3 months before or after the second anniversary date or within 3 months before or after the third anniversary date of the Certificate, which should take the place of one of the annual surveys specified in 1.5.2.1.4. The intermediate survey should be such as to ensure that the safety equipment, and other equipment, and associated pump and piping systems fully comply with the applicable provisions of the Code and are in good working order. Such intermediate surveys should be endorsed on the Certificate issued under 1.5.4 or 1.5.5.

.4 An annual survey within 3 months before or after each anniversary date of the Certificate, including a general inspection of the structure, equipment, fittings, arrangements and material referred to in 1.5.2.1.1 to ensure that they have been maintained in accordance

with 1.5.3 and that they remain satisfactory for the service for which the ship is intended. Such annual surveys should be endorsed on the Certificate issued under 1.5.4 or 1.5.5.

.5 An additional survey, either general or partial according to the circumstances, should be made when required after an investigation prescribed in 1.5.3.3, or whenever any important repairs or renewals are made. Such a survey should ensure that the necessary repairs or renewals have been effectively made, that the material and workmanship of such repairs or renewals are satisfactory; and that the ship is fit to proceed to sea without danger to the ship or persons on board or without presenting unreasonable threat of harm to the marine environment.

1.5.3 *Maintenance of conditions after survey*

1.5.3.1 The condition of the ship and its equipment should be maintained to conform with the provisions of the Code to ensure that the ship will remain fit to proceed to sea without danger to the ship or persons on board or without presenting unreasonable threat of harm to the marine environment.

1.5.3.2 After any survey of the ship under 1.5.2 has been completed, no change should be made in the structure, equipment, fittings, arrangements and material covered by the survey, without the sanction of the Administration, except by direct replacement.

1.5.3.3 Whenever an accident occurs to a ship or a defect is discovered, either of which affects the safety of the ship or the efficiency or completeness of its life-saving appliances or other equipment covered by the Code, the master or owner of the ship should report at the earliest opportunity to the Administration, the nominated surveyor or recognized organization responsible for issuing the Certificate, who should cause investigations to be initiated to determine whether a survey, as required by 1.5.2.1.5, is necessary. If the ship is in a port of another Contracting Government, the master or owner should also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization should ascertain that such a report has been made.

1.5.4 *Issue or endorsement of International Certificate of Fitness*

1.5.4.1 A Certificate, called an International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, should be issued after an initial or renewal survey to a chemical tanker engaged in international voyages which complies with the relevant provisions of the Code.

1.5.4.2 An International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be drawn up in the form corresponding to the model given in the appendix. If the language used is neither English nor French, the text should include the translation into one of these languages.

1.5.4.3 The Certificate issued under provisions of this section should be available on board for examination at all times.

1.5.4.4 Notwithstanding any other provisions of the amendments to this Code adopted by the Marine Environment Protection Committee (MEPC) by resolution MEPC.40(29) and the Maritime Safety Committee (MSC) by resolution MSC...(58)*, any International Certificate of Fitness for the Carriage of

Dangerous Chemicals in Bulk, which is current when these amendments enter into force, should remain valid until it expires under the terms of this Code prior to the amendments entering into force.

1.5.5 *Issue or endorsement of International Certificate of Fitness by another Government*

1.5.5.1 A Government that is both a Contracting Government to the 1974 SOLAS Convention and a Party to MARPOL 73/78 may, at the request of another such Government, cause a ship entitled to fly the flag of the other State to be surveyed and, if satisfied that the provisions of the Code are complied with, issue or authorize the issue of the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk to the ship, and, where appropriate, endorse or authorize the endorsement of the Certificate on board the ship in accordance with the Code. Any Certificate so issued should contain a statement to the effect that it has been issued at the request of the Government of the State whose flag the ship is entitled to fly.

1.5.6 *Duration and validity of International Certificate of Fitness*

1.5.6.1 An International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be issued for a period specified by the Administration which should not exceed 5 years.

1.5.6.2.1 Notwithstanding the provisions of 1.5.6.1, when the renewal survey is completed within 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

1.5.6.2.2 When the renewal survey is completed after the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of expiry of the existing Certificate.

1.5.6.2.3 When the renewal survey is completed more than 3 months before the expiry date of the existing Certificate, the new Certificate should be valid from the date of completion of the renewal survey to a date not exceeding 5 years from the date of completion of the renewal survey.

1.5.6.3 If a Certificate is issued for a period of less than 5 years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in 1.5.6.1, provided that the surveys referred to in 1.5.2.1.3 and 1.5.2.1.4 applicable when a Certificate is issued for a period of 5 years are carried out as appropriate.

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

1.5.6.5 If a ship at the time when a Certificate expires is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the Certificate but this extension should be granted

* MSC resolution number to be inserted after its adoption by MSC 58 (May 1990). A corrigenda will be issued to cover this point.

only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No Certificate should be extended for a period longer than 3 months, and a ship to which an extension is granted should not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new Certificate. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

1.5.6.6 A Certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this section may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new Certificate should be valid to a date not exceeding 5 years from the date of expiry of the existing Certificate before the extension was granted.

1.5.6.7 In special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificate as required by 1.5.6.2.2, 1.5.6.5 or 1.5.6.6. In these special circumstances, the new Certificate should be valid to a date not exceeding 5 years from the date of completion of the renewal survey.

1.5.6.8 If an annual or intermediate survey is completed before the period specified in 1.5.2, then:

.1 the anniversary date shown on the Certificate should be amended by endorsement to a date which should not be more than 3 months later than the date on which the survey was completed;

.2 the subsequent annual or intermediate survey required by 1.5.2 should be completed at the intervals prescribed by that section using the new anniversary date;

.3 the expiry date may remain unchanged provided one or more annual or intermediate surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by 1.5.2 are not exceeded.

1.5.6.9 A Certificate issued under 1.5.4 or 1.5.5 should cease to be valid in any of the following cases:

.1 if the relevant surveys are not completed within the periods specified under 1.5.2;

.2 if the Certificate is not endorsed in accordance with 1.5.2.1.3 or 1.5.2.1.4;

.3 upon transfer of the ship to the flag of another State. A new Certificate should only be issued when the Government issuing the new Certificate is fully satisfied that the ship is in compliance with the requirements of 1.5.3.1 and 1.5.3.2. In the case of a transfer between Governments that are both a Contracting Government to the 1974 SOLAS Convention and a Party to MARPOL 73/78, if requested within 3 months after the transfer has taken place, the Government of the State whose flag the ship was formerly entitled to fly should, as soon as possible, transmit to the Administration copies of the Certificate carried by the ship before the transfer and, if available, copies of the relevant survey reports.

Chapter 2

Ship survival capability and location of cargo tanks*

2.1 General

2.1.1 Ships subject to the Code should survive the normal effects of flooding following assumed hull damage caused by some external force. In addition, to safeguard the ship and the environment, the cargo tanks of certain types of ships should be protected from penetration in the case of minor damage to the ship resulting, for example, from contact with a jetty or tug, and given a measure of protection from damage in the case of collision or stranding, by locating them at specified minimum distances inboard from the ship's shell plating. Both the damage to be assumed and the proximity of the cargo tanks to the ship's shell should be dependent upon the degree of hazard presented by the products to be carried.

2.1.2 Ships subject to the Code should be designed to one of the following standards :

.1 A type 1 ship is a chemical tanker intended to transport chapter 17 products with very severe environmental and safety hazards which require maximum preventive measures to preclude an escape of such cargo.

.2 A type 2 ship is a chemical tanker intended to transport chapter 17 products with appreciably severe environmental and safety hazards which require significant preventive measures to preclude an escape of such cargo.

.3 A type 3 ship is a chemical tanker intended to transport chapter 17 products with sufficiently severe environmental and safety hazards which require a moderate degree of containment to increase survival capability in a damaged condition.

Thus a type 1 ship is a chemical tanker intended for the transportation of products considered to present the greatest overall hazard and type 2 and type 3 for products of progressively lesser hazards. Accordingly, a type 1 ship should survive the most severe standard of damage and its cargo tanks should be located at the maximum prescribed distance inboard from the shell plating.

2.1.3 The ship type required for individual products is indicated in column e in the table of chapter 17.

2.1.4 If a ship is intended to carry more than one product listed in chapter 17, the standard of damage should correspond to that product having the most stringent ship type requirement. The requirements for the location of individual cargo tanks, however, are those for ship types related to the respective products intended to be carried.

* Reference is made to the Guidelines for the uniform application of the survival requirements of the Bulk Chemical Code and the Gas Carrier Code (see page 201).

2.2 Freeboard and intact stability

2.2.1 Ships subject to the Code may be assigned the minimum freeboard permitted by the International Convention on Load Lines in force. However, the draught associated with the assignment should not be greater than the maximum draught otherwise permitted by this Code.

2.2.2 The stability of the ship in all seagoing conditions should be to a standard which is acceptable to the Administration.

2.2.3 When calculating the effect of free surfaces of consumable liquids for loading conditions it should be assumed that, for each type of liquid, at least one transverse pair or a single centre tank has a free surface and the tank or combination of tanks to be taken into account should be those where the effect of free surfaces is the greatest. The free surface effect in undamaged compartments should be calculated by a method acceptable to the Administration.

2.2.4 Solid ballast should not normally be used in double-bottom spaces in the cargo area. Where, however, because of stability considerations, the fitting of solid ballast in such spaces becomes unavoidable, then its disposition should be governed by the need to ensure that the impact loads resulting from bottom damage are not directly transmitted to the cargo-tank structure.

2.2.5 The master of the ship should be supplied with a loading and stability information booklet. This booklet should contain details of typical service and ballast conditions, provisions for evaluating other conditions of loading and a summary of the ship's survival capabilities. In addition, the booklet should contain sufficient information to enable the master to load and operate the ship in a safe and seaworthy manner.

2.3 Shipside discharges below the freeboard deck

2.3.1 The provision and control of valves fitted to discharges led through the shell from spaces below the freeboard deck or from within the superstructures and deck-houses on the freeboard deck fitted with weathertight doors should comply with the requirements of the relevant regulation of the International Convention on Load Lines in force, except that the choice of valves should be limited to :

.1 one automatic nonreturn valve with a positive means of closing from above the freeboard deck ; or

.2 where the vertical distance from the summer load waterline to the inboard end of the discharge pipe exceeds 0.01 L, two automatic nonreturn valves without positive means of closing, provided that the inboard valve is always accessible for examination under service conditions.

2.3.2 For the purpose of this chapter, “summer load line” and “freeboard deck” have the meanings as defined in the International Convention on Load Lines in force.

2.3.3 The automatic nonreturn valves referred to in 2.3.1.1 and 2.3.1.2 should be fully effective in preventing admission of water into the ship, taking into account the sinkage, trim and heel in survival requirements in 2.9, and should comply with recognized standards.

2.4 Conditions of loading

Damage survival capability should be investigated on the basis of loading information submitted to the Administration for all anticipated conditions of loading and variations in draught and trim. Ballast conditions where the chemical tanker is not carrying products covered by the Code, or is carrying only residues of such products, need not be considered.

2.5 Damage assumptions

2.5.1 The assumed maximum extent of damage should be :

.1 Side damage :

.1.1	Longitudinal extent :	$1/3L^{2/3}$ or 14.5 m, whichever is less
.1.2	Transverse extent : (measured inboard from the ship's side at right angles to the centreline at the level of the summer load line)	*B/5* or 11.5 m, whichever is less
.1.3	Vertical extent : (from the moulded line of the bottom shell plating at centreline)	upwards without limit

.2 Bottom damage :

		For 0.3 L from the forward perpendicular of the ship	**Any other part of the ship**
.2.1	Longitudinal extent :	$1/3L^{2/3}$ or 14.5 m, whichever is less	$1/3L^{2/3}$ or 5 m, whichever is less
.2.2	Transverse extent :	*B*/6 or 10 m, whichever is less	*B*/6 or 5 m, whichever is less

		For 0.3 L from the forward perpendicular of the ship	Any other part of the ship
.2.3	Vertical extent :	*B*/15 or 6 m, whichever is less [measured from the moulded line of the bottom shell plating at centreline (see 2.6.2)]	*B*/15 or 6 m, whichever is less [measured from the moulded line of the bottom shell plating at centreline (see 2.6.2)]

2.5.2 If any damage of a lesser extent than the maximum damage specified in 2.5.1 would result in a more severe condition, such damage should be considered.

2.6 Location of cargo tanks

2.6.1 Cargo tanks should be located at the following distances inboard :

.1 Type 1 ships : from the side shell plating, not less than the transverse extent of damage specified in 2.5.1.1.2, and from the moulded line of the bottom shell plating at centreline, not less than the vertical extent of damage specified in 2.5.1.2.3, and nowhere less than 760 mm from the shell plating. This requirement does not apply to the tanks for diluted slops arising from tank washing.

.2 Type 2 ships : from the moulded line of the bottom shell plating at centreline, not less than the vertical extent of damage specified in 2.5.1.2.3, and nowhere less than 760 mm from the shell plating. This requirement does not apply to the tanks for diluted slops arising from tank washing.

.3 Type 3 ships : no requirement.

2.6.2 Except for type 1 ships, suction wells installed in cargo tanks may protrude into the vertical extent of bottom damage specified in 2.5.1.2 provided that such wells are as small as practicable and the protrusion below the inner bottom plating does not exceed 25% of the depth of the double bottom or 350 mm, whichever is less. Where there is no double bottom, the protrusion of the suction well of independent tanks below the upper limit of bottom damage should not exceed 350 mm. Suction wells installed in accordance with this paragraph may be ignored in determining the compartments affected by damage.

2.7 Flooding assumptions

2.7.1 The requirements of 2.9 should be confirmed by calculations which take into consideration the design characteristics of the ship ; the arrangements, configuration and contents of the damaged compartments ; the distribution, relative densities and the free surface effects of liquids ; and the draught and trim for all conditions of loading.

2.7.2 The permeabilities of spaces assumed to be damaged should be as follows :

Spaces	Permeabilities
Appropriated to stores	0.60
Occupied by accommodation	0.95
Occupied by machinery	0.85
Voids	0.95
Intended for consumable liquids	0 to 0.95[1]
Intended for other liquids	0 to 0.95[1]

[1] The permeability of partially filled compartments should be consistent with the amount of liquid carried in the compartment.

2.7.3 Wherever damage penetrates a tank containing liquids it should be assumed that the contents are completely lost from that compartment and replaced by salt water up to the level of the final plane of equilibrium.

2.7.4 Every watertight division within the maximum extent of damage defined in 2.5.1 and considered to have sustained damage in positions given in 2.8.1 should be assumed to be penetrated. Where damage less than the maximum is being considered in accordance with 2.5.2, only watertight divisions or combinations of watertight divisions within the envelope of such lesser damage should be assumed to be penetrated.

2.7.5 The ship should be so designed as to keep unsymmetrical flooding to the minimum consistent with efficient arrangements.

2.7.6 Equalization arrangements requiring mechanical aids such as valves or cross-levelling pipes, if fitted, should not be considered for the purpose of reducing an angle of heel or attaining the minimum range of residual stability to meet the requirements of 2.9 and sufficient residual stability should be maintained during all stages where equalization is used. Spaces which are linked by ducts of large cross-sectional area may be considered to be common.

2.7.7 If pipes, ducts, trunks or tunnels are situated within the assumed extent of damage penetration, as defined in 2.5, arrangements should be such that progressive flooding cannot thereby extend to compartments other than those assumed to be flooded for each case of damage.

2.7.8 The buoyancy of any superstructure directly above the side damage should be disregarded. The unflooded parts of superstructures beyond the extent of damage, however, may be taken into consideration provided that :

.1 they are separated from the damaged space by watertight divisions and the requirements of 2.9.3 in respect of these intact spaces are complied with ; and

.2 openings in such divisions are capable of being closed by remotely operated sliding watertight doors and unprotected openings are not immersed within the minimum range of residual stability required in 2.9 ; however, the immersion of any other openings capable of being closed weathertight may be permitted.

2.8 Standard of damage

2.8.1 Ships should be capable of surviving the damage indicated in 2.5 with the flooding assumptions in 2.7 to the extent determined by the ship's type according to the following standards :

.1 A type 1 ship should be assumed to sustain damage anywhere in its length ;

.2 A type 2 ship of more than 150 m in length should be assumed to sustain damage anywhere in its length ;

.3 A type 2 ship of 150 m in length or less should be assumed to sustain damage anywhere in its length except involving either of the bulkheads bounding a machinery space located aft ;

.4 A type 3 ship of more than 225 m in length should be assumed to sustain damage anywhere in its length ;

.5 A type 3 ship of 125 m in length or more but not exceeding 225 m in length should be assumed to sustain damage anywhere in its length except involving either of the bulkheads bounding a machinery space located aft ;

.6 A type 3 ship below 125 m in length should be assumed to sustain damage anywhere in its length except involving damage to the machinery space when located aft. However, the ability to survive the flooding of the machinery space should be considered by the Administration.

2.8.2 In the case of small type 2 and type 3 ships which do not comply in all respects with the appropriate requirements of 2.8.1.3 and 2.8.1.6, special dispensation may only be considered by the Administration provided that alternative measures can be taken which maintain the same degree of safety. The nature of the alternative measures should be approved and clearly stated and be available to the port Administration. Any such dispensation should be duly noted on the International Certificate of Fitness referred to in 1.5.4.

2.9 Survival requirements

2.9.1 Ships subject to the Code should be capable of surviving the assumed damage specified in 2.5 to the standard provided in 2.8 in a condition of stable equilibrium and should satisfy the following criteria.

2.9.2 In any stage of flooding :

.1 the waterline, taking into account sinkage, heel and trim, should be below the lower edge of any opening through which progressive flooding or downflooding may take place. Such openings should include air pipes and openings which are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo-tank hatch covers which maintain the high integrity of the deck, remotely operated watertight sliding doors, and sidescuttles of the non-opening type ;

.2 the maximum angle of heel due to unsymmetrical flooding should not exceed 25°, except that this angle may be increased to 30° if no deck immersion occurs ;

.3 the residual stability during intermediate stages of flooding should be to the satisfaction of the Administration. However, it should never be significantly less than that required by 2.9.3.

2.9.3 At final equilibrium after flooding :

.1 the righting-lever curve should have a minimum range of 20° beyond the position of equilibrium in association with a maximum residual righting lever of at least 0.1 m within the 20° range ; the area under the curve within this range should not be less than 0.0175 m rad. Unprotected openings should not be immersed within this range unless the space concerned is assumed to be flooded. Within this range, the immersion of any of the openings listed in 2.9.2.1 and other openings capable of being closed weathertight may be permitted ; and

.2 the emergency source of power should be capable of operating.

Chapter 3
Ship arrangements

3.1 Cargo segregation

3.1.1 Unless expressly provided otherwise, tanks containing cargo or residues of cargo subject to the Code should be segregated from accommodation, service and machinery spaces and from drinking water and stores for human consumption by means of a cofferdam, void space, cargo pump-room, pump-room, empty tank, oil fuel tank or other similar space.

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

.1 be segregated from such other cargoes by means of a cofferdam, void space, cargo pump-room, pump-room, empty tank, or tank containing a mutually compatible cargo ;

.2 have separate pumping and piping systems which should not pass through other cargo tanks containing such cargoes, unless encased in a tunnel ; and

.3 have separate tank venting systems.

3.1.3 Cargo piping should not pass through any accommodation, service or machinery space other than cargo pump-rooms or pump-rooms.

3.1.4 Cargoes subject to the Code should not be carried in either the fore or aft peak tank.

3.2 Accommodation, service and machinery spaces and control stations

3.2.1 No accommodation or service spaces or control stations should be located within the cargo area except over a cargo pump-room recess or pump-room recess that complies with regulation II-2/56 of the 1983 SOLAS amendments and no cargo or slop tank should be aft of the forward end of any accommodation.

3.2.2 In order to guard against the danger of hazardous vapours, due consideration should be given to the location of air intakes and openings into accommodation, service and machinery spaces and control stations in relation to cargo piping and cargo vent systems.

3.2.3 Entrances, air inlets and openings to accommodation, service and machinery spaces and control stations should not face the cargo area. They should be located on the end bulkhead not facing the cargo area and/or on the outboard side of the superstructure or deck-house at a distance of at least 4% of the length (L) of the ship but not less than 3 m from the end of the superstructure or deck-house fac-

ing the cargo area. This distance, however, need not exceed 5 m. No doors should be permitted within the limits mentioned above, except that doors to those spaces not having access to accommodation and service spaces and control stations, such as cargo control stations and store-rooms, may be fitted. Where such doors are fitted, the boundaries of the space should be insulated to "A-60" standard. Bolted plates for removal of machinery may be fitted within the limits specified above. Wheelhouse doors and wheelhouse windows may be located within the limits specified above so long as they are so designed that a rapid and efficient gas- and vapour-tightening of the wheelhouse can be ensured. Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deck-houses within the limits specified above should be of the fixed (non-opening) type. Such sidescuttles in the first tier on the main deck should be fitted with inside covers of steel or equivalent material.

3.3 Cargo pump-rooms

3.3.1 Cargo pump-rooms should be so arranged as to ensure :

.1 unrestricted passage at all times from any ladder platform and from the floor ; and

.2 unrestricted access to all valves necessary for cargo handling for a person wearing the required personnel protective equipment.

3.3.2 Permanent arrangements should be made for hoisting an injured person with a rescue line while avoiding any projecting obstacles.

3.3.3 Guard railings should be installed on all ladders and platforms.

3.3.4 Normal access ladders should not be fitted vertical and should incorporate platforms at suitable intervals.*

3.3.5 Means should be provided to deal with drainage and any possible leakage from cargo pumps and valves in cargo pump-rooms. The bilge system serving the cargo pump-room should be operable from outside the cargo pump-room. One or more slop tanks for storage of contaminated bilge water or tank washings should be provided. A shore connection with a standard coupling or other facilities should be provided for transferring contaminated liquids to onshore reception facilities.

3.3.6 Pump discharge pressure gauges should be provided outside the cargo pump-room.

3.3.7 Where machinery is driven by shafting passing through a bulkhead or deck, gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal should be fitted in way of the bulkhead or deck.

* Reference is made to the Recommendation on safe access to and working in large tanks (resolution A. 272(VIII), annex I) as amended by resolution A. 330(IX).

3.4 Access to spaces in the cargo area

3.4.1 Access to cofferdams, ballast tanks, cargo tanks and other spaces in the cargo area should be direct from the open deck and such as to ensure their complete inspection. Access to double-bottom spaces may be through a cargo pump-room, pump-room, deep cofferdam, pipe tunnel or similar compartments, subject to consideration of ventilation aspects.

3.4.2 For access through horizontal openings, hatches or manholes, the dimensions should be sufficient to allow a person wearing a self-contained air-breathing apparatus and protective equipment to ascend or descend any ladder without obstruction and also to provide a clear opening to facilitate the hoisting of an injured person from the bottom of the space. The minimum clear opening should be not less than 600 mm by 600 mm.

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

3.4.4 Smaller dimensions may be approved by the Administration in special circumstances, if the ability to traverse such openings or to remove an injured person can be proved to the satisfaction of the Administration.

3.5 Bilge and ballast arrangements

3.5.1 Pumps, ballast lines, vent lines and other similar equipment serving permanent ballast tanks should be independent of similar equipment serving cargo tanks and of cargo tanks themselves. Discharge arrangements for permanent ballast tanks sited immediately adjacent to cargo tanks should be outside machinery spaces and accommodation spaces. Filling arrangements may be in the machinery spaces provided that such arrangements ensure filling from tank deck level and nonreturn valves are fitted.

3.5.2 Filling of ballast in cargo tanks may be arranged from deck level by pumps serving permanent ballast tanks, provided that the filling line has no permanent connection to cargo tanks or piping and that nonreturn valves are fitted.

3.5.3 Bilge pumping arrangements for cargo pump-rooms, pump-rooms, void spaces, slop tanks, double-bottom tanks and similar spaces should be situated entirely within the cargo area except for void spaces, double-bottom tanks and ballast tanks where such spaces are separated from tanks containing cargo or residues of cargo by a double bulkhead.

3.6 Pump and pipeline identification

Provisions should be made for the distinctive marking of pumps, valves and pipelines to identify the service and tanks which they serve.

3.7 Bow or stern loading and unloading arrangements

3.7.1 Cargo piping may be fitted to permit bow or stern loading and unloading. Portable arrangements should not be permitted.

3.7.2 Bow or stern loading and unloading lines should not be used for the transfer of products required to be carried in type 1 ships. Bow and stern loading and unloading lines should not be used for the transfer of cargoes emitting toxic vapours required to comply with 15.12.1, unless specifically approved by the Administration.

3.7.3 In addition to 5.1, the following provisions apply :

.1 The piping outside the cargo area should be fitted at least 760 mm inboard on the open deck. Such piping should be clearly identified and fitted with a shutoff valve at its connection to the cargo piping system within the cargo area. At this location, it should also be capable of being separated by means of a removable spool-piece and blank flanges when not in use.

.2 The shore connection should be fitted with a shutoff valve and a blank flange.

.3 The piping should be full-penetration butt-welded, and fully radiographed. Flange connections in the piping should only be permitted within the cargo area and at the shore connection.

.4 Spray shields should be provided at the connections specified in .1 as well as collecting trays of sufficient capacity, with means for the disposal of drainage.

.5 The piping should be self-draining to the cargo area and preferably into a cargo tank. Alternative arrangements for draining the piping may be accepted by the Administration.

.6 Arrangements should be made to allow such piping to be purged after use and maintained gas-safe when not in use. The vent pipes connected with the purge should be located in the cargo area. The relevant connections to the piping should be provided with a shutoff valve and blank flange.

3.7.4 Entrances, air inlets and openings to accommodation, service and machinery spaces and control stations should not face the cargo shore-connection location of bow or stern loading and unloading arrangements. They should be located on the outboard side of the superstructure or deck-house at a distance of at least 4% of the length of the ship but not less than 3 m from the end of the house facing the

cargo shore-connection location of the bow or stern loading and unloading arrangements. This distance, however, need not exceed 5 m. Sidescuttles facing the shore-connection location and on the sides of the superstructure or deck-house within the distance mentioned above should be of the fixed (non-opening) type. In addition, during the use of the bow or stern loading and unloading arrangements, all doors, ports and other openings on the corresponding superstructure or deck-house side should be kept closed. Where, in the case of small ships, compliance with 3.2.3 and this paragraph is not possible, the Administration may approve relaxations from the above requirements.

3.7.5 Air pipes and other openings to enclosed spaces not listed in 3.7.4 should be shielded from any spray which may come from a burst hose or connection.

3.7.6 Escape routes should not terminate within the coamings required by 3.7.7 or within a distance of 3 m beyond the coamings.

3.7.7 Continuous coamings of suitable height should be fitted to keep any spills on deck and away from the accommodation and service areas.

3.7.8 Electrical equipment within the coamings required by 3.7.7 or within a distance of 3 m beyond the coamings should be in accordance with the requirements of chapter 10.

3.7.9 Fire-fighting arrangements for the bow or stern loading and unloading areas should be in accordance with 11.3.16.

3.7.10 Means of communication between the cargo control station and the cargo shore-connection location should be provided and certified safe, if necessary. Provision should be made for the remote shutdown of cargo pumps from the cargo shore-connection location.

Chapter 4
Cargo containment

4.1 Definitions

4.1.1 *Independent tank* means a cargo-containment envelope which is not contiguous with, or part of, the hull structure. An independent tank is built and installed so as to eliminate whenever possible (or in any event to minimize) its stressing as a result of stressing or motion of the adjacent hull structure. An independent tanks is not essential to the structural completeness of the ship's hull.

4.1.2 *Integral tank* means a cargo-containment envelope which forms part of the ship's hull and which may be stressed in the same manner and by the same loads which stress the contiguous hull structure and which is normally essential to the structural completeness of the ship's hull.

4.1.3 *Gravity tank* means a tank having a design pressure not greater than 0.7 bar gauge at the top of the tank. A gravity tank may be independent or integral. A gravity tank should be constructed and tested according to recognized standards, taking account of the temperature of carriage and relative density of the cargo.

4.1.4 *Pressure tank* means a tank having a design pressure greater than 0.7 bar gauge. A pressure tank should be an independent tank and should be of a configuration permitting the application of pressure-vessel design criteria according to recognized standards.

4.2 Tank type requirements for individual products

Requirements for both installation and design of tank types for individual products are shown in column f in the table of chapter 17.

Chapter 5
Cargo transfer

5.1 Piping scantlings*

5.1.1 Subject to the conditions stated in 5.1.4, the wall thickness (t) of, pipes should not be less than :

$$t = \frac{t_0 + b + c}{1 - \frac{a}{100}} (mm)$$

where :

t_o : theoretical thickness

t_o = PD/520Ke + P) (mm)

with

P = design pressure (bar) referred to in 5.1.2

D = outside diameter (mm)

K = allowable stress (N/mm^2) referred to in 5.1.5

e = efficiency factor equal to 1.0 for seamless pipes and for longitudinally or spirally welded pipes, delivered by approved manufacturers of welded pipes, which are considered equivalent to seamless pipes when non-destructive testing on welds is carried out in accordance with recognized standards. In other cases, an efficiency factor of less than 1.0, in accordance with recognized standards, may be required depending on the manufacturing process.

b : allowance for bending (mm). The value of b should be chosen so that the calculated stress in the bend, due to internal pressure only, does not exceed the allowable stress. Where such justification is not given, b should be not less than :

$b = (Dt_o)/(2.52)$ (mm)

with

r = mean radius of the bend (mm).

c : corrosion allowance (mm). If corrosion or erosion is expected, the wall thickness of piping should be increased over that required by the other design requirements.

a : negative manufacturing tolerance for thickness (%).

* Reference is also made to the published Rules of the Members and Associate Members of the International Association of Classification Societies (IACS).

5.1.2 The design pressure P in the formula for t_o in 5.1.1 is the maximum gauge pressure to which the system may be subjected in service, taking into account the highest set pressure on any relief valve on the system.

5.1.3 Piping and piping-system components which are not protected by a relief valve, or which may be isolated from their relief valve, should be designed for at least the greatest of :

.1 for piping systems or components which may contain some liquid, the saturated vapour pressure at 45° C ;

.2 the pressure setting of the associated pump discharge relief valve ;

.3 the maximum possible total pressure head at the outlet of the associated pumps when a pump discharge relief valve is not installed.

5.1.4 The design pressure should not be less than 10 bar gauge except for open-ended lines, where it should be not less than 5 bar gauge.

5.1.5 For pipes, the allowable stress K to be considered in the formula for t_o in 5.1.1 is the lower of the following values :

R_m/A or R_e/B

where :

R_m : specified minimum tensile strength at ambient temperature (N/mm^2)

R_e : specified minimum yield stress at ambient temperature (N/mm^2). If the stress-strain curve does not show a defined yield stress, the 0.2% proof stress applies.

A and B should have values of at least A = 2.7 and B = 1.8.

5.1.6.1 The minimum wall thickness should be in accordance with recognized standards.

5.1.6.2 Where necessary for mechanical strength to prevent damage, collapse, excessive sag or buckling of pipes due to weight of pipes and content and to superimposed loads from supports, ship deflection or other causes, the wall thickness should be increased over that required by 5.1.1 or, if this is impracticable or would cause excessive local stresses, these loads should be reduced, protected against or eliminated by other design methods.

5.1.6.3 Flanges, valves and other fittings should be in accordance with recognized standards, taking into account the design pressure defined under 5.1.2.

5.1.6.4 For flanges not complying with a standard, the dimensions for flanges and associated bolts should be to the satisfaction of the Administration.

5.2 Piping fabrication and joining details

5.2.1 The requirements of this section apply to piping inside and outside the cargo tanks. However, relaxations from these requirements may be accepted in accordance with recognized standards for open-ended piping and for piping inside cargo tanks except for cargo piping serving other cargo tanks.

5.2.2 Cargo piping should be joined by welding except :

.1 for approved connections to shutoff valves and expansion joints ; and

.2 for other exceptional cases specifically approved by the Administration.

5.2.3 The following direct connections of pipe lengths without flanges may be considered :

.1 Butt-welded joints with complete penetration at the root may be used in all applications.

.2 Slip-on welded joints with sleeves and related welding having dimensions in accordance with recognized standards should only be used for pipes with an external diameter of 50 mm or less. This type of joint should not be used when crevice corrosion is expected to occur.

.3 Screwed connections, in accordance with recognized standards, should only be used for accessory lines and instrumentation lines with external diameters of 25 mm or less.

5.2.4 Expansion of piping should normally be allowed for by the provision of expansion loops or bends in the piping system.

.1 Bellows, in accordance with recognized standards, may be specially considered.

.2 Slip joints should not be used.

5.2.5 Welding, post-weld heat treatment and non-destructive testing should be performed in accordance with Recognized Standards.

5.3 Flange connections

5.3.1 Flanges should be of the welded-neck, slip-on or socket-welded type. However, socket-welded-type flanges should not be used in nominal size above 50 mm.

5.3.2 Flanges should comply with recognized standards as to their type, manufacture and test.

5.4 Test requirements for piping

5.4.1 The test requirements of this section apply to piping inside and outside cargo tanks. However, relaxations from these requirements may be accepted in accordance with recognized standards for piping inside tanks and open-ended piping.

5.4.2 After assembly, each cargo piping system should be subject to a hydrostatic test to at least 1.5 times the design pressure. When piping systems or parts of systems are completely manufactured and equipped with all fittings, the hydrostatic test may be conducted prior to installation aboard the ship. Joints welded on board should be hydrostatically tested to at least 1.5 times the design pressure.

5.4.3 After assembly on board, each cargo piping system should be tested for leaks to a pressure depending on the method applied.

5.5 Piping arrangements

5.5.1 Cargo piping should not be installed under deck between the outboard side of the cargo-containment spaces and the skin of the ship unless clearances required for damage protection (see 2.6) are maintained ; but such distances may be reduced where damage to the pipe would not cause release of cargo provided that the clearance required for inspection purposes is maintained.

5.5.2 Cargo piping located below the main deck may run from the tank it serves and penetrate tank bulkheads or boundaries common to longitudinally or transversally adjacent cargo tanks, ballast tanks, empty tanks, pump-rooms or cargo pump-rooms provided that inside the tank it serves it is fitted with a stop valve operable from the weather deck and provided cargo compatibility is assured in the event of piping failure. As an exception, where a cargo tank is adjacent to a cargo pump-room, the stop valve operable from the weather deck may be situated on the tank bulkhead on the cargo pump-room side, provided an additional valve is fitted between the bulkhead valve and the cargo pump. A totally enclosed hydraulically operated valve located outside the cargo tank may, however, be accepted, provided that the valve is :

.1 designed to preclude the risk of leakage ;

.2 fitted on the bulkhead of the cargo tank which it serves ;

.3 suitably protected against mechanical damage ;

.4 fitted at a distance from the shell as required for damage protection ; and

.5 operable from the weather deck.

5.5.3 In any cargo pump-room where a pump serves more than one tank, a stop valve should be fitted in the line to each tank.

5.5.4 Cargo piping installed in pipe tunnels should also comply with the requirements of 5.5.1 and 5.5.2. Pipe tunnels should satisfy all tank requirements for construction, location and ventilation and electrical hazard requirements. Cargo compatibility should be assured in the event of a piping failure. The tunnel should not have any other openings except to the weather deck and cargo pump-room or pump-room.

5.5.5 Cargo piping passing through bulkheads should be so arranged as to preclude excessive stresses at the bulkhead and should not utilize flanges bolted through the bulkhead.

5.6 Cargo-transfer control systems

5.6.1 For the purpose of adequately controlling the cargo, cargo-transfer systems should be provided with :

.1 one stop valve capable of being manually operated on each tank filling and discharge line, located near the tank penetration ; if an individual deepwell pump is used to discharge the contents of a cargo tank, a stop valve is not required on the discharge line of that tank ;

.2 one stop valve at each cargo-hose connection ;

.3 remote shutdown devices for all cargo pumps and similar equipment.

5.6.2 The controls necessary during transfer or transport of cargoes covered by the Code other than in cargo pump-rooms which have been dealt with elsewhere in the Code should not be located below the weather deck.

5.6.3 For certain products, additional cargo-transfer control requirements are shown in column o in the table of chapter 17.

5.7 Ship's cargo hoses

5.7.1 Liquid and vapour hoses used for cargo transfer should be compatible with the cargo and suitable for the cargo temperature.

5.7.2 Hoses subject to tank pressure or the discharge pressure of pumps should be designed for a bursting pressure not less than 5 times the maximum pressure the hose will be subjected to during cargo transfer.

5.7.3 For cargo hoses installed on board ships on or after 1 July 2002, each new type of cargo hose, complete with end-fittings, should be prototype-tested at a normal ambient temperature with 200 pressure cycles from zero to at least twice the specified maximum working pressure. After this cycle

pressure test has been carried out, the prototype test should demonstrate a bursting pressure of at least 5 times its specified maximum working pressure at the extreme service temperature. Hoses used for prototype testing should not be used for cargo service. Thereafter, before being placed in service, each new length of cargo hose produced should be hydrostatically tested at ambient temperature to a pressure not less than 1.5 times its specified maximum working pressure but not more than two-fifths of its bursting pressure. The hose should be stencilled or otherwise marked with the date of testing, its specified maximum working pressure and, if used in services other than the ambient temperature services, its maximum and minimum service temperature, as applicable. The specified maximum working pressure should not be less than 10 bar gauge.

Chapter 6
Materials of construction

6.1 General

6.1.1 Structural materials used for tank construction, together with associated piping, pumps, valves, vents and their jointing materials, should be suitable at the temperature and pressure for the cargo to be carried in accordance with recognized standards. Steel is assumed to be the normal material of construction.

6.1.2 Where applicable, the following should be taken into account in selecting the material of construction :

.1 notch ductility at the operating temperature ;

.2 corrosive effect of the cargo ;

.3 possibility of hazardous reactions between the cargo and the material of construction ; and

.4 suitability of linings.

6.2 Special requirements for materials

6.2.1 For certain products, special requirements apply in respect of materials indicated by symbols in column m in the table of chapter 17, as stipulated in 6.2.2, 6.2.3 and 6.2.4.

6.2.2 The following materials of construction should not be used for tanks, pipelines, valves, fittings and other equipment which may come into contact with the products or their vapour where referred to in column m in the table of chapter 17 :

N1 : Aluminium, copper, copper alloys, zinc, galvanized steel and mercury

N2 : Copper, copper alloys, zinc and galvanized steel

N3 : Aluminium, magnesium, zinc, galvanized steel and lithium

N4 : Copper and copper-bearing alloys

N5 : Aluminium, copper and alloys of either

N6 : Copper, silver, mercury, magnesium and other acetylide-forming metals and their alloys

N7 : Copper and copper-bearing alloys with greater than 1% copper

N8 : Aluminium, zinc, galvanized steel and mercury

6.2.3 Materials normally used in electrical apparatus, such as copper, aluminium and insulation, should as far as practicable be protected, e.g. by encapsulation, to prevent contact with vapours of products where referred to by Z in column m in the table of chapter 17.

6.2.4 The following materials of construction, which may come into contact with certain products or their vapour, should be used for tanks, pipelines, valves, fittings and other equipment, where referred to in column m in the table of chapter 17 :

Y1 : Steel covered with a suitable protective lining or coating, aluminium or stainless steel

Y2 : Aluminium or stainless steel for product concentrations of 98% or more

Y3 : Special acid-resistant stainless steel for product concentrations of less than 98%

Y4 : Solid austenitic stainless steel

Y5 : Steel covered with suitable protective lining or coating or stainless steel

6.2.5 Materials of construction having a melting point below 925° C, e.g. aluminium and its alloys, should not be used for external piping involved in cargo-handling operations on ships intended for the carriage of products with flashpoints not exceeding 60° C (closed-cup test) unless so specified in column m in the table of chapter 17. Short lengths of external pipes connected to cargo tanks may be fitted if they are provided with fire-resistant insulation.

Chapter 7
Cargo temperature control

7.1 General

7.1.1 When provided, any cargo heating or cooling systems should be constructed, fitted and tested to the satisfaction of the Administration. Materials used in the construction of temperature-control systems should be suitable for use with the product intended to be carried.

7.1.2 Heating or cooling media should be of a type approved for use with the specific cargo. Consideration should be given to the surface temperature of heating coils or ducts to avoid dangerous reactions from localized overheating or overcooling of cargo. (See also 15.13.6).

7.1.3 Heating or cooling systems should be provided with valves to isolate the system for each tank and to allow manual regulation of flow.

7.1.4 In any heating or cooling system, means should be provided to ensure that, when in any condition other than empty, a higher pressure can be maintained within the system than the maximum pressure head that could be exerted by the cargo-tank contents on the system.

7.1.5 Means should be provided for measuring the cargo temperature.

.1 The means for measuring the cargo temperature should be of restricted or closed type, respectively, when a restricted or closed gauging device is required for individual substances, as shown in column j in the table of chapter 17.

.2 A restricted temperature-measuring device is subject to the definition for a restricted gauging device in 13.1.1.2, e.g. a portable thermometer lowered inside a gauge tube of the restricted type.

.3 A closed temperature-measuring device is subject to the definition for a closed gauging device in 13.1.1.3, e.g. a remote-reading thermometer of which the sensor is installed in the tank.

.4 When overheating or overcooling could result in a dangerous condition, an alarm system which monitors the cargo temperature should be provided. (See also operational requirements in 16.6.)

7.1.6 When products for which 15.12, 15.12.1 or 15.12.3 are listed in column o in the table of chapter 17 are being heated or cooled, the heating or cooling medium should operate in a circuit :

.1 which is independent of other ship's services, except for another cargo heating or cooling system, and which does not enter the machinery space ; or

.2 which is external to the tank carrying toxic products ; or

.3 where the medium is sampled to check for the presence of cargo before it is recirculated to other services of the ship or into the machinery space. The sampling equipment should be located within the cargo area and be capable of detecting the presence of any toxic cargo being heated or cooled. Where this method is used, the coil return should be tested not only at the commencement of heating or cooling of a toxic product, but also on the first occasion the coil is used subsequent to having carried an unheated or uncooled toxic cargo.

7.2 Additional requirements

For certain products, additional requirements contained in chapter 15 are shown in column o in the table of chapter 17.

Chapter 8
Cargo-tank venting and gas-freeing arrangements

8.1 Application

8.1.1 Unless expressly provided otherwise, this chapter applies to ships constructed on or after 1 January 1994.

8.1.2 Ships constructed before 1 January 1994 should comply with the requirements of chapter 8 of this Code which were in force prior to the said date.

8.1.3 For the purpose of this regulation, the term "ship constructed" is as defined in regulation II-1/ 1.3.1 of the 1974 SOLAS Convention as amended.

8.1.4 Ships constructed on or after 1 July 1986 but before 1 January 1994 which fully comply with the requirements of the Code applicable at that time may be regarded as complying with the requirements of regulation II-2/59 of SOLAS 74.

8.1.5 For ships to which the Code applies, the requirements of this chapter should apply in lieu of regulation II-2/59.1 and 59.2 of the 1974 SOLAS Convention, as amended.

8.1.6 Ships constructed on or after 1 July 1986, but before 1 July 2002 should comply with the requirements of paragraph 8.3.3 by the date of the first scheduled dry-docking after 1 July 2002, but not later than 1 July 2005. However, the Administration may approve relaxation of paragraph 8.3.3 for ships of less than 500 gross tonnage which were constructed on or after 1 July 1986, but before 1 July 2002.

8.2 Cargo-tank venting

8.2.1 All cargo tanks should be provided with a venting system appropriate to the cargo being carried and these systems should be independent of the air pipes and venting systems of all other compartments of the ship. Tank venting systems should be designed so as to minimize the possibility of cargo vapour accumulating about the decks, entering accommodation, service and machinery spaces and control stations and, in the case of flammable vapours, entering or collecting in spaces or areas containing sources of ignition. Tank venting systems should be arranged to prevent entrance of water into the cargo tanks and, at the same time, vent outlets should direct the vapour discharge upwards in the form of unimpeded jets.

8.2.2 The venting systems should be connected to the top of each cargo tank and as far as practicable the cargo vent lines should be self-draining back to the cargo tanks under all normal operational

conditions of list and trim. Where it is necessary to drain venting systems above the level of any pressure/vacuum valve, capped or plugged drain cocks should be provided.

8.2.3 Provision should be made to ensure that the liquid head in any tank does not exceed the design head of the tank. Suitable high-level alarms, overflow control systems or spill valves, together with gauging and tank filling procedures, may be accepted for this purpose. Where the means of limiting cargo-tank overpressure includes an automatic closing valve, the valve should comply with the appropriate provisions of 15.19.

8.2.4 Tank venting systems should be designed and operated so as to ensure that neither pressure nor vacuum created in the cargo tanks during loading or unloading exceeds tank design parameters. The main factors to be considered in the sizing of a tank venting system are as follows :

.1 design loading and unloading rate ;

.2 gas evolution during loading : this should be taken account of by multiplying the maximum loading rate by a factor of at least 1.25 ;

.3 density of the cargo vapour mixture ;

.4 pressure loss in vent piping and across valves and fittings ;

.5 pressure/vacuum settings of relief devices.

8.2.5 Tank vent piping connected to cargo tanks of corrosion-resistant material, or to tanks which are lined or coated to handle special cargoes as required by the Code, should be similarly lined or coated or constructed of corrosion-resistant material.

8.2.6 The master should be provided with the maximum permissible loading and unloading rates for each tank or group of tanks consistent with the design of the venting systems.

8.3 Types of tank venting systems

8.3.1 An open tank venting system is a system which offers no restriction except for friction losses to the free flow of cargo vapours to and from the cargo tanks during normal operations. An open venting system may consist of individual vents from each tank, or such individual vents may be combined into a common header or headers, with due regard to cargo segregation. In no case should shutoff valves be fitted either to the individual vents or to the header.

8.3.2 A controlled tank venting system is a system in which pressure- and vacuum-relief valves or pressure/vacuum valves are fitted to each tank to limit the pressure or vacuum in the tank. A controlled venting system may consist of individual vents from each tank or such individual vents on the pressure side only as may be combined into a common header or headers, with due regard to cargo segregation. In no case should shut-off valves be fitted either above or below pressure- or vacuum-relief valves or

pressure/vacuum valves. Provision may be made for bypassing a pressure- or vacuum-relief valve or pressure/vacuum valve under certain operating conditions provided that the requirement of 8.3.6 is maintained and that there is suitable indication to show whether or not the valve is bypassed.

8.3.3 On ships constructed on or after 1 July 2002, controlled tank venting systems should consist of a primary and a secondary means of allowing full flow relief of vapour to prevent over-pressure or under-pressure in the event of failure of one means. Alternatively, the secondary means may consist of pressure sensors fitted in each tank with a monitoring system in the ship's cargo control room or position from which cargo operations are normally carried out. Such monitoring equipment should also provide an alarm facility which is activated by detection of over-pressure or under-pressure conditions within a tank.

8.3.4 The position of vent outlets of a controlled tank venting system should be arranged :

.1 at a height of not less than 6 m above the weather deck or above a raised walkway if fitted within 4 m of the raised walkway ;

.2 at a distance of at least 10 m measured horizontally from the nearest air intake or opening to accommodation, service and machinery spaces and ignition sources.

8.3.5 The vent outlet height referred to in 8.3.4.1 may be reduced to 3 m above the deck or a raised walkway, as applicable, provided that high-velocity venting valves of an approved type, directing the vapour/air mixture upwards in an unimpeded jet with an exit velocity of at least 30 m/s, are fitted.

8.3.6 Controlled tank venting systems fitted to tanks to be used for cargoes having a flashpoint not exceeding 60° C (closed-cup test) should be provided with devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of the devices should comply with the requirements of the Administration, which should contain at least the standards adopted by the Organization.*

8.3.7 In designing venting systems and in the selection of devices to prevent the passage of flame for incorporation into the tank venting system, due attention should be paid to the possibility of the blockage of these systems and fittings by, for example, the freezing of cargo vapour, polymer build-up, atmospheric dust or icing up in adverse weather conditions. In this context it should be noted that flame arresters and flame screens are more susceptible to blockage. Provisions should be made such that the system and fittings may be inspected, operationally checked, cleaned or renewed as applicable.

8.3.8 Reference in 8.3.1 and 8.3.2 to the use of shutoff valves in the venting lines should be interpreted to extend to all other means of stoppage, including spectacle blanks and blank flanges.

* Reference is made to the Revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers (MSC/Circ. 373/Rev. 1) (see page 207).

8.4 Venting requirements for individual products

Venting requirements for individual products are shown in column g, and additional requirements in column o in the table of chapter 17.

8.5 Cargo-tank gas-freeing*

8.5.1 The arrangements for gas-freeing cargo tanks used for cargoes other than those for which open venting is permitted should be such as to minimize the hazards due to the dispersal of flammable or toxic vapours in the atmosphere and to flammable or toxic vapour mixtures in a cargo tank. Accordingly, gas-freeing operations should be carried out such that vapour is initially discharged :

.1 through the vent outlets specified in 8.3.3 and 8.3.4 ; or

.2 through outlets at least 2 m above the cargo-tank deck level with a vertical efflux velocity of at least 30 m/s maintained during the gas-freeing operation ; or

.3 through outlets at least 2 m above the cargo-tank deck level with a vertical efflux velocity of at least 20 m/s which are protected by suitable devices to prevent the passage of flame.

When the flammable vapour concentration at the outlets has been reduced to 30% of the lower flammable limit and, in the case of a toxic product, the vapour concentration does not present a significant health hazard, gas-freeing may thereafter be continued at cargo-tank deck level.

8.5.2 The outlets referred to in 8.5.1.2 and 8.5.1.3 may be fixed or portable pipes.

8.5.3 In designing a gas-freeing system in conformity with 8.5.1, particularly in order to achieve the required exit velocities of 8.5.1.2 and 8.5.1.3, due consideration should be given to the following :

.1 materials of construction of system ;

.2 time to gas-free ;

.3 flow characteristics of fans to be used ;

.4 the pressure losses created by ducting, piping, cargo-tank inlets and outlets ;

.5 the pressure achievable in the fan driving medium (e.g. water or compressed air) ;

.6 the densities of the cargo vapour/air mixtures for the range of cargoes to be carried.

* Reference is made to the Revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangements (MSC/Circ. 450/Rev. 1) (see page 222) and to the Revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers (MSC/Circ. 373/Rev. 1) (see page 207).

Chapter 9
Environmental control

9.1 General

9.1.1 Vapour spaces within cargo tanks and, in some cases, spaces surrounding cargo tanks may require to have specially controlled atmospheres.

9.1.2 There are four different types of control for cargo tanks, as follows :

.1 *Inerting* – by filling the cargo tank and associated piping systems and, where specified in chapter 15, the spaces surrounding the cargo tanks, with a gas or vapour which will not support combustion and which will not react with the cargo, and maintaining that condition.

.2 *Padding* – by filling the cargo tank and associated piping systems with a liquid, gas or vapour which separates the cargo from the air, and maintaining that condition.

.3 *Drying* – by filling the cargo tank and associated piping systems with moisture-free gas or vapour with a dewpoint of –40° C or below at atmospheric pressure, and maintaining that condition.

.4 *Ventilation* – forced or natural.

9.1.3 Where inerting or padding of cargo tanks is required :

.1 An adequate supply of inert gas for use in filling and discharging the cargo tanks should be carried or should be manufactured on board unless a shore supply is available. In addition, sufficient inert gas should be available on the ship to compensate for normal losses during transportation.

.2 The inert gas system on board the ship should be able to maintain a pressure of at least 0.07 bar gauge within the containment system at all times. In addition, the inert gas system should not raise the cargo-tank pressure to more than the tank's relief-valve setting.

.3 Where padding is used, similar arrangements for supply of the padding medium should be made as required for inert gas in .1 and .2.

.4 Means should be provided for monitoring ullage spaces containing a gas blanket to ensure that the correct atmosphere is being maintained.

.5 Inerting or padding arrangements or both, where used with flammable cargoes, should be such as to minimize the creation of static electricity during the admission of the inerting medium.

9.1.4 Where drying is used and dry nitrogen is used as the medium, similar arrangements for supply of the drying agent should be made to those required in 9.1.3. Where drying agents are used as the drying medium on all air inlets to the tank, sufficient medium should be carried for the duration of the voyage, taking into consideration the diurnal temperature range and the expected humidity.

9.2 Environmental control requirements for individual products

The required types of environmental control for certain products are shown in column h in the table of chapter 17.

Chapter 10
Electrical installations

10.1 General

10.1.1 The provisions of this chapter are applicable to ships carrying cargoes which are inherently, or due to their reaction with other substances, flammable or corrosive to the electrical equipment, and should be applied in conjunction with applicable electrical requirements of part D of chapter II-1 of the 1983 SOLAS amendments.

10.1.2.1 Electrical installations should be such as to minimize the risk of fire and explosion from flammable products. Electrical installations complying with this chapter should not be considered a source of ignition for the purposes of 8.2.2.3, having regard to 10.1.4.

10.1.2.2 Where the specific cargo is liable to damage the materials normally used in electrical apparatus, due consideration should be given to the particular characteristics of the materials chosen for conductors, insulation, metal parts, etc. As far as necessary, these components should be protected to prevent contact with gases or vapours liable to be encountered.

10.1.3 The Administration should take appropriate steps to ensure uniformity in the implementation and the application of the provisions of this chapter in respect of electrical installations*.

10.1.4 Electrical equipment and wiring should not be installed in the hazardous locations referred to in 10.2 unless essential for operational purposes, when the exceptions listed in 10.2.3 are permitted.

10.1.5 Where electrical equipment is installed in hazardous locations, as permitted in this chapter, it should be to the satisfaction of the Administration and certified by the relevent authorities recognized by the Administration for operation in the flammable atmosphere concerned, as indicated in column i in the table of chapter 17.

10.1.6 Absence of information on temperature class and apparatus group in column i in the table of chapter 17 means that data are not currently available, and this should not be confused with the non-flammable (NF) notation describing some substances. For guidance, indication is given if the flashpoint of a substance is in excess of 60° C (closed-cup test). In the case of heated cargo, carriage conditions might need to be established and the requirements of 10.2.2 applied.

* Reference is made to the recommendations published by the International Electrotechnical Commission and in particular to Publication 92-502, Electrical Installations in Ships – Part 502 : Special features – Tankers.

10.2 Hazardous locations and types of equipment and wiring

10.2.1 The restrictions in this section do not preclude the use of intrinsically safe systems and circuits in all hazardous locations including cargo piping. It is particularly recommended that intrinsically safe systems and circuits are used for measurement, monitoring, control and communication purposes.

10.2.2 Cargoes with a flashpoint exceeding 60° C (closed-cup test) :

.1 Cargo tanks and cargo piping are the only hazardous locations for such cargoes which have no qualification in column o in the table of chapter 17. Submerged cargo-pump motors and their associated cables may, in exceptional circumstances for a specific cargo or for a clearly defined range of cargoes, be permitted by the Administration, due consideration having been given to the chemical and physical characteristics of the products. Arrangements should be made to prevent the energizing of motors and cables in flammable gas-air mixtures and to de-energize the motors and cables in the event of low liquid level. Such a shutdown should be indicated by an alarm at the cargo control station.

.2 Where electrical equipment is located in a cargo pump-room, due consideration should be given to the use of types of apparatus which ensure the absence of arcs or sparks and hot spots during normal operation, or which are of a certified safe type.

.3 Where the cargo is heated to within 15° C of its flashpoint value, the cargo pump-room should be considered as a hazardous area as well as areas within 3 m of openings from tanks where the cargo is so heated, and within 3 m of the entrance or ventilation openings to cargo pump-rooms. Electrical equipment installed within these locations should be of a certified safe type.

.4 Where the cargo is heated above its flashpoint value, the requirements of 10.2.3 are applicable.

10.2.3 For cargoes with a flashpoint not exceeding 60° C (closed-cup test) without qualification in column o in the table of chapter 17, the hazardous locations are given below. In addition to intrinsically safe systems and circuits, the only electrical installations permitted in hazardous locations are the following :

.1 Cargo tanks and cargo piping :

No additional electrical equipment is permitted.

.2 Void spaces adjacent to, above or below integral tanks :

.2.1 Through runs of cables. Such cables should be installed in heavy gauge steel pipes with gastight joints. Expansion bends should not be fitted in such spaces.

.2.2 Electrical depth-sounding or log devices and impressed-current cathodic protection system anodes or electrodes. These devices should be housed in gastight enclosures ; associated cables should be protected as referred to in 10.2.3.2.1.

.3 Hold spaces containing independent cargo tanks :

.3.1 Through runs of cable without any additional protection.

.3.2 Lighting fittings with pressurized enclosure or of the flameproof type. The lighting system should be divided between at least two branch circuits. All switches and protective devices should interrupt all poles or phases and should be located in a non-hazardous location.

.3.3 Electrical depth-sounding or log devices and impressed-current cathodic protection system anodes or electrodes. These devices should be housed in gastight enclosures.

.4 Cargo pump-rooms and pump-rooms in the cargo area :

.4.1 Lighting fittings with pressurized enclosures or of the flameproof type. The lighting system should be divided between at least two branch circuits. All switches and all protective devices should interrupt all poles or phases and should be located in a non-hazardous location.

.4.2 Electrical motors for driving cargo pumps and any associated auxiliary pumps. These should be separated from these spaces by a gastight bulkhead or deck. Flexible couplings, or other means of maintaining alignment, should be fitted to the shafts between the driven equipment and its motors, and in addition, glands should be provided in accordance with recognized standards where the shafts pass through the bulkhead or deck. Such electrical motors should be located in a compartment having positive-pressure ventilation.

.4.3 Flameproof general alarm audible indicator.

.5 Zones on open deck, or semi-enclosed spaces on open deck, within 3 m of any cargo-tank outlet, gas or vapour outlet, cargo-pipe flange, cargo valve or entrance and ventilation opening to cargo pump-rooms ; cargo area on open deck over all cargo tanks and cargo-tank holds, including all ballast tanks and cofferdams within the cargo-tank block, to the full width of the ship, plus 3 m fore and aft and up to a height of 2.4 m above the deck :

.5.1 Equipment of a certified safe type, adequate for open deck use ;

.5.2 Through runs of cables.

.6 Enclosed or semi-enclosed spaces in which pipes containing cargoes are located ; enclosed or semi-enclosed spaces immediately above cargo tanks (e.g. between decks) or

having bulkheads above and in line with cargo-tank bulkheads ; enclosed or semi-enclosed spaces immediately above cargo pump-rooms or above vertical cofferdams adjoining cargo tanks, unless separated by a gastight deck and suitably ventilated ; and compartments for cargo hoses :

.6.1 Lighting fittings of a certified safe type. The lighting system should be divided between at least two branch circuits. All switches and protective devices should interrupt all poles or phases and should be located in a non-hazardous location.

.6.2 Through runs of cables.

.7 Enclosed or semi-enclosed spaces having a direct opening into any hazardous location referred to above should have electrical installations complying with the requirements for the space or zone into which the opening leads.

10.3 Bonding

Independent cargo tanks should be electrically bonded to the hull. All gasketed cargo-pipe joints and hose connections should be electrically bonded.

10.4 Electrical requirements for individual products

Electrical requirements for individual products are shown in column i in the table of chapter 17.

Chapter 11
Fire protection and fire extinction

11.1 Application

11.1.1 The requirements for tankers in chapter II-2 of the 1983 SOLAS amendments should apply to ships covered by the Code, irrespective of tonnage, including ships of less than 500 tons gross tonnage, except that :

.1 regulations 60, 61, 62 and 63 should not apply ;

.2 regulation 56.2, i.e. the requirements for location of the main cargo control station, need not apply ;

.3 regulation 4, as applicable to cargo ships, and regulation 7 should apply as they would apply to tankers of 2,000 tons gross tonnage and over ;

.4 the provisions of 11.3 should apply in lieu of regulation 61 ; and

.5 the provisions of 11.2 should apply in lieu of regulation 63.

11.1.2 Notwithstanding the provisions of 11.1.1, ships engaged solely in the carriage of products which are non-flammable (entry NF in column i of the table of minimum requirements) need not comply with part D of chapter II-2 of the 1983 SOLAS amendments, provided that they comply with part C of that chapter, except that regulation 53 need not apply to such ships and 11.2 and 11.3 hereunder need not apply.

11.1.3 For ships engaged solely in the carriage of products with flashpoint above 60° C (entry “yes” in column i of the table of minimum requirements), the requirements of chapter II-2 of the 1983 SOLAS amendments may apply as specified in regulation II-2/55.4 in lieu of the provisions of this chapter.

11.2 Cargo pump-rooms

11.2.1 The cargo pump-room of any ship should be provided with a fixed fire-extinguishing system as follows :

.1 a carbon dioxide system as specified in regulation II-2/5.1 and .2 of the 1983 SOLAS amendments. A notice should be exhibited at the controls stating that the system is only to be used for fire-extinguishing and not for inerting purposes, due to the electrostatic ignition hazard. The alarms referred to in regulation II-2/5.1.6 of the 1983 SOLAS amendments should be safe for use in a flammable cargo vapour-air mixture. For the purpose of this requirement, an extinguishing system should be provided which would be suitable

for machinery spaces. However, the amount of gas carried should be sufficient to provide a quantity of free gas equal to 45% of the gross volume of the cargo pump-room in all cases ; or

.2 a halogenated hydrocarbon system as specified in regulation II-2/5.1 and .3 of the 1983 SOLAS amendments. A notice should be exhibited at the controls stating that the system is only to be used for fire-extinguishing and not for inerting purposes, due to the electrostatic ignition hazard. The alarms referred to in regulation II-2/5.1.6 of the 1983 SOLAS amendments should be safe for use in a flammable cargo vapour-air mixture. For the purpose of this requirement, an extinguishing system should be provided which would be suitable for machinery spaces but utilizing the following minimum design quantities, based on the gross volume of the cargo pump-room :

halon 1301	7%
halon 1211	5.5%
halon 2402	0.3 kg/m^3

11.2.2 Cargo pump-rooms of ships which are dedicated to the carriage of a restricted number of cargoes should be protected by an appropriate fire-extinguishing system approved by the Administration.

11.2.3 A fire-extinguishing system consisting of either a fixed pressure water-spray system or a high-expansion foam system could be provided for a cargo pump-room if cargoes will be carried which are not suited to extinguishment by carbon dioxide or equivalent media. The International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should reflect this conditional requirement.

11.3 Cargo area*

11.3.1 Every ship should be provided with a fixed deck foam system in accordance with the requirements of 11.3.2 to 11.3.12.

11.3.2 Only one type of foam concentrate should be supplied, and it should be effective for the maximum possible number of cargoes intended to be carried. For other cargoes for which foam is not effective or is incompatible, additional arrangements to the satisfaction of the Administration should be provided. Regular protein foam should not be used.

11.3.3 The arrangements for providing foam should be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank, the deck of which is assumed to be ruptured.

* Reference is made to MSC/Circ. 314 (see page 224), which provides guidance for calculating the capacity of foam systems for chemical tankers and may be used in applying the requirements for extinguishing media of the Code.

11.3.4 The deck foam system should be capable of simple and rapid operation. The main control station for the system should be suitably located outside of the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fires in the areas protected.

11.3.5 The rate of supply of foam solution should be not less than the greatest of the following :

.1 2 l/min per square metre of the cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces ;

.2 20 l/min per square metre of the horizontal sectional area of the single tank having the largest such area ;

.3 10 l/min per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 l/min. For ships of less than 4,000 tonnes deadweight, the minimum capacity of the monitor should be to the satisfaction of the Administration.

11.3.6 Sufficient foam concentrate should be supplied to ensure at least 30 minutes of foam generation when using the highest of the solution rates stipulated in 11.3.5.1, 11.3.5.2 and 11.3.5.3.

11.3.7 Foam from the fixed foam system should be supplied by means of monitors and foam applicators. At least 50% of the foam rate required in 11.3.5.1 or 11.3.5.2 should be delivered from each monitor. The capacity of any monitor should be at least 10 l/min of foam solution per square metre of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity should be not less than 1,250 l/min. For ships of less than 4,000 tonnes deadweight, the minimum capacity of the monitor should be to the satisfaction of the Administration.

11.3.8 The distance from the monitor to the farthest extremity of the protected area forward of that monitor should be not more than 75% of the monitor throw in still air conditions.

11.3.9 A monitor and hose connection for a foam applicator should be situated both port and starboard at the poop front or accommodation spaces facing the cargo area.

11.3.10 Applicators should be provided for flexibility of action during fire-fighting operations and to cover areas screened from the monitors. The capacity of any applicator should be not less than 400 l/min and the applicator throw in still air conditions should be not less than 15 m. The number of foam applicators provided should be not less than four. The number and disposition of foam main outlets should be such that foam from at least two applicators can be directed to any part of the cargo tanks deck area.

11.3.11 Valves should be provided in the foam main, and in the fire main where this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

11.3.12 Operation of a deck foam system at its required output should permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

11.3.13 Ships which are dedicated to the carriage of a restricted number of cargoes should be protected by alternative provisions to the satisfaction of the Administration when they are just as effective for the products concerned as the deck foam system required for the generality of flammable cargoes.

11.3.14 Suitable portable fire-extinguishing equipment for the products to be carried should be provided and kept in good operating order.

11.3.15 Where flammable cargoes are to be carried, all sources of ignition should be excluded from hazardous locations referred to in 10.2.

11.3.16 Ships fitted with bow or stern loading and unloading arrangements should be provided with one additional foam monitor meeting the requirements of 11.3.7 and one additional applicator meeting the requirements of 11.3.10. The additional monitor should be located to protect the bow or stern loading and unloading arrangements. The area of the cargo line forward or aft of the cargo area should be protected by the above-mentioned applicator.

11.4 Special requirements

Fire-extinguishing media determined to be effective for certain products are listed in column / in the table of chapter 17.

Chapter 12
Mechanical ventilation in the cargo area

For ships to which the Code applies, the requirements of this chapter replace the requirements of regulation II-2/59.3 of the 1983 SOLAS amendments.
However, for products addressed under paragraphs 11.1.2 and 11.1.3, except acids and products for which paragraph 15.17 applies, regulation II-2/59.3 of the 1983 SOLAS amendments may apply in lieu of the provisions of this chapter.

12.1 Spaces normally entered during cargo-handling operations

12.1.1 Cargo pump-rooms and other enclosed spaces which contain cargo-handling equipment and similar spaces in which work is performed on the cargo should be fitted with mechanical ventilation systems, capable of being controlled from outside such spaces.

12.1.2 Provision should be made to ventilate such spaces prior to entering the compartment and operating the equipment and a warning notice requiring the use of such ventilation should be placed outside the compartment.

12.1.3 Mechanical ventilation inlets and outlets should be arranged to ensure sufficient air movement through the space to avoid the accumulation of toxic or flammable vapours or both (taking into account their vapour densities) and to ensure sufficient oxygen to provide a safe working environment, but in no case should the ventilation system have a capacity of less than 30 changes of air per hour, based upon the total volume of the space. For certain products, increased ventilation rates for cargo pump-rooms are prescribed in 15.17.

12.1.4 Ventilation systems should be permanent and should normally be of the extraction type. Extraction from above and below the floor plates should be possible. In rooms housing motors driving cargo pumps, the ventilation should be of the positive-pressure type.

12.1.5 Ventilation exhaust ducts from spaces within the cargo area should discharge upwards in locations at least 10 m in the horizontal direction from ventilation intakes and openings to accommodation, service and machinery spaces and control stations and other spaces outside the cargo area.

12.1.6 Ventilation intakes should be so arranged as to minimize the possibility of recycling hazardous vapours from any ventilation discharge opening.

12.1.7 Ventilation ducts should not be led through accommodation, service and machinery spaces or other similar spaces.

12.1.8 Electric motors driving fans should be placed outside the ventilation ducts if the carriage of flammable products is intended. Ventilation fans and fan ducts, in way of fans only, for hazardous locations referred to in chapter 10 should be of non-sparking construction, defined as :

.1 impellers or housing of nonmetallic construction, due regard being paid to the elimination of static electricity ;

.2 impellers and housing of nonferrous materials ;

.3 impellers and housing of austenitic stainless steel ; and

.4 ferrous impellers and housing with not less than 13 mm design tip clearance.

Any combination of an aluminium or magnesium alloy fixed or rotating component and a ferrous fixed or rotating component, regardless of tip clearance, is considered a sparking hazard and should not be used in these places.

12.1.9 Sufficient spare parts should be carried for each type of fan on board required by this chapter.

12.1.10 Protection screens of not more than 13 mm square mesh should be fitted in outside openings of ventilation ducts.

12.2 Pump-rooms and other enclosed spaces normally entered

Pump-rooms and other enclosed spaces normally entered which are not covered by 12.1.1 should be fitted with mechanical ventilation systems, capable of being controlled from outside such spaces and complying with the requirements of 12.1.3, except that the capacity should not be less than 20 changes of air per hour, based upon the total volume of the space. Provision should be made to ventilate such spaces prior to personnel entering.

12.3 Spaces not normally entered

Double bottoms, cofferdams, duct keels, pipe tunnels, hold spaces and other spaces where cargo may accumulate should be capable of being ventilated to ensure a safe environment when entry into the spaces is necessary. Where a permanent ventilation system is not provided for such spaces, approved means of portable mechanical ventilation should be provided. Where necessary, owing to the arrangement of spaces, for instance hold spaces, essential ducting for ventilation should be permanently installed. For permanent installations the capacity of eight air changes per hour should be provided and for portable systems the capacity of 16 air changes per hour. Fans or blowers should be clear of personnel access openings, and should comply with 12.1.8.

Chapter 13
Instrumentation

13.1 Gauging

13.1.1 Cargo tanks should be fitted with one of the following types of gauging devices :

.1 *Open device* — which makes use of an opening in the tanks and may expose the gauger to the cargo or its vapour. An example of this is the ullage opening.

.2 *Restricted device* — which penetrates the tank and which, when in use, permits a small quantity of cargo vapour or liquid to be exposed to the atmosphere. When not in use, the device is completely closed. The design should ensure that no dangerous escape of tank contents (liquid or spray) can take place in opening the device.

.3 *Closed device* — which penetrates the tank, but which is part of a closed system and keeps tank contents from being released. Examples are the float-type systems, electronic probe, magnetic probe and protected sight-glass. Alternatively, an indirect device which does not penetrate the tank shell and which is independent of the tank may be used. Examples are weighing of cargo, pipe flow meter.

13.1.2 Gauging devices should be independent of the equipment required under 15.19.

13.1.3 Open gauging and restricted gauging should be allowed only where :

.1 open venting is allowed by the Code ; or

.2 means are provided for relieving tank pressure before the gauge is operated.

13.1.4 Types of gauging for individual products are shown in column j in the table of chapter 17.

13.2 Vapour detection

13.2.1 Ships carrying toxic or flammable products or both should be equipped with at least two instruments designed and calibrated for testing for the specific vapours in question. If such instruments are not capable of testing for both toxic concentrations and flammable concentrations, then two separate sets of instruments should be provided.

13.2.2 Vapour-detection instruments may be portable or fixed. If a fixed system is installed, at least one portable instrument should be provided.

13.2.3 When toxic-vapour-detection equipment is not available for some products which require such detection, as indicated in column k in the table of chapter 17, the Administration may exempt the ship from the requirement, provided an appropriate entry is made on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk. When granting such an exemption, the Administration should recognize the necessity for additional breathing-air supply and an entry should be made on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk drawing attention to the provisions of 14.2.4 and 16.4.2.2.

13.2.4 Vapour-detection requirements for individual products are shown in column k in the table of chapter 17.

Chapter 14
Personnel protection

14.1 Protective equipment

14.1.1 For the protection of crew members who are engaged in loading and discharging operations, the ship should have on board suitable protective equipment consisting of large aprons, special gloves with long sleeves, suitable footwear, coveralls of chemical-resistant material, and tight-fitting goggles or face shields or both. The protective clothing and equipment should cover all skin so that no part of the body is unprotected.

14.1.2 Work clothes and protective equipment should be kept in easily accessible places and in special lockers. Such equipment should not be kept within accommodation spaces, with the exception of new, unused equipment and equipment which has not been used since undergoing a thorough cleaning process. The Administration may, however, approve storage rooms for such equipment within accommodation spaces if adequately segregated from living spaces such as cabins, passageways, dining rooms, bathrooms, etc.

14.1.3 Protective equipment should be used in any operation which may entail danger to personnel.

14.2 Safety equipment

14.2.1 Ships carrying cargoes for which 15.12, 15.12.1 or 15.12.3 is listed in column o in the table of chapter 17 should have on board sufficient but not less than three complete sets of safety equipment, each permitting personnel to enter a gas-filled compartment and perform work there for at least 20 min. Such equipment should be in addition to that required by regulation II-2/17 of the 1983 SOLAS amendments.

14.2.2 One complete set of safety equipment should consist of :

.1 one self-contained air-breathing apparatus (not using stored oxygen) ;

.2 protective clothing, boots, gloves and tight-fitting goggles ;

.3 fireproof lifeline with belt resistant to the cargoes carried ; and

.4 explosion-proof lamp.

14.2.3 For the safety equipment required in 14.2.1, all ships should carry either :

.1 one set of fully charged spare air bottles for each breathing apparatus ;

.2 a special air compressor suitable for the supply of high-pressure air of the required purity ;

.3 a charging manifold capable of dealing with sufficient spare air bottles for the breathing apparatus ; or

.4 fully charged spare air bottles with a total free air capacity of at least 6,000 l for each breathing apparatus on board in excess of the requirements of regulation II-2/17 of the 1983 SOLAS amendments.

14.2.4 A cargo pump-room on ships carrying cargoes which are subject to the requirements of 15.18 or cargoes for which in column k in the table of chapter 17 toxic-vapour-detection equipments is required but is not available should have either :

.1 a low-pressure line system with hose connections suitable for use with the breathing apparatus required by 14.2.1. This system should provide sufficient high-pressure air capacity to supply, through pressure-reduction devices, enough low-pressure air to enable two men to work in a gas-dangerous space for at least 1 h without using the air bottles of the breathing apparatus. Means should be provided for recharging the fixed air bottles and the breathing apparatus air bottles from a special air compressor suitable for the supply of high-pressure air of the required purity ; or

.2 an equivalent quantity of spare bottled air in lieu of the low-pressure air line.

14.2.5 At least one set of safety equipment as required by 14.2.2 should be kept in a suitable clearly marked locker in a readily accessible place near the cargo pump-room. The other sets of safety equipment should also be kept in suitable, clearly marked, easily accessible places.

14.2.6 The breathing apparatus should be inspected at least once a month by a responsible officer, and the inspection recorded in the ship's log-book. The equipment should be inspected and tested by an expert at least once a year.

14.2.7 A stretcher which is suitable for hoisting an injured person up from spaces such as the cargo pump-room should be placed in a readily accessible location.

14.2.8 Ships intended for the carriage of certain cargoes should be provided with suitable respiratory and eye protection sufficient for every person on board for emergency escape purposes, subject to the following :

.1 filter-type respiratory protection is unacceptable ;

.2 self-contained breathing apparatus should have normally at least a duration of service of 15 min ;

.3 emergency escape respiratory protection should not be used for fire-fighting or cargo-handling purposes and should be marked to that effect.

Individual cargoes to which the provisions of this paragraph apply are indicated in column n in the table of chapter 17.

14.2.9 The ship should have on board medical first-aid equipment, including oxygen resuscitation equipment and antidotes for cargoes to be carried, based on the guidelines developed by the Organization*.

14.2.10 Suitably marked decontamination showers and an eyewash should be available on deck in convenient locations. The showers and eyewash should be operable in all ambient conditions.

* Reference is made to the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), which provides advice on the treatment of casualties in accordance with the symptoms exhibited as well as equipment and antidotes that may be appropriate for treating the casualty.

Chapter 15
Special requirements

The provisions of this chapter are applicable where specific reference is made in column o in the table of chapter 17. These requirements are additional to the general requirements of the Code.

15.1 Acetone cyanohydrin and lactonitrile solution (80% or less)

Acetone cyanohydrin and lactonitrile solution (80% or less) should be stabilized with an inorganic acid to prevent decomposition. A certificate of stabilization should be provided by the manufacturer, and kept on board, 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 length of voyage exceed the effective lifetime of the stabilizer.

15.2 Ammonium nitrate solution (93% or less)

15.2.1 The ammonium nitrate solution should contain at least 7% by weight of water. The acidity (pH) of the cargo when diluted with ten parts of water to one part of cargo by weight should be between 5.0 and 7.0. The solution should not contain more than 10 ppm chloride ions, 10 ppm ferric ions, and should be free of other contaminants.

15.2.2 Tanks and equipment for ammonium nitrate solution should be independent of tanks and equipment containing other cargoes or combustible products. Equipment which may, in service or when defective, release combustible products into the cargo, e.g. lubricants, should not be used. Tanks should not be used for seawater ballast.

15.2.3 Except where expressly approved by the Administration, ammonium nitrate solutions should not be transported in tanks which have previously contained other cargoes unless tanks and associated equipment have been cleaned to the satisfaction of the Administration.

15.2.4 The temperature of the heat-exchanging medium in the tank heating system should not exceed 160° C. The heating system should be provided with a control system to keep the cargo at a bulk mean temperature of 140° C. High-temperature alarms at 145° C and 150° C and a low-temperature alarm at 125° C should be provided. Where the temperature of the heat-exchanging medium exceeds 160° C,

an alarm should also be given. Temperature alarms and controls should be located on the navigating bridge.

15.2.5 If the bulk mean cargo temperature reaches 145° C, a cargo sample should be diluted with ten parts of distilled or demineralized water to one part of cargo by weight and the pH should be determined by means of a narrow-range indicator paper or stick. Acidity measurements should then be taken every 24 hours. If the pH is found to be below 4.2, ammonia gas should be injected into the cargo until the pH of 5.0 is reached.

15.2.6 A fixed installation should be provided to inject ammonia gas into the cargo. Controls for this system should be located on the navigation bridge. For this purpose, 300 kg of ammonia per 1,000 tonnes of ammonium nitrate solution should be available on board.

15.2.7 Cargo pumps should be of the centrifugal deepwell type or of the centrifugal type with water-flushed seals.

15.2.8 Vent piping should be fitted with approved weatherhoods to prevent clogging. Such weatherhoods should be accessible for inspection and cleaning.

15.2.9 Hot work on tanks, piping and equipment which have been in contact with ammonium nitrate solution should only be done after all traces of ammonium nitrate have been removed, inside as well as outside.

15.3 Carbon disulphide

Carbon disulphide may be carried either under a water pad or under a suitable inert gas pad as specified in the following paragraphs.

Carriage under water pad

15.3.1 Provision should be made to maintain a water pad in the cargo tank during loading, unloading and transit. In addition, a suitable inert gas pad should be maintained in the ullage space during transit.

15.3.2 All openings should be in the top of the tank, above the deck.

15.3.3 Loading lines should terminate near the bottom of the tank.

15.3.4 A standard ullage opening should be provided for emergency sounding.

15.3.5 Cargo piping and vent lines should be independent of piping and vent lines used for other cargo.

15.3.6 Pumps may be used for discharging cargo provided they are of the deepwell or hydraulically driven submersible types. The means of driving a deepwell pump should not present a source of ignition for carbon disulphide and should not employ equipment that may exceed a temperature of 80°C.

15.3.7 If a cargo discharge pump is used, it should be inserted through a cylindrical well extending from the tank top to a point near the tank bottom. A water pad should be formed in this well before attempting pump removal unless the tank has been certified as gas-free.

15.3.8 Water or inert-gas displacement may be used for discharging cargo, provided the cargo system is designed for the expected pressure and temperature.

15.3.9 Safety relief valves should be of stainless steel construction.

15.3.10 Because of its low ignition temperature and close clearances required to arrest its flame propagation, only intrinsically safe systems and circuits are permitted in the hazardous locations described in 10.2.3.

Carriage under suitable inert gas pad

15.3.11 Carbon disulphide should be carried in independent tanks with a design pressure of not less than 0.6 bar gauge.

15.3.12 All openings should be located on the top of the tank, above the deck.

15.3.13 Gaskets used in the containment system should be of a material which does not react with, or dissolve in, carbon disulphide.

15.3.14 Threaded joints should not be permitted in the cargo containment system, including the vapour lines.

15.3.15 Prior to loading, the tank(s) should be inerted with suitable inert gas until the oxygen level is 2% by volume or lower. Means should be provided to automatically maintain a positive pressure in the tank using suitable inert gas during loading, transport and discharge. The system should be able to maintain this positive pressure between 0.1 and 0.2 bar gauge, and should be remotely monitored and fitted with over/underpressure alarms.

15.3.16 Hold spaces surrounding an independent tank carrying carbon disulphide should be inerted by a suitable inert gas until the oxygen level is 2% or less. Means should be provided to monitor and maintain this condition throughout the voyage. Means should also be provided to sample these spaces for carbon disulphide vapour.

15.3.17 Carbon disulphide should be loaded, transported and discharged in such a manner that venting to the atmosphere does not occur. If carbon disulphide vapour is returned to shore during loading or

to the ship during discharge, the vapour return system should be independent of all other containment systems.

15.3.18 Carbon disulphide should be discharged only by submerged deepwell pumps or by a suitable inert gas displacement. The submerged deepwell pumps should be operated in a way that prevents heat build-up in the pump. The pump should also be equipped with a temperature sensor in the pump housing with remote readout and alarm in the cargo control room. The alarm should be set at 80°C. The pump should also be fitted with an automatic shut-down device, if the tank pressure falls below atmospheric pressure during the discharge.

15.3.19 Air should not be allowed to enter the cargo tank, cargo pump or lines while carbon disulphide is contained in the system.

15.3.20 No other cargo handling, tank cleaning or deballasting should take place concurrent with loading or discharge of carbon disulphide.

15.3.21 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 an uniform distribution rate of 10 l/m2/min. Remote manual operation should be arranged such that remote starting of pumps supplying the water-spray system and remote operation of any normally closed valves in the system can be carried out from a suitable location outside the cargo area adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected. 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 temperature permits, should be connected ready for immediate use during loading and unloading operations.

15.3.22 No cargo tanks should be more than 98% liquid-full at the reference temperature (R).

15.3.23 The maximum volume (VL) of cargo to be loaded in a tank should be:

$$V_L = 0{,}98V\frac{\rho_L}{\rho_L}$$

where:

V = volume of the tank

rR = relative density of cargo at the reference temperature (R)

rL = relative density of cargo at the loading temperature

R = reference temperature, i.e. the temperature at which the vapour pressure of the cargo corresponds to the set pressure of the pressurerelief valve.

15.3.24 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 approved by the Administration. A copy of the list should be permanently kept on board by the master.

15.3.25 Zones on open deck, or semi-enclosed spaces on open deck within three metres of a tank outlet, gas or vapour outlet, cargo pipe flange or cargo valve of a tank certified to carry carbon disulphide, should comply with the electrical equipment requirements specified for carbon disulphide in column "i", chapter 17. Also, within the specified zone, no other heat sources, like steam piping with surface temperatures in excess of 80°C should be allowed.

15.3.26 Means should be provided to ullage and sample the cargo without opening the tank or disturbing the positive suitable inert gas blanket.

15.3.27 The product should be transported only in accordance with a cargo handling plan that has been approved by the Administration. Cargo handling plans should show the entire cargo piping system. A copy of the approved cargo handling plan should be available on board. The International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be endorsed to include reference to the approved cargo handling plan.

15.4 Diethyl ether

15.4.1 Unless inerted, natural ventilation should be provided for the voids around the cargo tanks while the vessel is under way. If a mechanical ventilation system is installed, all blowers should be of non-sparking construction. Mechanical ventilation equipment should not be located in the void spaces surrounding the cargo tanks.

15.4.2 Pressure-relief-valve settings should not be less than 0.2 bar gauge for gravity tanks.

15.4.3 Inert-gas displacement may be used for discharging cargo from pressure tanks provided the cargo system is designed for the expected pressure.

15.4.4 In view of the fire hazard, provision should be made to avoid any ignition source or heat generation or both in the cargo area.

15.4.5 Pumps may be used for discharging cargo, provided that they are of a type designed to avoid liquid pressure against the shaft gland or are of a hydraulically operated submerged type and are suitable for use with the cargo.

15.4.6 Provision should be made to maintain the inert-gas pad in the cargo tank during loading, unloading and transit.

15.5 Hydrogen peroxide solutions

Hydrogen peroxide solutions over 60% but not over 70%

15.5.1 Hydrogen peroxide solutions over 60% but not over 70% should be carried in dedicated ships only and no other cargoes should be carried.

15.5.2 Cargo tanks and associated equipment should be either pure aluminium (99.5%) or solid stainless steel (304L, 316, 316L or 316Ti), and passivated in accordance with approved procedures. Aluminium should not be used for piping on deck. All nonmetallic materials of construction for the containment system should neither be attacked by hydrogen peroxide nor contribute to its decomposition.

15.5.3 Pump-rooms should not be used for cargo-transfer operations.

15.5.4 Cargo tanks should be separated by cofferdams from oil fuel tanks or any other space containing flammable or combustible materials.

15.5.5 Tanks intended for the carriage of hydrogen peroxide should not be used for seawater ballast.

15.5.6 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 tanks rises above 35° C, visible and audible alarms should be activated on the navigating bridge.

15.5.7 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. 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 be activated if the oxygen concentration in these void spaces exceeds 30% by volume. Two portable oxygen monitors should also be available as back-up systems.

15.5.8 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 5-hour period or when the temperature in the tank exceeds 40° C.

15.5.9 Cargo-tank venting systems should have pressure/vacuum-relief valves for normal controlled venting, and rupture discs or a similar device for emergency venting, should tank pressure rise rapidly as a result of uncontrolled decomposition. Rupture discs should be sized on the basis of tank design pressure, tank size and anticipated decomposition rate.

15.5.10 A fixed water-spray system should be provided for diluting and washing away any concentrated hydrogen peroxide solution spilled on deck. The areas covered by the water-spray should include

the manifold/hose connections and the tank tops of those tanks designated for carrying 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 5 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.

15.5.11 Hydrogen peroxide solutions should be stabilized to prevent decomposition. A certificate of stabilization should be provided by the manufacturer, and kept on board, 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 length of voyage exceed the effective lifetime of the stabilizer.

15.5.12 Only those hydrogen peroxide solutions which have a maximum decomposition rate of 1% 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.

15.5.13 Protective clothing that is resistant to hydrogen peroxide solutions should be provided for each crew member involved in cargo-transfer operations. Protective clothing should include nonflammable coveralls, suitable gloves, boots and eye protection.
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 (see page 225). 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 carried simultaneously.

.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 nonmetallic 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 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 temperature sensors should also be located on the navigating bridge. The visible and audible alarms should activate if the oxygen concentration in these void spaces exceeds 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 5-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 water-spray 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 5 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 the 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, and kept on board, 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% 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 nonflammable, suitable gloves, boots and eye protection.

15.5.26 During transfer of hydrogen peroxide the related piping system should be separated from all other systems. Cargo hoses used for transfer of hydrogen peroxide should be marked “FOR HYDROGEN PEROXIDE TRANSFER ONLY”.

15.6 Motor fuel anti-knock compounds (containing lead alkyls)

15.6.1 Tanks used for these cargoes should not be used for the transportation of any other cargo except those commodities to be used in the manufacture of motor fuel anti-knock compounds containing lead alkyls.

15.6.2 If a cargo pump-room is located on deck level according to 15.18, the ventilation arrangements should be in compliance with 15.17.

15.6.3 Entry into cargo tanks used for the transportation of these cargoes is not permitted unless approved by the Administration.

15.6.4 Air analysis should be made for lead content to determine if the atmosphere is satisfactory prior to allowing personnel to enter the cargo pump-room or void spaces surrounding the cargo tank.

15.7 Phosphorus, yellow or white

15.7.1 Phosphorus should, at all times, be loaded, carried and discharged under a water pad of 760 mm minimum depth. During discharge operations, arrangements should be made to ensure that water occupies the volume of phosphorus discharged. Any water discharged from a phosphorus tank should be returned only to a shore installation.

15.7.2 Tanks should be designed and tested to a minimum equivalent water head of 2.4 m above the top of the tank, under designed loading conditions, taking into account the depth, relative density and method of loading and discharge of the phosphorus.

15.7.3 Tanks should be so designed as to minimize the interfacial area between the liquid phosphorus and its water pad.

15.7.4 A minimum ullage space of 1% should be maintained above the water pad. The ullage space should be filled with inert gas or naturally ventilated by two cowled standpipes terminating at different heights but at least 6 m above the deck and at least 2 m above the pump-house top.

15.7.5 All openings should be at the top of cargo tanks, and fittings and joints attached thereto should be of materials resistant to phosphorus pentoxide.

15.7.6 Phosphorus should be loaded at a temperature not exceeding 60°C.

15.7.7 Tank heating arrangements should be external to tanks and have a suitable method of temperature control to ensure that the temperature of the phosphorus does not exceed 60°C. A high-temperature alarm should be fitted.

15.7.8 A water drench system acceptable to the Administration should be installed in all void spaces surrounding the tanks. The system should operate automatically in the event of an escape of phosphorus.

15.7.9 Void spaces referred to in 15.7.8 should be provided with effective means of mechanical ventilation which should be capable of being sealed off quickly in an emergency.

15.7.10 Loading and discharge of phosphorus should be governed by a central system on the ship which, in addition to incorporating high-level alarms, should ensure that no overflow of tanks is possible and that such operations can be stopped quickly in an emergency from either ship or shore.

15.7.11 During cargo transfer, a water hose on deck should be connected to a water supply and kept flowing throughout the operation so that any spillage of phosphorus may be washed down with water immediately.

15.7.12 Ship-to-shore loading and discharge connections should be of a type approved by the Administration.

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. benzenesulphonic) ;

.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 in accordance with recognized standards. 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 autoignition temperature of these products and which are fire-resistant and posses adequate mechanical behaviour. The surface presented to the cargo should be polytetrafluoroethylene (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.

15.8.10 Insulation and packing, if used, should be of a material which does not react with, dissolve in, or lower the autoignition 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 discharge 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 temperature 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 the 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 section 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-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.

* See 15.14.7.2

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 in-advertent 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 :

$V_L = 0,98\ V\ \rho_R/\rho_L$

Where

V_L : maximum volume to which the tank may be loaded

V : volume of the tank

ρ_R : relative density of cargo at the reference temperature

ρ_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.

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. Remote manual operation should be arranged such that remote starting of pumps supplying the water-spray system and remote operation of any normally closed valves in the system can be carried out from a suitable location outside the cargo area, adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected. 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 atmos-

* See 15.14.7.2.

pheric temperatures permit, should be connected ready for immediate use during loading and unloading operations.

15.8.30 A remotely operated, controlled closing-rate, shutoff valve should be provided at each cargo-hose connection used during cargo transfer.

15.9 Sodium chlorate solution (50% or less)

15.9.1 Tanks and associated equipment which have contained this product may be used for other cargoes after thorough cleaning by washing or purging.

15.9.2 In the event of spillage of this product, all spilled liquid should be thoroughly washed away without delay. To minimize fire risk, spillage should not be allowed to dry out.

15.10 Sulphur (molten)

15.10.1 Cargo-tank ventilation should be provided to maintain the concentration of hydrogen sulphide below one half of its lower explosive limit throughout the cargo-tank vapour space for all conditions of carriage, i.e. below 1.85% by volume.

15.10.2 Where mechanical ventilation systems are used for maintaining low gas concentrations in cargo tanks, an alarm system should be provided to give warning if the system fails.

15.10.3 Ventilation systems should be so designed and arranged as to preclude depositing of sulphur within the system.

15.10.4 Openings to void spaces adjacent to cargo tanks should be so designed and fitted as to prevent the entry of water, sulphur or cargo vapour.

15.10.5 Connections should be provided to permit sampling and analysing of vapour in void spaces.

15.10.6 Cargo temperature controls should be provided to ensure that the temperature of the sulphur does not exceed 155° C.

15.11 Acids

15.11.1 The ship's shell plating should not form any boundaries of tanks containing mineral acids.

15.11.2 Proposals for lining steel tanks and related piping systems with corrosion-resistant materials may be considered by the Administration. The elasticity of the lining should not be less than of the supporting boundary plating.

15.11.3 Unless constructed wholly of corrosion-resistant materials or fitted with an approved lining, the plating thickness should take into account the corrosivity of the cargo.

15.11.4 Flanges of the loading and discharge manifold connections should be provided with shields, which may be portable, to guard against the danger of the cargo being sprayed ; and in addition, drip trays should also be provided to guard against leakage on to the deck.

15.11.5 Because of the danger of evolution of hydrogen when these substances are being carried, the electrical arrangements should comply with 10.2.3.1, 10.2.3.2, 10.2.3.3, 10.2.3.4, 10.2.3.6 and 10.2.3.7. The certified safe type equipment should be suitable for use in hydrogen-air mixtures. Other sources of ignition should not be permitted in such spaces.

15.11.6 Substances subjected to the requirements of this section should be segregated from oil fuel tanks, in addition to the segregation requirements in 3.1.1.

15.11.7 Provision should be made for suitable apparatus to detect leakage of cargo into adjacent spaces.

15.11.8 The cargo pump-room bilge pumping and drainage arrangements should be of corrosion-resistant materials.

15.12 Toxic products

15.12.1 Exhaust openings of tank vent systems should be located :

.1 at a height of B/3 or 6 m, whichever is greater, above the weather deck or, in the case of a deck tank, the access gangway ;

.2 not less than 6 m above the fore-and-aft gangway, if fitted within 6 m of the gangway ; and

.3 15 m from any opening or air intake to any accommodation and service spaces ;

.4 the vent height may be reduced to 3 m above the deck or fore-and-aft gangway, as applicable, provided high-velocity vent valves of an approved type, directing the vapour-air mixture upwards in an unimpeded jet with an exit velocity of at least 30 m/s, are fitted.

15.12.2 Tank venting systems should be provided with a connection for a vapour-return line to the shore installation.

15.12.3 Products should :

.1 not be stowed adjacent to oil fuel tanks ;

.2 have separate piping systems ; and

.3 have tank vent systems separate from tanks containing nontoxic products.

(See also 3.7.2)

15.12.4 Cargo-tank relief-valve settings should be a minimum of 0.2 bar gauge.

15.13 Cargoes protected by additives

15.13.1 Certain cargoes with a reference in column o in the table of chapter 17, by the nature of their chemical make-up, tend, under certain conditions of temperature, exposure to air or contact with a catalyst, to undergo polymerization, decomposition, oxidation or other chemical changes. Mitigation of this tendency is carried out by introducing small amounts of chemical additives into the liquid cargo or controlling the cargo-tank environment.

15.13.2 Ships carrying these cargoes should be so designed as to eliminate from the cargo tanks and cargo-handling system any material of construction or contaminants which could act as a catalyst or destroy the inhibitor.

15.13.3 Care should be taken to ensure that these cargoes are sufficiently protected to prevent deleterious chemical change at all times during the voyage. Ships carrying such cargoes should be provided with a certificate of protection from the manufacturer, and kept during the voyage, specifying :

.1 the name and amount of additive present ;

.2 whether the additive is oxygen-dependent ;

.3 date additive was put in the product and duration of effectiveness ;

.4 any temperature limitations qualifying the additives' effective lifetime ; and

.5 the action to be taken should the length of voyage exceed the effective lifetime of the additives.

15.13.4 Ships using the exclusion of air as the method of preventing oxidation of the cargo should comply with 9.1.3.

15.13.5 A product containing an oxygen-dependent additive should be carried without inertion (in tanks of a size not greater than 3,000 m^3). Such cargoes should not be carried in a tank requiring inertion under the requirements of SOLAS chapter II-2.

15.13.6 Venting systems should be of a design that eliminates blockage from polymer build-up. Venting equipment should be of a type that can be checked periodically for adequacy of operation.

15.13.7 Crystallization or solidification of cargoes normally carried in the molten state can lead to depletion of inhibitor in parts of the tank's contents. Subsequent remelting can thus yield pockets of uninhibited liquid, with the accompanying risk of dangerous polymerization. To prevent this, care should be taken to ensure that at no time are such cargoes allowed to crystallize or solidify, either wholly or partially, in any part of the tank. Any required heating arrangements should be such as to ensure that in no part of the tank does cargo become overheated to such an extent that any dangerous polymerization can be initiated. If the temperature from steam coils would induce overheating, an indirect low-temperature heating system should be used.

15.14 Cargoes with a vapour pressure greater than 1.013 bar absolute at 37.8° C

15.14.1 For a cargo referenced in column o in the table of chapter 17 to this section, a mechanical refrigeration system should be provided unless the cargo system is designed to withstand the vapour pressure of the cargo at 45° C. Where the cargo system is designed to withstand the vapour pressure of the cargo at 45° C, and no refrigeration system is provided, a notation should be made in the conditions of carriage on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk to indicate the required relief-valve setting for the tanks.

15.14.2 A mechanical refrigeration system should maintain the liquid temperature below the boiling temperature at the cargo-tank design pressure.

15.14.3 When ships operate in restricted areas and at restricted times of the year, or on voyages of limited duration, the Administration involved may agree to waive requirements for a refrigeration system. A notation of any such agreement, listing geographic area restrictions and times of the year, or voyage duration limitations, should be included in the conditions of carriage on the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk.

15.14.4 Connections should be provided for returning expelled gases to shore during loading.

15.14.5 Each tank should be provided with a pressure gauge which indicates the pressure in the vapour space above the cargo.

15.14.6 Where the cargo needs to be cooled, thermometers should be provided at the top and bottom of each tank.

15.14.7.1 No cargo tanks should be more than 98% liquid-full at the reference temperature (R).

15.14.7.2 The maximum volume (V_L) of cargo to be loaded in a tank should be :

$V_L = 0.98\ V\ \rho_R/\rho_L$

where

V : volume of the tank

ρ_R : relative density of cargo at the reference temperature (R)

ρ_L : relative density of cargo at the loading temperature

R : reference temperature, i.e. the temperature at which the vapour pressure of the cargo corresponds to the set pressure of the pressure-relief valve.

15.14.7.3 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 approved by the Administration. A copy of the list should be permanently kept on board by the master.

15.15 Cargoes with low ignition temperature and wide flammability range

[Deleted]

15.16 Cargo contamination

15.16.1 Where column o in the table of chapter 17 refers to this section, alkaline or acidic materials, such as caustic soda or sulphuric acid, should not be allowed to contaminate the cargo.

15.16.2 Where column o in the table of chapter 17 refers to this section, water should not be allowed to contaminate this cargo. In addition, the following provisions apply :

.1 Air inlets to pressure/vacuum-relief valves of tanks containing the cargo should be situated at least 2 m above the weather deck.

.2 Water or steam should not be used as the heat-transfer media in a cargo temperature control system required by chapter 7.

.3 The cargo should not be carried in cargo tanks adjacent to permanent ballast or water tanks unless the tanks are empty and dry.

.4 The cargo should not be carried in tanks adjacent to slop tanks or cargo tanks containing ballast or slops or other cargoes containing water which may react in a dangerous manner. Pumps, pipes or vent lines serving such tanks should be separate from similar

equipment serving tanks containing the cargo. Pipelines from slop tanks or ballast lines should not pass through tanks containing the cargo unless encased in a tunnel.

15.17 Increased ventilation requirements

For certain products, the ventilation system as described in 12.1.3 should have a minimum capacity of at least 45 changes of air per hour, based upon the total volume of space. The ventilation system exhaust ducts should discharge at least 10 m away from openings into accommodation spaces, work areas or other similar spaces, and intakes to ventilation systems, and at least 4 m above the tank deck.

15.18 Special cargo pump-room requirements

For certain products, the cargo pump-room should be located on the deck level or cargo pumps should be located in the cargo tank. The Administration may give special consideration to cargo pump-rooms below deck.

15.19 Overflow control

15.19.1 The provisions of this section are applicable where specific reference is made in column o in the table of chapter 17, and are in addition to the requirements for gauging devices.

15.19.2 In the event of a power failure on any system essential for safe loading, an alarm should be given to the operators concerned.

15.19.3 Loading operations should be terminated at once in the event of any system essential for safe loading becoming inoperative.

15.19.4 Level alarms should be capable of being tested prior to loading.

15.19.5 The high-level alarm system required under 15.19.6 should be independent of the overflow-control system required by 15.19.7 and should be independent of the equipment required by 13.1.

15.19.6 Cargo tanks should be fitted with a visual and audible high-level alarm which complies with 15.19.1 to 15.19.5 and which indicates when the liquid level in the cargo tank approaches the normal full condition.

15.19.7 A tank overflow-control system required by this section should :

.1 come into operation when the normal tank loading procedures fail to stop the tank liquid level exceeding the normal full condition ;

.2 give a visual and audible tank-overflow alarm to the ship's operator ; and

.3 provide an agreed signal for sequential shutdown of onshore pumps or valves or both and of the ship's valves. The signal, as well as the pump and valve shutdown, may be dependent on operator's intervention. The use of shipboard automatic closing valves should be permitted only when specific approval has been obtained from the Administration and the port State authority concerned.

15.19.8 The loading rate (LR) of the tank should not exceed :

LR = 3600 U/t (m^3/h)

where

U : ullage volume (m^3) at operating signal level ;

t : time(s) needed from the initiating signal to fully stopping the cargo flow into the tank, being the sum of times needed for each step in sequential operations such as operator's responses to signals, stopping pumps and closing valves ;

and should also take into account the pipeline system design pressure.

15.20 Alkyl (C_7 — C_9) nitrates, all isomers

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

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

.1 the tanks are sufficiently insulated from fire ; and

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

15.21 Temperature sensors

Temperature sensors should be used to monitor the cargo-pump temperature to detect overheating due to pump failures.

Chapter 16

*Operational requirements**

16.1 Maximum allowable quantity of cargo per tank

16.1.1 The quantity of cargo required to be carried in a type 1 ship should not exceed 1,250 m^3 in any one tank.

16.1.2 The quantity of cargo required to be carried in a type 2 ship should not exceed 3,000 m^3 in any one tank.

16.1.3 Tanks carrying liquids at ambient temperatures should be so loaded as to avoid the tank becoming liquid-full during the voyage, having due regard to the highest temperature which the cargo may reach.

16.2 Cargo information

16.2.1 A copy of this Code, or national regulations incorporating the provisions of this Code, should be on board every ship covered by this Code.

16.2.2 Any cargo offered for bulk shipment should be indicated in the shipping documents by the correct technical name. Where the cargo is a mixture, an analysis indicating the dangerous components contributing significantly to the total hazard of the product should be provided, or a complete analysis if this is available. Such an analysis should be certified by the manufacturer or by an independent expert acceptable to the Administration.

16.2.3 Information should be on board, and available to all concerned, giving the necessary data for the safe carriage of the cargo. Such information should include a cargo stowage plan, to be kept in an accessible place, indicating all cargo on board, including each dangerous chemical carried :

.1 a full description of the physical and chemical properties, including reactivity, necessary for the safe containment of the cargo ;

.2 action to be taken in the event of spills or leaks ;

.3 countermeasures against accidental personal contact ;

.4 fire-fighting procedures and fire-fighting media ;

* Attention is also drawn to the operation guidelines contained in the ICS Tanker Safety Guide (Chemicals).

.5 procedures for cargo transfer, tank cleaning, gas-freeing and ballasting ;

.6 for those cargoes required to be stabilized or inhibited in accordance with 15.1, 15.5.11 or 15.13.3, the cargo should be refused if the certificate required by these paragraphs is not supplied.

16.2.4 If sufficient information necessary for the safe transportation of the cargo is not available, the cargo should be refused.

16.2.5 Cargoes which evolve highly toxic imperceptible vapours should not be transported unless perceptible additives are introduced into the cargo.

16.2.6 Where column o 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 o 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 o 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 o in the table of chapter 17 refers to this paragraph, the cargo's melting point should be indicated in the shipping document.

16.3 Personnel training**

16.3.1 All personnel should be adequately trained in the use of protective equipment and have basic training in the procedures appropriate to their duties necessary under emergency conditions.

16.3.2 Personnel involved in cargo operations should be adequately trained in handling procedures.

* Special areas are defined in regulation 1(7) of Annex II to MARPOL 73/78.
** Reference is made to the provisions of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995, and in particular to the “Mandatory minimum requirements for the training and qualification of masters, officers and ratings on tankers” – regulation V/1 of the annex to that Convention – and to section A-V/1 of the STCW Code (paragraphs 15 to 21).

16.3.3 Officers should be trained in emergency procedures to deal with conditions of leakage, spillage or fire involving the cargo, based on the guidelines developed by the Organization*, and a sufficient number of them should be instructed and trained in essential first aid for cargoes carried.

16.4 Opening of and entry into cargo tanks

16.4.1 During handling and carriage of cargoes producing flammable or toxic vapours, or both, or when ballasting after the discharge of such cargo, or when loading or unloading cargo, cargo-tank lids should always be kept closed. With any hazardous cargo, cargo-tank lids, ullage and sighting ports and tank washing access covers should be open only when necessary.

16.4.2 Personnel should not enter cargo tanks, void spaces around such tanks, cargo-handling spaces or other enclosed spaces unless :

.1 the compartment is free of toxic vapours and not deficient in oxygen ; or

.2 personnel wear breathing apparatus and other necessary protective equipment, and the entire operation is under the close supervision of a responsible officer.

16.4.3 Personnel should not enter such spaces when the only hazard is of a purely flammable nature, except under the close supervision of a responsible officer.

16.5 Stowage of cargo samples

16.5.1 Samples which have to be kept on board should be stowed in a designated space situated in the cargo area or, exceptionally, elsewhere, subject to the approval of the Administration.

16.5.2 The stowage space should be :

.1 cell-divided in order to avoid shifting of the bottles at sea ;

.2 made of material fully resistant to the different liquids intended to be stowed ; and

.3 equipped with adequate ventilation arrangements.

16.5.3 Samples which react with each other dangerously should not be stowed close to each other.

16.5.4 Samples should not be retained on board longer than necessary.

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* Refer to the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), which provides advice on the treatment of casualties in accordance with the symptoms exhibited as well as equipment and antidotes that may be appropriate for treating the casualty and to the relevant provisions of the STCW Code, parts A and B.

16.6 Cargoes not to be exposed to excessive heat

16.6.1 Where the possibility exists of a dangerous reaction of a cargo, such as polymerization, decomposition, thermal instability or evolution of gas, resulting from local overheating of the cargo in either the tank or associated pipelines, such cargo should be loaded and carried adequately segregated from other products whose temperature is sufficiently high to initiate a reaction of such cargo (see 7.1.5.4).

16.6.2 Heating coils in tanks carrying this product should be blanked off or secured by equivalent means.

16.6.3 Heat-sensitive products should not be carried in deck tanks which are not insulated.

16.6.4 In order to avoid elevated temperatures, this cargo should not be carried in deck-tanks.

16.7 Additional operational requirements

The Code contains additional operational requirements in :

3.1.1	15.3.8	15.8.23.3
3.1.2.1	15.4.6	15.8.23.4
3.1.2.2	15.5	15.8.25.1
3.1.4	15.6.1	15.8.25.2
3.5.2	15.6.3	15.8.25.3
3.7.4	15.6.4	15.8.26.1
7.1.2	15.7.1	15.8.26.2
7.1.6.3	15.7.6	15.8.26.3
8.3.6	15.7.11	15.8.27
9.1.4	15.8.1	15.8.28
9.2	15.8.2	15.8.29
11.3.2	15.8.3	15.9
11.4	15.8.4	15.10.1
12.1.2	15.8.5	15.11.4
12.2	15.8.7	15.11.6
13.2.1	15.8.14.2	15.12.3.1
13.2.2	15.8.14.3	15.13

13.2.3	15.8.16	15.14.7.1
13.2.4	15.8.17	15.14.7.2
Ch. 14	15.8.18	15.14.7.3
15.1	15.8.19	15.16
15.3.1	15.8.20	15.19.8
15.3.7		

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 Conditions of carriage

16A.2.1 The conditions of carriage of 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 Procedures and Arrangements for the Discharge of Noxious Liquid Substances and approved by the Administration.

16A.3.2 Each ship should be fitted with equipment and arrangements identified in its Procedures and Arrangements Manual.

* When 16A.2.2 is referred to in column o in the table of chapter 17 for a product but the melting point of the cargo is less than 15° C, the requirements of 16A.2.2 need not apply. The melting point of the cargo should be specified in the shipping document.

Chapter 17
Summary of minimum requirements

Mixtures of noxious liquid substances presenting pollution hazards only, and which are provisionally assessed under regulation 3(4) of Annex II of MARPOL 73/78, may be carried under the requirements of the Code applicable to the appropriate position of the entry in this chapter for "noxious liquid, not otherwise specified".

EXPLANATORY NOTES

Product name (column a)	The product names are not identical with the names given in previous issues of the Code, or the BCH Code (for explanation see page 155).
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 its 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)

EXPLANATORY NOTES

Tank vents (column g)	Open	:	open venting
	Cont.	:	controlled venting
	SR	:	safety relief valve
Tank environmental control [1] (column h)	Inert	:	inerting (9.1.2.1)
	Pad	:	liquid or gas padding (9.1.2.2)
	Dry	:	drying (9.1.2.3)
	Vent	:	natural or forced ventilation (9.1.2.4)
Electrical equipment (column i)	T1 to T6:		temperature classes[2]
	IIA, IIB or IIC:		apparatus groups[2] nonflammable product (10.1.6)
	NF	:	
	Yes	:	flashpoint exceeding 60° C (closed-cup test) (10.1.6)
	No	:	flashpoint 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[1] (column k)	F	:	flammable vapours
	I	:	toxic vapours
Fire protection (column l)	A	:	alcohol-resistant foam or multi-purpose foam
	B	:	regular foam ; encompasses all foams that are not of an alcohol-resistant type, including fluoro-protein and aqueous-film-forming foam (AFFF)
	C	:	water-spray
	D	:	dry chemical[3]
	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

EXPLANATORY NOTES

Respiratory and eye protection (column n)	E	:	see 14.2.8
	No	:	no special requirements under this Code

[1] "No" indicates nil requirements.

[2] 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.

[3] Dry chemical powder systems, when used, may require an additional water system for boundary cooling. This is normally provided in sufficient quantities by the standard fire-main system required by regulation II-2/4 of the 1974 SOLAS Convention as amended.

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Acetic acid		D	S	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, 15.19.6
Acetic anhydride	1715	D	S	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, 15.19.6
Acetochlor		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
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, 16.6.1 to 16.6.3
Acetonitrile	1648	III	S	2	2G	Cont.	No	T2	IIA	No	R	F-T	A		No	15.12, 15.19.6
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, 15.19.6, 16.6.1
Acrylonitrile	1093	B	S/P	2	2G	Cont.	No	T1	IIB	No	C	F-T	A	N3, Z	E	15.12, 15.13, 15.17, 15.19
Adiponitrile	2205	D	S	3	2G	Cont.	No		IIB	Yes	R	T	A		No	
Alachlor technical (90% or more)		B	S/P	3	2G	Open	No			Yes	O	No	A, C	Y1	No	15.19.6, 16.2.6, 16.2.9, 16A.2.2

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Alcohol (C12–C15) poly(1–6)ethoxylates		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Alcohol (C12–C15) poly(7–19)ethoxylates		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Alcohol (C12–C15) poly(20+)ethoxylates		C	P	3	2G	Open	No			Yes	O	No	A		No	
Alcohol (C6–C17) (secondary) poly(3–6)ethoxylates		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Alcohol (C6–C17) (secondary) poly(7–12)ethoxylates		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9
Alkanes (C6–C9)		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.6, 16.2.9
Alkaryl polyethers (C9–C20)		B	P	3	2G	Open	No			Yes	O	No	A, B		No	15.19.6, 16.2.6
Alkyl acrylate-vinylpyridine copolymer in toluene		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Alkylbenzene, alkylindane, alkylindene mixture (each C12–C17)		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Alkyl(C3–C4)benzenes		A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Alkyl(C5–C8)benzenes		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Alkylbenzenesulphonic acid	2584, 2586	C	S/P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.8

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Alkylbenzenesulphonic acid, sodium salt solution		C	P	3	2G	Open	No		NF		O	No	No		E	16.2.7 to 16.2.9
Alkyl (C7–C9) nitrates		B	S/P	2	2G	Open	No			Yes	O	No	A,B		No	15.19.6, 15.20, 16.6.1 to 16.6.3
Alkyl (C7–C11)phenol poly (4–12)ethoxylate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9
Allyl alcohol	1098	B	S/P	2	2G	Cont.	No	T2	IIB	No	C	F-T	A		E	15.12, 15.17, 15.19
Allyl chloride	1100	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A		E	15.12, 15.17, 15.19
Aluminium chloride (30% or less)/Hydrochloric acid (20% or less) solution		D	S	3	1G	Cont.	No		NF		R	T	No		E (f)	15.11
2-(2-Aminoethoxy)ethanol	3055	D	S	3	2G	Open	No			Yes	O	No	A,D	N2	No	15.19.6
Aminoethylethanolamine		(D)	S	3	2G	Open	No	T2	IIA	Yes	O	No	A	N1	No	
N-Aminoethylpiperazine	2815	D	S	3	2G	Cont.	No			Yes	R	T	A	N2	No	15.19.6
2-Amino-2-methyl-1-propanol (90% or less)		D	S	3	2G	Open	No			Yes	O	No	A	N1	No	
Ammonia aqueous (28% or less)	2672 (m)	C	S/P	3	2G	Cont.	No		NF		R	T	A,B, C	N4	E (a)	
Ammonium bisulphite solution (70% or less)		D	S	3	2G	Cont.	No		NF		R	T	No	Y5	No	15.16.1, 16.6.1 to 16.6.3

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Ammonium nitrate solution (93% or less)		D	S	2	1G	Open	No	NF			O	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	F-T	A	N1	E	15.12, 15.16.1, 15.17, 15.19, 16.6.1 to 16.6.3
Ammonium thiocyanate (25% or less)/Ammonium thiosulphate (20% or less) solution		(C)	P	3	2G	Open	No	NF			O	No	No		No	
Ammonium thiosulphate solution (60% or less)		(C)	P	3	2G	Open	No	NF			O	No	No		No	16.2.9
Amyl acetate (all isomers)	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Aniline	1547	C	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A		No	15.12, 15.17, 15.19
Aviation alkylates (C8 paraffins and isoparaffins B.Pt. 95–120× C)(bb)		(C)	P	3	2G	Cont.	No			No	R	F	B		No	15.19.6
Benzene and mixtures having 10% benzene or more[a]	1114(t)	C	S/P	3	2G	Cont.	No	T1	IIA	No	C	F-T	A, B		No	15.12.1, 15.17, 15.19.6, 16.2.9
Benzenesulphonyl chloride	2225	D	S	3	2G	Cont.	No			Yes	R	T	A, D	N1	No	15.19.6
Benzyl acetate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Benzyl alcohol		C	P	3	2G	Open	No			Yes	O	No	A		No	
Benzyl chloride	1738	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A,B		E	15.12, 15.13, 15.17, 15.19
Bromochloromethane		D	S	3	2G	Cont.	No	NF			R	T	No	N3	No	

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Butene oligomer		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Butyl acetate (all isomers)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Butyl acrylate (all isomers)		B	S/P	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.13, 15.19.6, 16.6.1, 16.6.2
Butylamine (all isomers)		C	S/P	2	2G	Cont.	No			No	R	F-T	A	N1	E	15.12, 15.17, 15.19.6
Butylbenzene (all isomers)	2709	A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Butyl benzyl phthalate		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Butyl butyrate (all isomers)		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Butyl/Decyl/Cetyl/Eicosyl meth-acylate mixture		D	S	3	2G	Cont.	No			Yes	R	No	A, D		No	15.13, 16.6.1, 16.6.2
1,2-Butylene oxide	3022	C	S/P	3	2G	Cont.	Inert	T2	IIB	No	R	F	A, C	Z	No	15.8.1 to .7, .12, .13, .16 to .19, .21, .25, .27, .29, 15.19.6
n-Butyl ether	1149	C	S/P	3	2G	Cont.	Inert	T4	IIB	No	R	F-T	A		No	15.4.6, 15.12, 15.19.6
Butyl methacrylate		D	S	3	2G	Cont.	No		IIA	No	R	F-T	A, D		No	15.13, 15.19.6, 16.6.1, 16.6.2
n-Butyl propionate	1914	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Butyraldehyde (all isomers)		C	S/P	3	2G	Cont.	No	T3	IIA	No	R	F-T	A		No	15.16.1, 15.19.6
Butyric acid	2820	D	S	3	2G	Cont.	No			Yes	R	No	A	Y1	No	15.11.2 to 15.11.4, 15.11.6 to 15.11.8

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Calcium alkyl(C9)phenol sulphide/Polyoletin phosphorosulphide mixture		A	P	2	2G	Open	No			Yes	O	No	A, B		No	15.19.6
Calcium hypochlorite solution (15% or less)		C	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1
Calcium hypochlorite solution (more than 15%)		B	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1, 15.19.6
Calcium long-chain alkyl salicylate (C13+)		C	P	3	2G	Open	No			Yes	O	No	A,B		No	16.2.7, 16.2.8
Camphor oil		B	S/P	2	2G	Cont.	No		IIA	No	R	F	A,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	B	S/P	2	1G	Cont.	Pad+ Inert	T6	IIC	No	C	F-T	C		E	15.3, 15.12, 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	A,B		No	
Cetyl/Eicosyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A,D		No	15.13, 16.6.1, 16.6.2
Chlorinated paraffins (C10–C13)		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19
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 to 15.11.8, 15.12.3, 15.19, 16.2.9

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Chlorobenzene	1134	B	S/P	3	2G	Cont.	No	T1	IIA	No	R	F-T	A,B		No	15.19.6
Chloroform	1888	B	S/P	3	2G	Cont.	No		NF		R	T	No		E	15.12, 15.19.6
Chlorohydrins (crude)		(D)	S	2	2G	Cont.	No		IIA	No	C	F-T	A		No	15.12, 15.19
4-Chloro-2-methyl-phenoxyacetic acid, dimethylamine salt solution		(C)	P	3	2G	Open	No		NF		O	No	No	N1	No	
o-Chloronitrobenzene	1578	B	S/P	2	2G	Cont.	No			Yes	C	T	A,B, D		No	15.12, 15.17 to 15.19, 16.2.6, 16.2.9, 16A.2.2
2-or 3-Chloropropionic 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, 16.2.7 to 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, 15.16.215.19
m-Chlorotoluene	2238	B	S/P	3	2G	Cont.	No			No	R	F-T	A,B		No	15.19.6
o-Chlorotoluene	2238	A	S/P	3	2G	Cont.	No			No	R	F-T	A,B		No	15.19.6
p-Chlorotoluene	2238	B	S/P	2	2G	Cont.	No			No	R	F-T	A,B		No	15.19.6, 16.2.9
Chlorotoluences (mixed isomers)	2238	A	S/P	2	2G	Cont.	No			No	R	F-T	A,B		No	15.19.6
Coal tar		A	S/P	2	2G	Cont.	No	T2	IIA	Yes	R	No	B,D		No	15.19.6
Coal tar naphtha solvent		B	S/P	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,D		No	15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Coal tar pitch (molten)		D	S/P	3	1G	Cont.	No	T2	IIA	Yes	R	No	B,D		No	15.19.6
Cobalt naphthenate in solvent naphtha		A	S/P	2	2G	Cont.	No			No	R	F-T	A,D		No	15.19.6
Coconut oil fatty acid		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7 to 16.2.9
Creosote (coal tar)		A	S/P	2	2G	Open	No	T2	IIA	Yes	O	No	A,D		No	15.19.6
Creosote (wood)		A	S/P	2	2G	Open	No	T2	IIA	Yes	O	No	A,D		No	15.19.6
Cresols (all isomers)	2076	A	S/P	2	2G	Open	No	T1	IIA	Yes	O	No	A,B		No	15.19.6
Cresylic acid, dephenolized		A	S/P	2	2G	Open	No			Yes	O	No	A,B		No	15.19.6
Cresylic acid, sodium salt solution		A	S/P	2	2G	Open	No			Yes	O	No	No	N8	No	15.19.6
Crotonaldehyde	1143	A	S/P	2	2G	Cont.	No	T3	IIB	No	R	F-T	A		E	15.12, 15.16.1, 15.17, 15.19.6
1, 5, 9-Cyclododecatriene		A	S/P	1	2G	Cont.	No			Yes	R	T	A	N2	No	15.13, 15.19, 16.6.1, 16.6.2
Cycloheptane (bb)	2241	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Cyclohexane (bb)	1145	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9
Cyclohexanone	1915	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	N5	No	15.19.6
Cyclohexanone, Cyclohexanol mixture		D	S	3	2G	Cont.	No			Yes	R	F-T	A	N5	No	
Cyclohexyl acetate	2243	(B)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Cyclohexylamine	2357	C	S/P	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,C	N1	No	15.19.6
1,3-Cyclopentadiene dimer (molten)		B	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Cyclopentane (bb)	1146	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Cyclopentene	2246	(B)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
p-Cymene (bb)	2046	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Decanoic acid		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7 to 16.2.9
Decene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Decyl acetate		(B)	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Decyl acrylate		A	S/P	2	2G	Open	No	T3	IIA	Yes	O	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	O	No	A		No	15.19.6, 16.2.9(s)
Decyloxytetrahydrothiophene dioxide		A	S/P	2	2G	Cont.	No			Yes	R	T	A		No	15.19.6
Dibromomethane		C	S/P	2	2G	Cont.	No	NF			R	T	No	N3	No	15.12.3, 15.19
Dibutylamine		C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A,C, D	N4	No	15.19.6
Dibutyl hydrogen phosphonate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Dibutyl phthalate		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Electrical equipment i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Dichlorobenzene (all isomers)		B	S/P	2	2G	Cont.	No	T1	IIA	Yes	R	T	A,B, D	N5	No	15.19.6, 16.2.6(x), 16.2.9(y), 16A.2.2(z)
3,4-Dichloro-1-butene		B	S/P	3	2G	Cont.	No			No	C	F-T	ABC		E	15.12.3, 15.17, 15.19.6
1,1-Dichloroethane	2362	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A		E	15.19.6
Dichloroethyl ether		B	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A	N5	No	15.19.6
1,6-Dichlorohexane		B	S/P	2	2G	Cont.	No			No	R	T	A,B		No	15.19.6
2,2¢-Dichloroisopropyl ether	2490	C	S/P	2	2G	Cont.	No			Yes	R	T	A,C, D	N5	No	15.12, 15.17, 15.19
Dichloromethane	1593	D	S	3	2G	Cont.	No	T1	IIA	Yes	R	T	No		No	
2,4-Dichlorophenol	2021	A	S/P	2	2G	Cont.	Dry			Yes	R	T	A	N1	No	15.19.6
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution		A	S/P	3	2G	Open	No	NF			O	No	No	N1	No	15.19.6
2,4-Dichlorophenoxyacetic acid, dimethylamine salt solution (70% or less)		A	S/P	3	2G	Open	No	NF			O	No	No	N1	No	15.19.6
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution		A	S/P	3	2G	Open	No	NF			O	No	No	N1	No	15.19.6
1,1-Dichloropropane		C	S/P	2	2G	Cont.	No			No	R	F-T	A,B	Z	No	15.12, 15.19.6
1,2-Dichloropropane	1279	C	S/P	2	2G	Cont.	No	T1	IIA	No	R	F-T	A,B	Z	No	15.12, 15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
1,3-Dichloropropane		D	S	2	2G	Cont.	No	T1	IIA	No	R	F-T	A,B		No	15.12, 15.19.6
1,3-Dichloropropene	2047	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A,B		E	15.12, 15.17 to 15.19
Dichloropropene/Dichloropropane mixtures		B	S/P	2	2G	Cont.	No			No	C	F-T	A,B, 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 to 15.11.8
Diethanolamine		D	S	3	2G	Open	No	T1	IIA	Yes	O	No	A	N2	No	
Diethylamine	1154	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	N1	E	15.12, 15.19.6
Diethylaminoethanol	2686	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A, C	N1	E	15.19.6
2,6-Diethylaniline		C	S/P	3	2G	Open	No			Yes	O	No	B,C, D	N4	No	15.19.6, 16.2.9
Diethylbenzene	2049	A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Diethylenetriamine	2079	D	S	3	2G	Open	No	T2	IIA	Yes	O	No	A	N2	No	
Diethyl ether	1155	III	S	2	1G	Cont.	Inert	T4	IIB	No	C	F-T	A	N7	E	15.4, 15.14, 15.19
Di-(2-ethylhexyl)phosphoric acid	1902	C	S/P	3	2G	Open	No			Yes	O	No	A, D	N2	No	
Diethyl phthalate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Diethyl sulphate	1594	(B)	S/P	2	2G	Cont.	No			Yes	C	T	A	N3	No	15.19.6
Diglycidyl ether of bisphenol A		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Diglycidyl ether of bisphenol F		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Di-n-hexyl adipate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Diisobutylamine	2361	(C)	S/P	2	2G	Cont.	No			No	R	F-T	A, C, D	N1	No	15.12.3, 15.19.6
Diisobutylene	2050	B	P	3	2G	Cont.	No			No	R	F	A		No	
Diisobutyl phthalate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Diisopropanolamine		C	S/P	3	2G	Open	No	T2	IIA	Yes	O	No	A	N2	No	16.2.7 to 16.2.9
Diisopropylamine	1158	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A	N2	E	15.12, 15.19
Diisopropylbenzene (all isomers)		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
N,N-Dimethylacetamide solution (40% or less)		D	S	3	2G	Cont.	No			Yes	R	T	B	N4	No	15.12.1, 15.17
Dimethyl adipate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.9
Dimethylamine solution (45% or less)	1160	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A, C, D	N1	No	15.12, 15.19.6
Dimethylamine solution (greater than 45% but not greater than 55%)	1160	C	S/P	2	2G	Cont.	No			No	C	F-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	F-T	A,C, D	N1	E	15.12, 15.14, 15.17, 15.19

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
N,N-Dimethylcyclohexylamine	2264	C	S/P	2	2G	Cont.	No			No	R	F-T	A,C	N1	No	15, 12, 15.17, 15.19.6
Dimethylethanolamine	2051	D	S	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,D	N2	No	15.19.6
Dimethylformamide	2265	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A,D		No	15.19.6
Dimethyl glutarate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Dimethyl hydrogen phosphite		(B)	S/P	3	2G	Cont.	No			Yes	R	T	A,D		No	15.12.1
Dimethyloctanoic acid		(C)	P	3	2G	Open	No			Yes	O	No	A		No	16.2.8, 16.2.9
Dimethyl phthalate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Dimethyl succinate		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.9
Dinitrotoluene (molten)	1600	A	S/P	2	2G (o)	Cont.	No			Yes	C	T	A		No	15.12, 15.17, 15.19, 15.21
1,4-Dioxane	1165	D	S	2	2G	Cont.	No	T2	IIB	No	C	F-T	A		No	15.12, 15.19
Diphenyl	2052	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Diphenyl		A	P	1	2G	Open	No			Yes	O	No	B		No	15.19
Diphenylamine, reaction product with 2,2,4-Trimethylpentene		(A)	S/P	1	2G	Open	No			Yes	O	No	A		No	15.19
Diphenylamines, alkylated		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Diphenyl/Diphenyl ether mixtures		A	P	1	2G	Open	No			Yes	O	No	B		No	15.19

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Diphenyl ether		A	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Diphenyl ether/Diphenyl phenyl ether mixture		A	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Diphenylmethane diisocyanate	2489	(B)	S/P	2	2G	Cont.	Dry			Yes (b)	C	T (b)	A,B, C(c) ,D	N5	No	15.12, 15.16.2, 15.17, 15.19.6, 16.2.6, 16.2.9, 16A.2.2
Diphenylol propane-epichlorohydrin resins		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Di-n-propylamine	2383	C	S/P	3	2G	Cont.	No			No	R	F-T	A	N2	No	15.12.3, 15.19.6
Dodecene (all isomers)		(B)	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Dodecyl alcohol		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Dodecylamine/Tetradecylamine mixture		A	S/P	2	2G	Cont.	No			Yes	R	T	A,D	N2	No	15.19.6
Dodecyldimethylamine/Tetradecyldimethylamine mixture		A	S/P	2	2G	Open	No			Yes	O	No	B, C, D	N4	No	15.19.6
Dodecyl diphenyl ether disulphonate solution		A	S/P	2	2G	Open	No	NF			O	No	No		No	15.19.6
Dodecyl methacrylate		III	S	3	2G	Open	No			Yes	O	No	A		No	15.13
Dodecyl/Pentadecyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A, D		No	15.13, 16.6.1, 16.6.2

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Dodecylphenol		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19
Drilling brines (containing zinc salts)		B	P	3	2G	Open	No			Yes	O	No	No		No	15.19.6
Epichlorohydrin	2023	A	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	A	S/P	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		E	15.13, 15.19.6, 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, 15.19.6
Ethylamine solutions (72% or less)	2270	(C)	S/P	2	2G	Cont.	No			No	C	F-T	A,C	N1	E	15.12, 15.14, 15.17, 15.19
Ethyl amyl ketone	2271	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ethylbenzene	1175	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
N-Ethylbutylamine		(C)	S/P	3	2G	Cont.	No			No	R	F-T	A	N1	No	15.12.3, 15.19.6
Ethyl butyrate	1180	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ethylcyclohexane (bb)		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
N-Ethylcyclohexylamine		D	S	3	2G	Cont.	No			No	R	F-T	A	N1	No	15.19.6
Ethylene chlorohydrin	1135	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A, D		E	15.12, 15.17, 15.19

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
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	F-T	A	N2	No	15.19.6, 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	A,B	N4	No	15.19
Ethylene glycol butyl ether acetate		(C)	P	3	2G	Open	No			Yes	O	No	A		No	
Ethylene glycol diacetate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Ethylene glycol methyl ether acetate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Ethylene glycol monoalkyl ethers		D	S	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ethylene oxide/propylene oxide mixtures with an ethylene oxide content of not more than 30% in weight	2983	C	S/P	2	1G	Cont.	Inert	T2	IIB	No	C	F-T	A,C		No	15.8, 15.12, 15.14, 15.19
Ethyl 3-ethoxypropionate		C	P	3	2G	Cont.	No			No	R	No	A		No	15.19.6
2-Ethylhexyl acrylate		B	S/P	3	2G	Open	No	T3	IIB	Yes	O	No	A		No	15, 13, 15.19.6, 16.6.1, 16.6.2
2-Ethylhexylamine	2276	B	S/P	2	2G	Cont.	No			No	R	F-T	A	N2	No	15.12, 15.19.6
Ethylidenenorbornene		B	S/P	3	2G	Cont.	No			No	R	F-T	A,D	N4	No	15, 12.1, 15.16.1, 15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Ethyl methacrylate	2277	(D)	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A,D		No	15, 13, 15.19.6, 16.6.1, 16.6.2
o-Ethylphenol		(A)	S/P	3	2G	Open	No	T1	IIA	Yes	O	No	B		No	15.19.6
2-Ethyl-3-propylacrolein		(A)	S/P	3	2G	Cont.	No		IIA	No	R	F-T	A		No	15.19.6
Ethyltoluene		(B)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ferric chloride solutions	2582	C	S/P	3	2G	Open	No	NF			O	No	No		No	15.11, 15.19.6, 16.2.9
Ferric nitrate/nitric acid solution		C	S/P	2	2G	Cont.	No	NF			R	T	No		E	15.11, 15.19
Fluorosilicic acid (20–30%) in water solution	1778	C	S/P	3	1G	Cont.	No	NF			R	T	No		E	15.11
Formaldehyde solutions (45% or less)	1198(d), 2209	C	S/P	3	2G	Cont.	No	T2	IIB	No	R	F-T	A		E(e)	15.16.1, 15.19.6, 16.2.9
Formic acid	1779	D	S	3	2G	Cont.	No	T1	IIA	No	R	T(v)	A	Y2,Y3	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8, 15.19.6
Fumaric adduct of rosin, water dispersion		B	P	3	2G	Open	No			Yes	O	No	No		No	15.19.6, 16.2.6
Furfural	1199	C	S/P	3	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.16.1, 15.19.6
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

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Electrical equipment i¢ Class	i ð Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Glycidyl ester of C10 trialkylacetic acid		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Heptane (all isomers) (bb)	1206	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Heptanol (all isomers) (q)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Heptene (all isomers) (bb)		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	15.19.6
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	15.19.6
Hexane (all isomers) (bb)	1208	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Hexene (all isomers) (bb)		(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
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
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
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
2-Hydroxy-4-(methylthio)-butanoic acid		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.8

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
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)
								i¢ Class	ið Group	iðc Flashpoint >60× C						
Icosa (oxypropane-2, 3-diyl)s		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Isophoronediamine	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	A, B, 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, 15.19.6, 16.6.1, 16.6.2
Isopropanolamine		C	S/P	3	2G	Open	No	T2	IIA	Yes	O	F-T	A	N2	No	16.2.8, 16.2.9
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
Isopropylamine (70% or less) solution		C	S/P	2	2G	Cont.	No			No	C	FT	CD	N1	E	15.12, 15.19
Isopropylcyclohexane (bb)		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Isopropyl ether	1159	D	S	3	2G	Cont.	Inert			No	R	F	A		No	15.4.6, 15.13.3, 15.19.6
Lactonitrile solution (80% or less)		B	S/P	2	1G	Cont.	No			Yes	C	T	A,C, D	Y1	E	15.1, 15.12, 15.17 to 15.19, 16.2.6, 16.6.1 to 16.6.3
Lauric acid		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Liquid chemical wastes		A	S/P	2	2G	Cont.	No			No	C	F-T	A		E	15.12, 15.19.6, 20.5.1
Long-chain alkaryl polyether (C11–C20)		C	P	3	2G	Open	No			Yes	O	No	A,B		No	16.2.7, 16.2.8

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Long-chain polyetheramine in alkyl(C2–C4)benzenes		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Long-chain polyetheramine in aromatic solvent		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Magnesium long-chain alkyl sal-icylate (C11+)		C	P	3	2G	Open	No			Yes	O	No	A,B		No	16.2.7, 16.2.8
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	15.19.6, 16.2.9
Mesityl oxide	1229	D	S	3	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.19.6
Metam sodium solution		A	S/P	2	2G	Open	No	NF			O	No	No	N1	No	15.19.6
Methacrylic acid	2531	D	S	3	2G	Cont.	No			Yes	R	T	A	Y1	No	15.13, 16.6.1
Methacrylic resin in ethylene dichloride		B	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A,B	N4	No	15.19, 16.2.6
Methacrylonitrile	3079	D	S	2	2G	Cont.	No			No	C	F-T	A	N4,Z	E	15.12, 15.13, 15.17, 15.19
N-(2-Methoxy-1-methylethyl)-2-ethyl-6-methyl-chloroacetanilide		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Methyl acrylate	1919	B	S/P	2	2G	Cont.	No	T1	IIB	No	R	F-T	A		E	15.13, 15.19.6, 16.6.1, 16.6.2

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
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
Methylamyl alcohol	2053	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Methyl butyrate	1237	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Methylcyclohexane (bb)	2296	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Methylcyclopentadiene dimer		(B)	P	3	2G	Cont.	No			No	R	F	B		No	15.19.6
Methyldiethanolamine		D	S	3	2G	Open	No			Yes	O	No	A	N2	No	
2-Methyl-6-ethylaniline		C	S/P	3	2G	Open	No			Yes	O	No	A, D		No	
2-Methyl-5-ethylpyridine	2300	(B)	S/P	3	2G	Open	No		IIA	Yes	O	No	A, D	N4	No	15.19.6
Methyl formate	1243	D	S	2	2G	Cont.	No			No	R	F-T	A		E	15.12, 15.14, 15.19
Methyl heptyl ketone		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
2-Methyl-2-hydroxy-3-butyne		III	S	3	2G	Cont.	No		IIA	No	R	F-T	A, B, D	N6	No	15.19.6
Methyl methacrylate	1247	D	S	2	2G	Cont.	No	T2	IIA	No	R	F-T	A		No	15.13, 15.19.6, 16.6.1, 16.6.2
Methylnaphthalene (molten)		A	S/P	2	2G	Cont.	No			Yes	R	No	A,D		No	15.19.6
2-Methylpyridine	2313	D	S	2	2G	Cont.	No			No	C	F	A	N4	No	15.12.3, 15.19.6
3-Methylpyridine	2313	C	S/P	2	2G	Cont.	No			No	C	F	A,C	N4	No	15.12.3, 15.19

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
4-Methylpyridine	2313	D	S	2	2G	Cont.	No			No	C	F-T	A	N4	No	15.12.3, 15.19, 16.2.9
Methyl salicylate		(B)	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
alpha-Methylstyrene	2303	A	S/P	3	2G	Cont.	No	T1	IIB	No	R	F-T	A,D b		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	15.19.6
Motor fuel anti-knock compounds (containing lead alkyls)	1649	A	S/P	1	1G	Cont.	No	T4	IIA	No	C	F-T	A, 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
Naphthenic acids		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Neodecanoic acid		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.8
Nitrating acid (mixture of sulphuric and nitric acids)	1796	(C)	S/P	2	2G	Cont.	No	NF			C	T	No		E	15.11, 15.16.2, 15.17, 15.19
Nitric acid (less than 70%)	2031	C	S/P	2	2G	Cont.	No	NF			R	T	No		E	15.11, 15.19
Nitric acid (70% and over)	2031, 2032(h)	C	S/P	2	2G	Cont.	No	NF			C	T	No		E	15.11, 15.19
Nitrobenzene	1662	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A, D		No	15.12, 15.17 to 15.19, 16.2.9
Nitroethane		(D)	S	3	2G	Cont.	No		IIB	No	R	FT	A(u)	N4	No	15.16.1, 15.19.6, 16.6.1, 16.6.2, 16.6.4

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Nitroethane (80%)/Nitropropane (20%)		D	S	3	2G	Cont.	No		IIB	No	R	FT	A(u)	N4	No	15.16.1, 15.19.6, 16.6.1 to 16.6.3
o-Nitrophenol (molten)	1663	B	S/P	2	2G	Cont.	No			Yes	C	T	A,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	15.19.6
Nitropropane (60%)/Nitroethane (40%) mixture		D	S	3	2G	Cont.	No			No	R	F-T	A(u)	N4	No	15.19.6
o- or p-Nitrotoluenes	1664	B	S/P	2	2G	Cont.	No		IIB	Yes	C	T	A,B		No	15.12, 15.17, 15.19, 16.2.9
Nonane (all isomers) (bb)	1920	(C)	P	3	2G	Cont.	No			No	R	F	B,C		No	15.19.6
Nonene (all isomers)		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Nonyl acetate		(C)	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Nonyl alcohol (all isomers)		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
Nonylphenol poly(4+)-ethoxylates		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2(aa)
Noxious liquid, N.F., (1) n.o.s. (trade name ..., contains ...) S.T. 1, Cat. A[c]		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Noxious liquid, F., (2) n.o.s. (trade name ..., contains ...) S.T. 1, Cat. A[C]		A	P	1	2G	Cont.	No			No	R	F	A		No	15.19
Noxious liquid, N.F., (3) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. A[C]		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Noxious liquid, F., (4) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. A[C]		A	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6
Noxious liquid, N.F., (5) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. B[C]		B	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6, (16.2.6, 16.2.9)[d]
Noxious liquid, N.F., (6) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. B, m.p. 15× C+[C]		B	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6, (16.2.6)[d]16.2.9, 16A.2.2
Noxious liquid, F., (7) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. B[C]		B	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6, (16.2.6, Cont. 16.2.9)[d]
Noxious liquid, F., (8) n.o.s. (trade name ..., contains ...) S.T. 2, Cat. B, m.p. 15× C+[C]		B	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6, (16.2.6)[d]16.2.9, 16A.2.2

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Noxious liquid, N.F., (9) n.o.s. (trade name …, contains …) S.T. 3, Cat. A[C]		A	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Noxious liquid, F., (10) n.o.s. (trade name …, contains …) S.T. 3, Cat. A[C]		A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Noxious liquid, N.F., (11) n.o.s. (trade name …, contains …) S.T. 3, Cat. B[C]		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, (16.2.6, 16.2.9)[d]
Noxious liquid, N.F., (12) n.o.s. (trade name …, contains …) S.T. 3, Cat. B, m.p. 15× C+[C]		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, (16.2.6)[d]16.2.9, 16A.2.2
Noxious liquid, F., (13) n.o.s. (trade name …, contains …) S.T. 3, Cat. B[C]		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, (16.2.6, 16.2.9)[d]
Noxious liquid, F., (14) n.o.s. (trade name …, contains …) S.T. 3, Cat. B, m.p. 15× C+[C]		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, (16.2.6)[d]16.2.9, 16A.2.2
Noxious liquid, N.F., (15) n.o.s. (trade name …, contains …) S.T. 3, Cat. C[C]		C	P	3	2G	Open	No			Yes	O	No	A		No	(16.2.7 to 16.2.9)[d]

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Noxious liquid, F., (16) n.o.s. trade name …, contains …) S.T. 3, Cat. C[C]		C	P	3	2G	Cont.	No			No	R	F	A		No	(16.2.7 to 16.2.9)[d]
Octane (all isomers) (bb)	1262	(C)	P	3	2G	Cont.	No			No	R	F	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	R	F	A		No	15.19.6
n-Octyl acetate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Octyl aldehydes	1191	(B)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9
Olefin mixtures (C5–C7) (bb)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Olefin mixtures (C5–C15)		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
alpha -Olefins (C6–C18)		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.6, 16.2.9
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, 16.2.8
Oleylamine		A	S/	2	2G	Cont.	No			Yes	R	T	A		No	15.19.6
Palm kernel acid oil		C	P	3	2G	Open	No			Yes	O	No	A, B		No	16.2.7 to 16.2.9
Paraldehyde	1264	C	S/P	3	2G	Cont.	No	T3	IIB	No	R	F	A		No	15.19.6, 16.2.9
Pentachloroethane	1669	B	S/P	2	2G	Cont	No	NF			R	T	No		No	15.12, 15.17, 15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
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)
								i¢ Class	ið Group	ið¢ Flashpoint >60× C						
1,3-Pentadiene		C	S/P	3	2G	Cont.	No			No	R	F-T	A,B		No	15.13, 15.19.6, 16.6.1 to 16.6.3
Pentane (all isomers) (bb)	1265	(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.14, 15.19.6
Pentene (all isomers) (bb)		C	P	3	2G	Cont.	No			No	R	F	A		No	15.14, 15.19.6
n-Pentyl propionate		C	P	3	2G			No			No	R	F	A		NoCont. 15.19.6
Perchloroethylene	1897	B	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12.1, 15.12.2, 15.19.6
Phenol	2312	C	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A		No	15.12, 15.19, 16.2.7, 16.2.8, 16.2.9
1-Phenyl-1-xylylethane (bb)		C	P	3	2G	Open	No			Yes	O	No	A,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		A	S/P	1	1G	Cont.	Pad+ (Vent or Inert)			No(k)	C	No	C		E	15.7, 15.19
Phthalic anhydride (molten)	2214	C	S/P	3	2G	Cont.	No	T1	IIA	Yes	R	No	A,D		No	16.2.7 to 16.2.9
alpha-Pinene	2368	A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
beta-Pinene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Pine oil	1272	C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.8

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
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)
								i¢ Class	ið Group	ið¢ Flashpoint >60× C						
Polyalkyl (C18–C22) acrylate in xylene		C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Polyalkylene oxide polyol		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.8
Poly(2+) cyclic aromatics		A	P	2	2G	Cont.	No			Yes	R	No	A,D		No	15.19.6
Polymethylene polyamines		(C)	S/P	3	2G	Open	No			Yes	O	No	A	N2	No	16.2.9
Polyferric sulphate solution		(C)	S/P	3	2G	Open	No		NF		O	No	No	Y4	No	
Polymethylene polyphenyl isocyanate		D	S	2	2G	Cont.	Dry			Yes(b)	C	T(b)	A	N5	No	15.12, 15.16.2, 15.19.6
Polyolefinamine in alkyl(C2–C4)benzenes		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Polyolefinamine in aromatic solvent		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.7, 16.2.8
Polyolefin phosphorosulphide, barium derivative (C28–C250)		C	P	3	2G	Open	No			Yes	O	No	A,B		No	16.2.7, 16.2.8
Potassium chloride solution (10% or more)		C	P	3	2G	Open	No		NF		O	No	No		No	
Potassium hydroxide solution	1814	C	S/P	3	2G	Open	No		NF		O	No	No	N8	No	16.2.9
Potassium oleate		C	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
n-Propanolamine		C	S/P	3	2G	Open	No			Yes	O	No	A,D	N2	No	16.2.9
beta-Propiolactone		D	S	2	2G	Cont.	No		IIA	Yes	R	T	A		No	

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Propionaldehyde	1275	C	S/P	3	2G	Cont.	No			No	R	F-T	A		E	15.16.1, 15.17, 15.19.6
Propionic acid	1848	D	S	3	2G			No	T1	IIA	No	R	F	A	Y1	ECont. 15.11.2 to 15.11.4, 15.11.6 to 15.11.8, 15.19.6
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	A, D	N2	E	15.12, 15.19
Propylbenzene (all isomers)		A	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
n-Propyl chloride	1278	D	S	3	2G	Cont.	No			No	R	F	A, B		No	15.19.6
Propylene dimer (bb)		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Propylene oxide	1280	C	S/P	2	2G	Cont.	Inert	T2	IIB	No	C	F-T	A, C	Z	No	15.8, 15.12.1, 15.14, 15.19
Propylene tetramer	2850	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Propylene trimer	2057	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Pyridine	1282	D	S	3	2G	Cont.	No	T1	IIA	No	R	F	A	N4	No	15.19.6
Rosin		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Rosin soap (disproportionated) solution		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
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)
								i¢ Class	ïð Group	ïð¢ Flashpoint >60× C						
Sodium alkyl (C14–C17) sulphonates 60–65% solution		B	P	3	2G	Open	No		NF		O	No	No		No	16.2.6
Sodium aluminate solution	1819	D	S	3	2G	Open	No		NF		O	No	No	N1	No	
Sodium borohydride (15% or less)/Sodium hydroxide solution		C	S/P	3	2G	Open	No		NF		O	No	No	N1	No	16.2.7
Sodium chlorate solution (50% or less)	2428	III	S	3	2G	Open	No		NF		O	No	No		No	15.9, 15.16.1, 15.19.6
Sodium dichromate solution (70% or less)		C	S/P	2	2G	Open	No		NF		C	No	No	N2	No	15.12.3, 15.19
Sodium hydrogen sulphide (6% or less)/Sodium carbonate (3% or less) solution		B	P	3	2G	Open	No		NF		O	No	No		No	15.19.6
Sodium hydrogen sulphite solution (45% or less)	2693	D	S	3	2G	Open	No		NF		O	No	No		No	
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, 15.19.6, 16.2.9
Sodium hydrosulphide/Ammonium sulphide solution		B	S/P	2	2G	Cont.	No			No	C	F-T	A	N1	E	15.12, 15.14, 15.16.1, 15.17, 15.19, 16.6.1 to 16.6.3
Sodium hydroxide solution	1824	D	S	3	2G	Open	No		NF		O	No	No	N8	No	

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Sodium hypochlorite solution (15% or less)	1791	C	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1
Sodium nitrite solution		B	S/P	2	2G	Open	No	NF			O	No	No		No	15.12.3.1, 15.12.3.2, 15.16.1, 15.19
Sodium petroleum sulphonate		B	S/P	2	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Sodium silicate solution		C	P	3	2G	Open	No	NF			O	No	No		No	
Sodium sulphide solution (15% or less)		B	S/P	3	2G	Cont.	No	NF			C	T	No	N5	No	15.16.1, 15.19.6, 16.2.9
Sodium sulphite solution (25% or less)		C	P	3	2G	Open	No	NF			O	No	No		No	15.16.1, 15.19.6, 16.2.9
Sodium tartrates/sodium succi-nates solution		D	S	3	2G	Open	No			Yes	O	No	A, B	Y5	No	
Sodium thiocyanate solution (56% or less)		(B)	P	3	2G	Open	No			Yes	O	No	No		No	15.19.6
Styrene monomer	2055	B	S/P	3	2G	Cont.	No	T1	IIA	No	R	F	A, B	N4, Z	No	15.13, 15.19.6, 16.6.1, 16.6.2
Sulpho hydrocarbon long-chain (C18+) alkylamine mixture		B	P	3	2G	Open	No			Yes	O	No	A, B		No	15.19.6, 16.2.6
Sulphur (molten)	2448	III	S	3	1G	Open	Vent or Pad (gas)	T3		Yes (l)	O	F-T	No		No	15.10

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Electrical equipment i¢ Class	ið Group	ið¢ Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
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
Tall oil (crude and distilled)		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Tall oil fatty acid, barium salt		B	S/P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6
Tall oil fatty acid (resin acids less than 20%)		(C)	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7 to 16.2.9
Tall oil soap (disproportionated) solution		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9
Tetrachloroethane	1702	B	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12, 15.17, 15.19.6
Tetraethylenepentamine	2320	D	S	3	2G	Open	No			Yes	O	No	A	N1	No	
Tetrahydrofuran	2056	D	S	3	2G	Cont.	No	T3	IIB	No	R	F-T	A		No	15.19.6
Tetrahydronaphthalene (bb)		C	P	3	2G	Open	No			Yes	O	No	A		No	
Tetramethylbenzene (all isomers)		A	P	3	2G	Open	No			Yes	O	No	A		No	16.2.9, 16A.2.2
Toluene (bb)	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	A,D	N1	E	15.12, 15.17, 15.19, 16.2.7, 16.2.9

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Toluene diisocyanate	2078	C	S/P	2	2G	Cont.	Dry	T1	IIA	Yes	C	F-T	A, C(c) , D	N4	E	15.12, 15.16.2, 15.7, 15.19, 16.2.9
o-Toluidine	1708	C	S/P	2	2G	Cont.	No			Yes	C	T	A		No	15.12, 15.17, 15.19
Tributyl phosphate		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
1,2,4-Trichlorobenzene	2321	B	S/P	2	2G	Cont.	No			Yes	R	T	A,B		No	15.19.6, 16.2.9, 16A.2.2
1,1,1-Trichloroethane	2831	C	P	3	2G	Open	No			Yes	O	No	A		No	
1,1,2-Trichloroethane		C	S/P	3	2G	Cont.	No	NF			R	T	No		No	15.12.1, 15.19.6
Trichloroethylene	1710	C	S/P	3	2G	Cont.	No	T2	IIA	Yes	R	T	No		No	15.12, 15.16.1, 15.17, 15.19.6
1,2,3-Trichloropropane		C	S/P	2	2G	Cont.	No			Yes	C	T	A,B, 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	A,B			No 15.12.3, 15.19
Tridecanoic acid		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 16.2.6, 16.2.9, 16A.2.2
Triethanolamine		D	S	3	2G	Open	No		IIA	Yes	O	No	A	N1	No	

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
Triethylamine	1296	C	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A,C	N2	E	15.12, 15.19.6
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	B	S/P	2	2G	Cont.	No			No	R	F-T	A,B		No	15.12.1, 15.19.6
Triisopropylated phenyl phosphates		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Trimethylacetic acid		D	S	3	2G	Cont.	No			Yes	R	No	A	Y1	No	15.11.2 to 15.11.8
Trimethylamine solution (30% or less)	1297	C	S/P	2	2G	Cont.	No			No	C	F-T	A,C	N1	E	15.12, 15.14, 15.19, 16.2.9
Trimethylbenzene (all isomers)		A	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 diiso-cyanate (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, 15.19.6
2,2,4-Trimethyl-1,3-pentane-diol-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
1,3,5-Trioxane		D	S	3	2G	Cont.	No			No	R	F	A, D		No	15.19.6

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
								Electrical equipment								
								i¢	ið	ið¢						
Product name	UN number	Pollution category	Hazards	Ship type	Tank type	Tank vents	Tank environmental control	Class	Group	Flashpoint >60× C	Gauging	Vapour detection	Fire protection	Materials of construction	Respiratory and eye protection	Special requirements (see chapter 15)
1,3,5-Trioxane		D	S	3	2G	Cont.	No			No	R	F	A, D		No	15.19.6
Trixylyl phosphate		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19
Turpentine	1299	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Undecanoic acid		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.9
1-Undecene		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6
Undecyl alcohol		B	P	3	2G	Open	No			Yes	O	No	A		No	15.19.6, 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	N4	No	
Valeraldehyde (all isomers)	2058	C	S/P	3	2G	Cont.	Inert	T3	IIB	No	R	F-T	A		No	15.4.6, 15.16.1, 15.19.6
Vinyl acetate	1301	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F	A		No	15.13, 15.19.6, 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	D	S	2	2G	Cont.	Inert	T2	IIA	No	R	F-T	B	N5	E	15.13, 15.14, 15.19.6, 16.6.1, 16.6.2
Vinyl neodecanoate		B	S/P	3	2G	Open	No			Yes	O	No	A,B		No	15.13, 15.16.1, 15.19.6, 16.6.1, 16.6.2
Vinyltoluene	2618	A	S/P	3	2G	Cont.	No		IIA	No	R	F	A,B	N1	No	15.13, 15.19.6, 16.6.1, 16.6.2

a	b	c	d	e	f	g	h	i			j	k	l	m	n	o
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)
								i¢ Class	ið Group	iðc Flashpoint >60× C						
White spirit, low (15–20%) aromatic	1300	(B)	P	2	2G	Cont.	No			No	R	F	A		No	15.19.6
Xylenes (bb)	1307	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9(w)
Xylenol	2261	B	S/P	3	2G	Open	No		IIA	Yes	O	No	A,B		No	15.19.6, 16.2.9, 16A.2.2
Zinc alkaryl dithiophosphate (C7–C16)		(C)	P	3	2G	Open	No			Yes	O	No	A,B		No	16.2.7, 16.2.8
Zinc alkyl dithiophosphate (C3–C14)		B	P	3	2G	Open	No			Yes	O	No	A,B		No	15.19.6, 16.2.6

a. For mixtures containing no other components with safety hazards and where the pollution category is C or less.
b. only certain alcohol-resistant foams are effective
c. In case of a specific n.o.s. cargo assessed as falling within this n.o.s. group that is carried on a ship, this entry, including the cargo's trade name and one or two principal components, should be provided in the shipping document. Abbreviations used mean :
N.F. : Flashpoint exceeding 60× C (closed-cup test) S.T. : Ship type
F. : Flashpoint not exceeding 60× C (closed-cup test) Cat. : Pollution category
n.o.s. : Not otherwise specified m.p. : Melting point
d. For high-viscosity or high-melting-point cargoes.

(a) Applies to ammonia aqueous (28% or less), but not below 10%.

Ammonia aqueous (28% or less)

(b) If the product to be carried contains flammable solvents such that the flashpoint does not exceed 60° C c.c., then special electrical systems and a flammable-vapour detector should be provided.

Diphenylmethane diisocyanate

Polymethylene polyphenyl isocyanate

(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.

Diphenylmethane diisocyanate

Toluene diisocyanate

Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4-isomers)

(d) UN N^{O} 1198 only applies if flashpoint is below 60° C c.c.

Formaldehyde solutions (45% or less)

(e) Applies to formaldehyde solutions (45% or less), but not below 5%.

Formaldehyde solutions (45% or less)

(f) Applies to hydrochloric acid not below 10%.

Aluminium chloride (30% or less)/Hydrochloric acid (20% or less) solution Hydrochloric acid

(g) Dry chemical cannot be used because of the possibility of an explosion.

Maleic anhydride

(h) UN N^{O} 2032 assigned to red fuming nitric acid.

Nitric acid (70% and over)

(i) (Deleted).

(j) UN number assigned to this substance containing more than 3% of *ortho*-isomer.

Tricresyl phosphate (containing 1% or more *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 c.c.

Phosphorus, yellow or white

(l) Sulphur (molten) has a flashpoint above 60° C c.c. ; however, electrical equipment should be certified safe for gases evolved.

Sulphur (molten)

(m) UN N^{O} 2672 refers to 10–35% ammonia solutions.

Ammonia aqueous (28% or less)

(n) UN N^{O} 2511 applies to 2-chloropropionic acid only.

2- or 3-Chloropropionic acid

(o) Dinitrotoluene should not be carried in deck tanks.

Dinitrotoluene (molten)

(p) (Deleted).

(q) Requirements are based on those isomers having a flashpoint of 60° C c.c., or less ; some isomers have a flashpoint greater than 60° C c.c., and therefore the requirements based on flammability would not apply to such isomers.

Heptanol (all isomers)

(r) Reference 16A.2.2 applies to 1-undecyl alcohol only.

Undecyl alcohol

(s) Applies to *n*-decyl alcohol only.

Decyl alcohol (all isomers)

(t) UN N^{o} 1114 applies to benzene.

Benzene and mixtures having 10% benzene or more

(u) Dry chemical should not be used as fire-extinguishing media.

Nitropropane (60%)/Nitroethane (40%) mixture

(v) Confined spaces should be tested for both formic acid vapours and carbon monoxide gas, a decomposition product.

Formic acid

(w) Applies to *p*-xylene only.

Xylenes

(x) Applies to
p
-isomer and mixtures containing p-isomer the viscosity of which is 23 mPa s at 20° C.

Dichlorobenzene (all isomers)

(y) Applies to *p*-isomer and mixtures containing p-isomer the melting point of which is 0° C and above.

Dichlorobenzene (all isomers)

(z) Applies to *p*-isomer and mixtures containing p-isomer the melting point of which is 15° C and above.

Dichlorobenzene (all isomers)

(aa) Applies only to products with the melting point of 15° C and above.

Nonylphenol poly(4+)ethoxylates

(ab) Applies to oil-like substances identified in accordance with the provisions of the unified interpretations of regulation 14 of Annex II of MARPOL 73/78 agreed by the MEPC.

Chapter 18
List of chemicals to which the Code does not apply

1 The following are chemicals which have been reviewed for their safety and pollution hazards and determined not to present hazards to such an extent as to warrant application of the Code. This may be used as a guide in considering bulk carriage of chemicals whose hazards have not yet been evaluated.

2 Although the chemicals 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.

3 Some chemicals are identified as falling into pollution category D and, therefore, subject to certain operational requirements of Annex II of MARPOL 73/78.

4 Liquid mixtures which are provisionally assessed under regulation 3(4) of Annex II of MARPOL 73/78 as falling into pollution category D, and which do not present safety hazards, may be carried under the entry for "noxious liquid, not otherwise specified" in this chapter. Similarly, those mixtures provisionally assessed as falling outside pollution category A, B, C or D, and which do not present safety hazards, may be carried under the entry for "non-noxious liquid, not otherwise specified" in this chapter.

EXPLANATORY NOTES

Product name (column a)	In some cases, the product names may not be identical with the names given in previous issues of the IBC Code or the BCH Code (for explanation see page 155).
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 its pollution hazards. Until the hazard evaluation is completed, the pollution category assigned is used.

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Acetone	1090	III
Acrylonitrile-Styrene copolymer dispersion in polyether polyol	–	D
Alcoholic beverages, n.o.s.	3065	III
Alcohols (C_{13+})	–	III
n-Alkanes (C_{10+})	–	III
Alkenyl(C_{11+})amide	–	D
Alkyl(C_{8+})amine, Alkenyl (C_{12+}) acid ester mixture	–	D
Alkyl(C_{9+})benzenes	–	III
Alkyldithiothiadiazole (C_6-C_{24})	–	D
Aluminium sulphate solution	–	D
Aminoethyldiethanolamine/Aminoethyletheranolamine solution	–	III
2-Amino-2-hydroxymethyl-1,3-propanediol solution (40% or less)	–	III
Ammonium hydrogen phosphate solution	–	D
Ammonium lignosulphonate solutions	–	III
Ammonium polyphosphate solution	–	D
Ammonium sulphate solution	–	D
n-Amyl alcohol	1105	D
sec-Amyl alcohol	1105	D
tert-Amyl alcohol	1105	III
Amyl alcohol, primary	1105	D

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Animal and fish acid oils and distillates, n.o.s., including : Animal acid oil Fish acid oil Lard acid oil Mixed acid oil Mixed general acid oil Mixed hard acid oil Mixed soft acid oil	–	D
Animal and fish oils, n.o.s., including : Cod liver oil Lanolin Neatsfoot oil Pilchard oil Sperm oil	–	D
Apple juice	–	III
Aryl polyolefins (C_{11}-C_{50})	–	D
Benzenetricarboxylic acid, trioctyl ester	–	III
Brake fluid base mix : (Poly(2-8)alkylene (C_2-C_3) glycols/Polyalkylene (C_2-C_{10}) glycols monoalkyl (C_1-C_4) ethers and their borate esters)[1]	–	D
n-Butyl alcohol	1120	III
sec-Butyl alcohol	1120	III
tert-Butyl alcohol	1120	III
Butylene glycol	–	D
Butyl stearate	–	III
gamma-Butyrolactone	–	D

a **Product name**	b **UN number**	c **Pollution category for operational discharge (regulation 3 of Annex II)**
Calcium carbonate slurry	–	III
Calcium hydroxide slurry	–	D
Calcium lignosulphonate solutions	–	III
Calcium long-chain alkaryl sulphonate (C_{11}-C_{50})	–	D
Calcium long-chain alkyl phenate sulphide (C_8-C_{40})	–	D
Calcium long-chain alkyl phenolic amine (C_8-C_{40})	–	III
Calcium nitrate/Magnesium nitrate/Potassium chloride solution	–	III
epsilon-Caprolactam (molten or aqueous solutions)	–	D
Caramel solutions	–	III
Chlorinated paraffins (C_{14}-C_{17}) (with 52% chlorine)	–	III
Choline chloride solutions	–	D
Citric acid (70% or less)	–	D
Clay slurry	–	III
Coal slurry	–	III
Coconut oil fatty acid methyl ester	–	D
Cyclohexanol	–	D
Decahydronaphthalene	1147	(D)
Dextrose solution	–	III
Diacetone alcohol	1148	D
Dialkyl (C_7-C_{13}) phthalates	–	D
Diethylene glycol	–	D
Diethylene glycol dibutyl ether	–	D
Diethylene glycol diethyl ether	–	III
Diethylene glycol phthalate	–	D

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Diethylenetriaminepentaacetic acid, pentasodium salt solution	–	III
Di-(2-ethylhexyl) adipate	–	D
Diheptyl phthalate	–	III
Dihexyl phthalate	–	III
1,4-Dihydro-9, 10-dihydroxyanthracene, disodium salt solution	–	III
Diisobutyl ketone	1157	D
Diisononyl adipate	–	D
Diisooctyl phthalate	–	III
Diisopropylnaphthalene (bb)	–	D
2,2-Dimethylpropane-1,3-diol	–	(D)
Dimethylpolysiloxane	–	III
Dinonyl phthalate	–	D
Dioctyl phthalate	–	III
Dipropylene glycol	–	III
Ditridecyl adipate	–	III
Ditridecyl phthalate	–	D
Diundecyl phthalate	–	D
Dodecane (all isomers)	–	III
Dodecenylsuccinic acid, dipotassium salt solution	–	(D)
Dodecylbenzene	–	III
Dodecylxylene	–	III
Drilling brines, including : Calcium bromide solution Calcium chloride solution Sodium chloride solution	–	III
2-EthATTyethanol	1171	D

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Ethyl acetate	1173	D
Ethyl acetoacetate	–	(D)
Ethyl alcohol	1170	III
Ethylene carbonate	–	III
Ethylenediaminetetraacetic acid, tetrasodium salt solution	–	D
Ethylene glycol	–	D
Ethylene glycol acetate	–	(D)
Ethylene glycol methyl butyl ether	–	D
Ethylene glycol phenyl ether	–	D
Ethylene glycol phenyl ether/Diethylene glycol phenyl ether mixture	–	D
Ethylene-Vinyl acetate copolymer (emulsion)	–	III
2-Ethylhexanoic acid	–	D
2-Ethyl-2-(hydroxymethyl) propane-1, 3-diol, C_8-C_{10} ester	–	D
Ethyl propionate	1195	D
Fatty acid (saturated C_{13+})	–	III
Ferric hydroxyethylethylenediaminetriacetic acid, trisodium salt solution	–	D
Fish solubles[2]	–	III
Formamide	–	D
Glucose solution	–	III
Glycerine	–	III
Glycerine (83%), Dioxanedimethanol (17%) mixture	–	D
Glycerol monooleate	–	D
Glycerol polyalkoxylate	–	III
Glyceryl triacetate	–	(III)

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Glycine, sodium salt solution	–	III
Glyoxal solution (40% or less)	–	D
n-Heptanoic acid	–	D
Hexamethylenediamine adipate (50% in water)	–	D
Hexamethylene glycol	–	III
Hexamethylenetetramine solutions	–	D
Hexanoic acid	–	D
Hexanol	2282	D
Hexylene glycol	–	III
N-(Hydroxyethyl)ethylenediaminetriacetic acid, trisodium salt solution	–	D
Isoamyl alcohol	1105	D
Isobutyl alcohol	1212	III
Isobutyl formate	2393	D
Iso- and cyclo-alkanes (C_{10}-C_{11})	–	D
Iso- and cyclo-alkanes (C_{12+})	–	III
Isophorone	–	D
Isopropyl acetate	1220	III
Isopropyl alcohol	1219	III
Kaolin slurry	–	III
Lactic acid	–	D
Lard	–	III
Latex, ammonia(1% or less)-inhibited	–	D
Latex : Carboxylated styrene-Butadiene copolymer Styrene-Butadiene rubber Ligninsulphonic acid, sodium salt solution	 – – –	 III III III
Long-chain alkaryl sulphonic acid (C_{16}-C_{60})	–	D

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Long-chain alkylphenate/Phenol sulphide mixture	–	III
Magnesium chloride solution	–	III
Magnesium hydroxide slurry	–	III
Magnesium long-chain alkaryl sulphonate (C_{11}-C_{50})	–	D
3-Methoxy-1-butanol	–	III
3-Methoxybutyl acetate	–	D
Methyl acetate	1231	III
Methyl acetoacetate	–	D
Methyl alcohol	1230	D
Methyl amyl ketone	1110	D
Methylbutenol	–	(D)
Methyl tert-butyl ether	2398	D
Methyl butyl ketone	–	D
Methylbutynol	–	D
Methyl ethyl ketone	1193	III
N-Methylglucamine solution (70% or less)	–	III
Methyl isobutyl ketone	1245	D
3-Methyl-3-methoxybutanol	–	III
3-Methyl-3-methoxybutyl acetate	–	III
Methyl propyl ketone	1249	D
N-Methyl-2-pyrrolidone	–	D
Molasses	–	III
Myrcene	–	D
Naphthalenesulphonic acid-Formaldehyde copolymer, sodium salt solution	–	D
Nitrilotriacetic acid, trisodium salt solution	–	D
Nonanoic acid (all isomers)	–	D

a **Product name**	b **UN number**	c **Pollution category for operational discharge (regulation 3 of Annex II)**
Nonyl methacrylate monomer	–	(D)
Noxious liquid, n.o.s. (17) (trade name …, contains …) Cat. D[3]	–	D
Non-noxious liquid, n.o.s. (18) (trade name …, contains …) Appendix III[3]	–	III
Octanoic acid (all isomers)	–	D
Octyl decyl adipate	–	III
Olefin-Alkyl ester copolymer (molecular weight 2000+)	–	D
Olefins (C_{13+}, all isomers)	–	III
Oleic acid	–	D
Palm oil fatty acid methyl ester	–	D
Palm stearin	–	D
Paraffin wax	–	III
Pentaethylenehexamine	–	D
Pentanoic acid	–	D
Petrolatum	–	(III)
Poly(2-8)alkylene glycol monoalkyl (C_1-C_6) ether	–	D
Poly(2-8)alkylene glycol monoalkyl (C_1-C_6) ether acetate	–	D
Polyaluminium chloride solution	–	III
Polybutene	–	III
Polybutenyl succinimide	–	D
Polyether (molecular weight 2000+)	–	D
Polyethylene glycol	–	III
Polyethylene glycol dimethyl ether	–	III
Polyglycerin, sodium salt solution (containing less than 3% sodium hydroxide)	–	III

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Polyglycerol	–	III
Poly (4+) isobutylene	–	III
Polyolefin (molecular weight 300+)	–	III
Polyolefin amide alkeneamine (C_{28+})	–	D
Polyolefin amide alkeneamine borate (C_{28} - C_{250})	–	D
Polyolefin amide alkeneamine/molybdenum oxysulphide mixture	–	III
Polyolefin amide alkeneamine polyol	–	D
Polyolefin anhydride	–	D
Polyolefin ester (C_{28} - C_{250})	–	D
Polyolefin phenolic amine (C_{28} - C_{250})	–	D
Poly(20)oxyethylene sorbitan monooleate	–	III
Poly(5+)propylene	–	III
Polypropylene glycol	–	D
Polysiloxane	–	III
n-Propyl acetate	1276	D
n-Propyl alcohol	1274	III
Propylene-Butylene copolymer	–	III
Propylene glycol	–	III
Propylene glycol methyl ether acetate	–	D
Propylene glycol monoalkyl ether	–	(D)
Sodium acetate solutions	–	(D)
Sodium aluminosilicate slurry	–	III
Sodium benzoate	–	D
Sodium carbonate solution	–	D
Sodium poly(4+)acrylate solutions	–	III
Sodium sulphate solutions	–	III

a Product name	b UN number	c Pollution category for operational discharge (regulation 3 of Annex II)
Sorbitol solution	–	III
Sulphohydrocarbon (C_3 - C_{88})	–	D
Sulpholane	–	D
Tallow	–	D
Tallow fatty acid	–	(D)
Tetraethylene glycol	–	III
Tridecane	–	III
Tridecyl acetate	–	III
Triethyl phosphate	–	D
Triethylene glycol	–	III
Triisopropanolamine	–	III
Trimethylolpropane polyethoxylate	–	D
2, 2, 4-Trimethyl-1,3-pentanediol diisobutyrate	–	III
Tripropylene glycol	–	III
Urea/Ammonium mono- and di-hydrogen phosphate/Potassium chloride solution	–	(D)
Urea/Ammonium nitrate solution	–	D
Urea/Ammonium phosphate solution	–	D
Urea formaldehyde resin solution	–	III
Urea solution	–	III
Vegetable acid oils and distillates, n.o.s., including : corn acid oil, cotton seed acid oil, dark mixed acid oil, groundnut acid oil, mixed acid oil, mixed general acid oil, mixed hard acid oil, mixed soft acid oil, rapeseed acid oil, safflower acid oil, soya acid oil, sunflower seed acid oil	–	D

a **Product name**	b **UN number**	c **Pollution category for operational discharge (regulation 3 of Annex II)**
Vegetable oils, n.o.s., including : babassu oil, beech nut oil, castor oil, cocoa butter, coconut oil, corn oil, cotton seed oil, groundnut oil, hazelnut oil, linseed oil, nutmeg butter, oiticica oil, olive oil, palm nut oil, palm oil, peel oil (oranges and lemons), perilla oil, poppy oil, raisin seed oil, rape seed oil, rice bran oil, safflower oil, salad oil, sesame oil, soya bean oil, sunflower oil, tucum oil, tung oil, walnut oil	–	D
Vegetable protein solution (hydrolysed)	–	III
Water	–	III
Waxes	–	D
Zinc alkenyl carboxamide	–	III

[1] Use “Brake fluid base mix” as a proper name on the shipping document.

[2] Water-based fish meal extract.

[3] In case of a specific n.o.s. (not otherwise specified) cargo assessed as falling within this n.o.s. group that is carried on a ship, this entry, including the cargo's trade name and one or two principal components, should be provided in the shipping document.

Chapter 19
Requirements for ships engaged in the incineration at sea of liquid chemical waste

19.1 General

19.1.1 chapter 1 to 16 apply to incinerator ships, as relevant, and as supplemented or modified by the provisions of this chapter.

19.1.2 Information on the composition and the hazards of the waste to be incinerated should be made available to the Administration or port Administration, or both, as appropriate, which may prohibit carriage of those wastes deemed to be too hazardous to be carried in bulk*.

19.1.3 The following additional definitions apply :

.1 *Incinerator space* is a gastight space containing solely the incinerator and its associated auxiliaries.

.2 *Incinerator blower space* is a space containing the blowers which supply combustion air to the incinerator burners.

.3 *London Convention 1972* means the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter at Sea, 1972.

.4 *Cargo area* is that part of the ship defined in 1.3.5, excluding incinerators and chemical waste piping leading to the incinerators.

19.1.4 During the periodical and intermediate surveys required under 1.5.2.1.2 and .3, all cargo tanks and the cargo piping system should be inspected for corrosion and the remaining thickness of material should be determined. Where severely corrosive wastes have been carried, inspections of cargo tanks and the cargo piping system for corrosion should be held annually and the remaining thickness of materials determined during those inspections.

19.2 Ship survival capability and location of cargo tanks

19.2.1 Ships subject to this chapter should comply with type 2 ship standards and with the requirements for location of cargo tanks in type 2 ships.

* The environmental aspects of incineration and dumping of wastes are regulated by the 1972 London Convention. The Sixteenth Consultative Meeting of Contracting Parties to the London Convention in November 1993 adopted amendments to the Convention (resolution LC.50(16)) which entered into force for all Contracting Parties on 21 February 1994, and which provide that incineration at sea of industrial wastes is prohibited.

19.2.2 Waste mixtures containing substances which would require a type 1 ship standard may be carried in type 2 ships if solely for the purpose of incineration.

19.3 Ship arrangements

19.3.1 Liquid chemical wastes should not be stowed adjacent to oil fuel tanks except those tanks containing oil fuel to be used exclusively for incineration.

19.3.2 Tanks and pumps, other than those described in 19.3.3, which may contain liquids and which are to be used for the incineration process or for washing cargo pipes and cargo tanks may be located adjacent to cargo tanks and should be located within the cargo area. The provisions of 3.1 should apply to such tanks and equipment to the same extent as they apply to cargo tanks.

19.3.3 Where necessary, oil fuel tanks and fuel pumps directly feeding the incinerator burners during the process of pre-heating or supporting incineration may be located outside the cargo area provided the oil fuel used has a flashpoint above 60° C (closed-cup test). (See also 19.5.3.)

19.3.4 Liquids which have been used for cleaning cargo pipes and cargo tanks as well as from pump-room drainage should be stored in a slop tank in the cargo area, for disposal in conformity with the technical guidelines annexed to the Dumping Convention. A cargo tank may be used as a slop tank. Pumps used for handling contaminated cleaning fluids should be located in the cargo area.

19.3.5 Where necessary, compliance with 3.2.1 need not be required in so far as accommodation spaces, service spaces, control stations and machinery spaces other than those of category A may be permitted forward of the cargo area, subject to an equivalent standard of safety and appropriate fire-extinguishing arrangements being provided to the satisfaction of the Administration.

19.3.6 If accommodation spaces, service spaces, control stations or machinery spaces other than those of category A are located forward of the cargo area in accordance with 19.3.5, the requirements of 3.2.3 should be applied by analogy ; i.e. the specified distances should be measured from the after end of a house located forward of the cargo area.

19.3.7 The incinerator should be located outside the external perimeter of the cargo area. Alternative arrangements may, however, be considered by the Administration, provided an equivalent degree of safety is achieved.

19.3.8 The effect which combustion gases may have on adequate vision from the navigating bridge, on air intakes and openings into accommodation, service and machinery spaces, and on deck working areas and passageways should be considered.

19.3.9 Access to the incinerator space should be from the open deck. However, the incinerator control room and incinerator blower space may have direct access to the incinerator space provided that

these spaces have an additional access from the open deck. Access openings of the incinerator space should be fitted with self-closing gastight doors.

19.4 Cargo containment and incinerator standards

19.4.1 Integral gravity tanks may be used for hazardous wastes.

19.4.2 The incinerator, including burners, should be designed and constructed to safety standards acceptable to the Administration*. For materials of construction the provisions of 6.1 apply.

19.4.3 The steel structure of the incinerator, including supports and other fixtures, should be designed for the most unfavourable static angle of heel within the range of 0° to 30°, taking into account the dynamic loads due to the ship's motion.

19.4.4 Suitable brick lining and insulation should be provided to ensure that any temperature rise will not impair the strength of the incinerator structure or the functioning of the associated auxiliaries and instruments and will not adversely affect personnel safety.

19.4.5 Means should be provided for measuring the temperature on the outside furnace surfaces. Means for alarms should be provided to indicate when the temperature approved by the Administration is exceeded and the process of incineration has to be stopped.

19.5 Cargo transfer

19.5.1 The requirements of 5.1 apply except that cargo piping should, as far as practicable, be fitted in the cargo area and that cargo piping leading to the incinerator should :

.1 be fitted at least 760 mm inboard ;

.2 if outside the cargo area, be on the open deck ;

.3 be clearly marked ; and

.4 be so designed as to allow draining and purging.

19.5.2 Arrangements of the cargo piping and controls should be such as to preclude the discharge overboard of wastes intended to be incinerated during normal cargo-handling operations.

* The standards set out by the London Convention for the control of incineration of wastes and other matter at sea should also be observed.

19.5.3 Oil fuel and cargo piping systems may be connected in front of the burners, provided that three-way cocks are installed and the oil fuel pipes are fitted with two screw-down nonreturn valves inside the incinerator space.

19.5.4 Remote shutdown devices to cut off the supply of waste and fuel for incineration should be fitted at the control station and on the navigating bridge. Shutoff valves should be located in the cargo area. Where shutoff valves are remotely controlled, provision for local manual operation should be made, or a separate manually operated valve should be fitted.

19.5.5 Flanges of the loading manifold connections should be provided with shields, which may be portable, to guard against the danger of the cargo being sprayed. Drip trays should also be provided.

19.6 Materials of construction

19.6.1 Section 6.2 – special requirements for materials – is replaced by the following :

.1 Aluminium, copper, copper alloys, zinc, galvanized steel or mercury should not be used for cargo tanks, pipelines, valves, fittings and other equipment which may come into contact with the liquid wastes or their vapour.

.2 Materials of construction having a melting point below 925° C, e.g. aluminium and its alloys, should not be used for external piping involved in cargo-handling operations on ships intended for the carriage of wastes with a flashpoint not exceeding 60° C (closed-cup test). Short lengths of external pipes connected to cargo tanks may be permitted by the Administration if they are provided with fire-resistant insulation.

.3 In determining the scantlings of the cargo system, the corrosivity of the waste should be taken into account.

19.7 Tank vent systems

19.7.1 The provisions for controlled venting systems – chapter 8 and section 15.12 – apply, except 8.2.1 and 15.12.3.

19.8 Cargo-tank environmental control

19.8.1 When the recirculating drop line does not terminate near the bottom of the cargo tank, the tank should be inerted whenever wastes having a flashpoint not exceeding 60° C (closed-cup test) are being recirculated to it.

19.8.2 When washing machines using liquids having a flashpoint not exceeding 60° C (closed-cup test) are employed, the cargo tank should be inerted.

19.8.3 The oxygen content of the atmosphere in an inerted tank should not exceed 8% by volume in any part of the tank.

19.8.4 An audible and visual alarm should be provided to indicate when the pressure in the vapour space of an inerted cargo tank is less than 0.07 bar gauge.

19.9 Electrical installation

19.9.1 In incinerator spaces, incinerator blower spaces, and adjacent spaces having direct access thereto, the lighting systems, telephone and public address systems and general alarm systems should be of the certified safe type.

19.9.2 All other electrical installations which are fitted in the spaces referred to in 19.9.1 should be of the certified safe type unless the following conditions are complied with :

.1 It is assured that the spaces are adequately ventilated prior to activating installations not of a certified safe type. Interlocks should be provided between fans and the switchgear of such installations to ensure compliance with this requirement.

.2 Installations not of a certified safe type should be automatically switched off in case of loss of the pressure required by 19.11.2.1 and 19.11.3.1. A reasonable time delay may be permitted by the Administration before these installations are switched off.

.3 Installations not of a certified safe type should comply as a minimum with IP 55* or equivalent protection.

19.10 Fire protection and fire extinguishing

19.10.1 The incinerator space should be provided with a fixed foam fire-extinguishing system complying with regulation II-2/8 or II-2/9 of the 1983 SOLAS amendments. This system may be connected to the deck foam fire-extinguishing system.

19.11 Mechanical ventilation in the cargo area and in the incinerator location

19.11.1 For cargo pump-rooms the provisions of 15.17 – increased ventilation requirements – apply.

* Reference is made to the recommendations published by the International Electrotechnical Commission and in particular to Publication 44.

19.11.2 The ventilation system of the incinerator space should be permanent, normally of the positive-pressure type and independent of all other air supply systems.

.1 The air pressure should always be positive to the pressure within the furnace (see also 19.9.2.2).

.2 A minimum capacity of 45 changes of air per hour should be provided, based upon the total volume of the incinerator space.

Consideration should be given to venting requirements during maintenance of burners.

19.11.3 The ventilation system of the incinerator blower space should be permanent, normally of the positive-pressure type and independent of other air supply systems.

.1 The air pressure should always be positive to the pressure within the furnace (see also 19.9.2.2).

.2 A minimum capacity of 20 changes of air per hour should be provided, based upon the total volume of the incinerator blower space.

19.12 Instrumentation and overflow control

19.12.1 Closed gauging devices described in 13.1.1.3 should be fitted and overflow-control systems required in 15.19 should be provided.

19.12.2 Vapour-detection instruments for toxic and flammable products described in 13.2 should be fitted.

19.13 Personnel protection

19.13.1 The safety equipment described in 14.2, including respiratory and eye protection for every person on board described in 14.2.8, should be provided.

Chapter 20
Transport of liquid chemical wastes

20.1 Preamble

20.1.1 Maritime transport of liquid chemical wastes could present a threat to human health and to the environment.

20.1.2 Liquid chemical wastes should, therefore, be transported in accordance with relevant international conventions and recommendations and, in particular, where it concerns maritime transport in bulk, with the requirements of this Code.

20.2 Definitions

For the purpose of this chapter :

20.2.1 *Liquid chemical wastes* are substances, solutions or mixtures, offered for shipment, containing or contaminated with one or more constituents which are subject to the requirements of this Code and for which no direct use is envisaged but which are carried for dumping, incineration or other methods of disposal other than at sea.

20.2.2 *Transboundary movement* means maritime transport of wastes from an area under the national jurisdiction of one country to or through an area under the national jurisdiction of another country, or to or through an area not under the national jurisdiction of any country, provided at least two countries are concerned by the movement.

20.3 Applicability

20.3.1 The requirements of this chapter are applicable to the transboundary movement of liquid chemical wastes in bulk by seagoing ships and should be considered in conjunction with all other requirements of this Code.

20.3.2 The requirements of this chapter do not apply to :

.1 wastes derived from shipboard operations which are covered by the requirements of MARPOL 73/78 ;

.2 liquid chemical wastes carried by ships engaged in the incineration of such wastes at sea which are covered by chapter 19 of this Code ; and

.3 substances, solutions or mixtures containing or contaminated with radioactive materials which are subject to the applicable requirements for radioactive materials.

20.4 Permitted shipments

20.4.1 Transboundary movement of wastes is permitted to commence only when :

.1 notification has been sent by the competent authority of the country of origin, or by the generator or exporter through the channel of the competent authority of the country of origin, to the country of final destination ; and

.2 the competent authority of the country of origin, having received the written consent of the country of final destination stating that the wastes will be safely incinerated or treated by other methods of disposal, has given authorization to the movement.

20.5 Documentation

20.5.1 In addition to the documentation specified in 16.2 of this Code, ships engaged in transboundary movement of liquid chemical wastes should carry on board a waste movement document issued by the competent authority of the country of origin.

20.6 Classification of liquid chemical wastes

20.6.1 For the purpose of the protection of the marine environment, all liquid chemical wastes transported in bulk should be treated as Category A noxious liquid substances, irrespective of the actual evaluated category.

20.7 Carriage and handling of liquid chemical wastes

20.7.1 Liquid chemical wastes should be carried in ships and cargo tanks in accordance with the minimum requirements for liquid chemical wastes specified in chapter 17, unless there are clear grounds indicating that the hazards of the wastes would warrant :

.1 carriage in accordance with the ship type 1 requirements ; or

.2 any additional requirements of this Code applicable to the substance or, in case of a mixture, its constituent presenting the predominant hazard.

Annex
Index of Dangerous Chemicals Carried in Bulk

1 Column 1 of the index gives the names of chemicals and chemical products listed in chapter 17 and chapter 18 of the Code.

.1 Chemicals listed in these chapters as well as abbreviations are shown in capitals. Alternative names are shown in lower case letters with an initial capital. If the chemical in column 1 is listed in chapter 17 or chapter 18 the relevant reference is indicated in column 2. Where no reference to an appropriate chapter is given in column 2, the name of the basic chemical is given and the chapter references and conditions of carriage for that chemical are applicable. An asterisk (*) alongside a chemical name signifies that the name conforms with the system of nomenclature of the International Union of Pure and Applied Chemistry (IUPAC).

.2 Prefixes forming an integral part of the name are shown in ordinary (roman) type and are taken into account in determining the alphabetical order of entries. These include such prefixes as :

Mono Di Tri Tetra Penta Iso Bis Neo Ortho

.3 Prefixes that are disregarded for purposes of alphabetical order are in italics and include the following :

n-	(normal-)	*dl-*	
sec-	(secondary-)	*cis-*	
tert-	(tertiary-)	*trans-*	
o-	*(ortho-)*	*(E)-*	
m-	*(meta-)*	*(Z)-*	
p-	*(para-)*	*alpha-*	(α)
N-		*beta-*	(β)
O-		*gamma-*	(γ)
sym-		*epsilon-*	(∈)
uns-			

2 Column 3 of the index gives the UN number of the chemical, where it is available. Column 4 gives the appropriate table number in the *Medical First Aid Guide for Use in Accidents Involving Dan-*

gerous Goods (MFAG number). Column 5 refers to the year of revision of the entry. Where no year is given, the entry appeared before 1993.

	Name	See	UN No.	MF AG	Rev.
	Acetaldehyde cyanohydrin	LACTONITRILE SOLUTION (80% OR LESS)			
*	ACETIC ACID	Chapter 17		700	
*	ACETIC ANHYDRIDE	Chapter 17	1715	700	
	Acetic ester	ETHYL ACETATE			
	Acetic ether	ETHYL ACETATE			
	Acetic oxide	ACETIC ANHYDRIDE			
	Acetoacetic ester	ETHYL ACETOACETATE			
	ACETOCHLOR	Chapter 17			1997
*	ACETONE	Chapter 18	1090	300	
	ACETONE CYANOHYDRIN	Chapter 17	1541	215	
*	ACETONITRILE	Chapter 17	1648	215	
	Acetylene tetrachloride	TETRACHLOROETHANE			
	Acetyl oxide	ACETIC ANHYDRIDE			
	Acroleic acid	ACRYLIC ACID			
*	ACRYLAMIDE SOLUTION (50% OR LESS)	Chapter 17	2074	323	
*	ACRYLIC ACID	Chapter 17	2218	700	
	Acrylic acid, 2-hydroxyethyl ester	2-HYDROXYETHYL ACRYLATE			
	Acrylic amide solution, 50% or less	ACRYLAMIDE SOLUTION (50% OR LESS)			
	Acrylic resin monomer	METHYL METHACRYLATE			
*	ACRYLONITRILE	Chapter 17	1093	215	
	ACRYLONITRILE-STYRENE COPOLYMER DISPERSION IN POLYETHER POLYOL	Chapter 18			1993
*	ADIPONITRILE	Chapter 17	2205	215	
	ALACHLOR TECHNICAL (90% OR MORE)	Chapter 17			1993
	Alcohol	ETHYL ALCOHOL			
	Alcohol, C_7	HEPTANOL (ALL ISOMERS)			
	Alcohol, C_8	OCTANOL (ALL ISOMERS)			
	Alcohol, C_9	NONYL ALCOHOL (ALL ISOMERS)			
	Alcohol, C_{10}	DECYL ALCOHOL (ALL ISOMERS)			
	Alcohol, C_{11}	UNDECYL ALCOHOL			
	Alcohol, C_{12}	DODECYL ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
	ALCOHOLIC BEVERAGES, N.O.S.	Chapter 18	3065	305	
	ALCOHOL (C_{12}–C_{15}) POLY(1–6)-ETHOXYLATES	Chapter 17			1993
	ALCOHOL (C_{12}–C_{15}) POLY(7–19)-ETHOXYLATES	Chapter 17			1993
	ALCOHOL (C_{12}–C_{15}) POLY(20+)-ETHOXYLATES	Chapter 17			1993
	ALCOHOLS (C_{13+})	Chapter 18			1993
	ALCOHOL (C_6–C_{17}) (SECONDARY) POLY(3–6)ETHOXYLATES	Chapter 17			
	ALCOHOL (C_6–C_{17}) (SECONDARY) POLY(7–12)ETHOXYLATES	Chapter 17			
	Aldehyde collidine	2-METHYL-5-ETHYLPYRIDINE			
	Aldehydine	2-METHYL-5-ETHYLPYRIDINE			
	ALKANES (C_6–C_9)	Chapter 17			1993
	n-ALKANES (C_{10+})	Chapter 18			1993
	ALKARYL POLYETHERS (C_9–C_{20})	Chapter 17			
	ALKENYL (C_{11+})AMIDE	Chapter 18			1993
	ALKYL ACRYLATE-VINYLPYRIDINE COPOLYMER IN TOLUENE	Chapter 17			
	ALKYL (C_{8+})AMINE, ALKENYL (C_{12+}) ACID ESTER MIXTURE	Chapter 18			
	ALKYLBENZENE, ALKYLINDANE, ALKYLINDENE MIXTURE (EACH C_{12}–C_{17})	Chapter 17			1993
	ALKYL (C_3–C_4)BENZENES	Chapter 17			1993
	ALKYL (C_5–C_8)BENZENES	Chapter 17			1993
	ALKYL (C_{9+})BENZENES	Chapter 18			1993
	ALKYLBENZENESULPHONIC ACID	Chapter 17		700	1993
	ALKYLBENZENESULPHONIC ACID, SODIUM SALT SOLUTION	Chapter 17		700	
	ALKYLDITHIOTHIADIAZOLE (C_6–C_{24})	Chapter 18			
	ALKYL (C_7–C_9) NITRATES	Chapter 17			
	ALKYL (C_7–C_{11})PHENOL POLY(4–12)-ETHOXYLATE	Chapter 17			1997
*	ALLYL ALCOHOL	Chapter 17	1098	307	
*	ALLYL CHLORIDE	Chapter 17	1100	340	

	Name	See	UN No.	MF AG	Rev.
*	ALUMINIUM CHLORIDE (30% OR LESS)/HYDROCHLORIC ACID (20% OR LESS) SOLUTION	Chapter 17			
*	ALUMINIUM SULPHATE SOLUTION	Chapter 18			
	Aminoacetic acid, sodium salt solution	GLYCINE, SODIUM SALT SOLUTION			
	Aminobenzene	ANILINE			
	1-Aminobutane	BUTYLAMINE (ALL ISOMERS)			
	2-Aminobutane	BUTYLAMINE (ALL ISOMERS)			
	Aminocyclohexane	CYCLOHEXYLAMINE			
	Aminoethane	ETHYLAMINE			
	Aminoethane solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)			
*	2-Aminoethanol	ETHANOLAMINE			
*	2-(2-AMINOETHOXY)ETHANOL	Chapter 17	3055	320	
*	2-(2-Aminoethylamino)ethanol	AMINOETHYLETH-ANOLAMINE			
	AMINOETHYLDIETHANOLAMINE/ AMINOETHYLETHANOLAMINE SOLUTION	Chapter 18			
	AMINOETHYLETHANOLAMINE	Chapter 17		320	
	N-AMINOETHYLPIPERAZINE	Chapter 17	2815	325	
	1-(2-Aminoethyl)piperazine	*N*-AMINOETHYLPIPERAZINE			1993
*	2-AMINO-2-HYDROXYMETHYL-1,3-PROPANEDIOL SOLUTION (40% OR LESS)	Chapter 18			
	2-Aminoisobutane	BUTYLAMINE (ALL ISOMERS)			
	Aminomethane solutions, 42% or less	METHYLAMINE SOLU-TIONS (42% OR LESS)			
	1-Amino-2-methylbenzene	*o*-TOLUIDINE			
	2-Amino-1-methylbenzene	*o*-TOLUIDINE			
*	2-AMINO-2-METHYL-1-PROPA-NOL (90% OR LESS)	Chapter 17			
	Aminophen	ANILINE			
	1-Aminopropane	*n*-PROPYLAMINE			
	2-Aminopropane	ISOPROPYLAMINE			
	2-Aminopropane (70% or less) solution	ISOPROPYLAMINE (70% OR LESS) SOLUTION			1997
*	1-Aminopropan-2-ol	ISOPROPANOLAMINE			
*	1-Amino-2-propanol	ISOPROPANOLAMINE			

	Name	See	UN No.	MF AG	Rev.
*	3-Aminopropan-1-ol	*n*-PROPANOLAMINE			
	2-Aminotoluene	*o*-TOLUIDINE			
	o-Aminotoluene	*o*-TOLUIDINE			
*	AMMONIA AQUEOUS (28% OR LESS)	Chapter 17	2672	725	
	Ammonia water, 28% or less	AMMONIA AQUEOUS (28% OR LESS)			
	AMMONIUM BISULPHITE SOLUTION (70% OR LESS)	Chapter 17			1997
	AMMONIUM HYDROGEN PHOSPHATE SOLUTION	Chapter 18			
*	Ammonium hydrogensulphite	AMMONIUM BISULPHITE SOLUTION (70% OR LESS)			1997
*	Ammonium hydroxide, 28% or less	AMMONIA AQUEOUS (28% OR LESS)			
	AMMONIUM LIGNOSULPHONATE SOLUTIONS	Chapter 18			1997
*	AMMONIUM NITRATE SOLUTION (93% OR LESS)	Chapter 17		235	
*	AMMONIUM POLYPHOSPHATE SOLUTION	Chapter 18			
*	AMMONIUM SULPHATE SOLUTION	Chapter 18			
*	AMMONIUM SULPHATE SOLUTION (45% OR LESS)	Chapter 17	2683	225	
*	AMMONIUM THIOCYANATE (25% OR LESS)/AMMONIUM THIOSULPHATE (20% OR LESS) SOLUTION	Chapter 17			
*	AMMONIUM THIOSULPHATE SOLUTION (60% OR LESS)	Chapter 17			
	n-Amyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
	sec-Amyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
	AMYL ACETATE (ALL ISOMERS)	Chapter 17	1104	330	
	Amyl acetate, commercial	AMYL ACETATE (ALL ISOMERS)			1993
	Amylacetic ester	AMYL ACETATE (ALL ISOMERS)			1993
	Amyl alcohol	*n*-AMYL ALCOHOL			
	n-AMYL ALCOHOL	Chapter 18	1105	305	
	sec-AMYL ALCOHOL	Chapter 18	1105	305	
	tert-AMYL ALCOHOL	Chapter 18	1105	305	
	AMYL ALCOHOL, PRIMARY	Chapter 18	1105	305	

	Name	See	UN No.	MF AG	Rev.
	Amyl aldehyde	VALERALDEHYDE (ALL ISOMERS)			
	Amyl carbinol	HEXANOL			
	alpha-n-Amylene	PENTENE (ALL ISOMERS)			
	Amylene hydrate	*tert*-AMYL ALCOHOL			
	tert-Amylenes	PENTENE (ALL ISOMERS)			
	Amyl ethyl ketone	ETHYL AMYL KETONE			
	Amyl hydrate	*n*-AMYL ALCOHOL			
	Amyl hydride	PENTANE (ALL ISOMERS)			
	Anaesthetic ether	DIETHYL ETHER			
*	ANILINE	Chapter 17	1547	335	
	Aniline oil	ANILINE			
	Animal acid oil	ANIMAL AND FISH ACID OILS AND DISTILLATES, N.O.S.			
	ANIMAL AND FISH ACID OILS AND DISTILLATES N.O.S.	Chapter 18			
	ANIMAL AND FISH ACID OILS, N.O.S.	Chapter 18			
	Anthracene oil (coal tar fraction)	COAL TAR			
	Ant oil, artificial	FURFURAL			
	APPLE JUICE	Chapter 18			
	Aqua fortis	NITRIC ACID (70% AND OVER)			
	ARYL POLYOLEFINS (C_{11}–C_{50})	Chapter 18			1993
	AVIATION ALKYLATES (C_8 PARAFFINS AND ISO-PARAFFINS B.PT. 95-120× C)	Chapter 17			
*	Azepane	HEXAMETHYLENEIMINE			
	Azotic acid	NITRIC ACID (70% AND OVER)			
	Babassu oil	VEGETABLE OILS, N.O.S.			1993
	Banana oil	AMYL ACETATE (ALL ISOMERS)			
	Battery acid	SULPHURIC ACID			
	Beech nut oil	VEGETABLE OILS, N.O.S.			
	Beechwood creosote	CREOSOTE			
	Behenyl alcohol	ALCOHOLS (C_{13+})			
	Benzenamine	2-METHYL-6-ETHYLANILINE			
*	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE	Chapter 17	1114	312	
*	BENZENESULPHONYL CHLORIDE	Chapter 17	2225	700	

	Name	See	UN No.	MF AG	Rev.
	BENZENETRICARBOXYLIC ACID, TRIOCTYL ESTER	Chapter 18			
	Benzol	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
	Benzole	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
	Benzophenol	PHENOL			
	(2-Benzothiazolythio) sodium solution	MERCAPTOBENZOTHIA-ZOL, SODIUM SALT SOLUTION			
*	BENZYL ACETATE	Chapter 17			1993
*	BENZYL ALCOHOL	Chapter 17		305	
*	Benzyl butyl phthalate	BUTYL BENZYL PHTHALATE			
*	BENZYL CHLORIDE	Chapter 17	1738	740	
	Betula oil	METHYL SALICYLATE			
*	Biphenyl	DIPHENYL			
*	Bis(2-aminoethyl)amine	DIETHYLENETRIAMINE			
	Bis(chloroethyl) ether	DICHLOROETHYL ETHER			
*	Bis(2-chloroethyl) ether	DICHLOROETHYL ETHER			
*	Bis(2-chloro-1-methylethyl) ether	2,2¢-DICHLOROISOPRO-PYL ETHER			
*	1,1-Bis[4-(2,3-epoxypropoxy)phe-nyl]-ethane	DIGLYCIDYL ETHER OF BISPHENOL A			
*	Bis[2-(2,3-epoxypropoxy)phenyl]-methane	DIGLYCIDYL ETHER OF BISPHENOL F			
*	Bis(2-ethoxyethyl) ether	DIETHYLENE GLYCOL DIE-THYL ETHER			
*	Bis(2-ethylhexyl) adipate	DI-(2-ETHYLHEXYL) ADIPATE			
*	Bis(2-ethylhexyl) hydrogen phosphate	DI-(2-ETHYLHEXYL)PHOS-PHORIC ACID			
*	Bis(2-ethylhexyl) phthalate	DIOCTYL PHTHALATE			
*	Bis(2-hydroxyethyl)amine	DIETHANOLAMINE			1993
*	Bis(6-methylhepty) phthalate	DIOCTYL PHTHALATE			
	BRAKE FLUID BASE MIX	Chapter 18			
	Bran oil	FURFURAL			
*	BROMOCHLOROMETHANE	Chapter 17	1887	345	1997
	Butaldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
*	Butanal	BUTYRALDEHYDE (ALL ISOMERS)			1993

	Name	See	UN No.	MF AG	Rev.
	n-Butanal	BUTYRALDEHYDE (ALL ISOMERS)			1993
*	Butane-1,3-diol	BUTYLENE GLYCOL			
*	1,3-Butanediol	BUTYLENE GLYCOL			
*	1,4-Butanediol	BUTYLENE GLYCOL			
*	Butane-1,4-diol	BUTYLENE GLYCOL			
*	2,3-Butanediol	BUTYLENE GLYCOL			
*	Butane-2,3-diol	BUTYLENE GLYCOL			
*	Butanoic acid	BUTYRIC ACID			
	Butanol	*n*-BUTYL ALCOHOL			
*	2-Butanol	*sec*-BUTYL ALCOHOL			
*	Butan-1-ol	*n*-BUTYL ALCOHOL			
*	Butan-2-ol	sec-BUTYL ALCOHOL			
	n-Butanol	*n*-BUTYL ALCOHOL			
	sec-Butanol	*sec*-BUTYL ALCOHOL			
	tert-Butanol	*tert*-BUTYL ALCOHOL			
	Butanol acetate	BUTYL ACETATE (ALL ISOMERS)			1993
	2-Butanol acetate	BUTYL ACETATE (ALL ISOMERS)			1993
	1,4-Butanolide	*gamma*-BUTYROLACTONE			
*	Butan-4-olide	*gamma*-BUTYROLACTONE			
*	2-Butanone	METHYL ETHYL KETONE			
*	Butan-2-one	METHYL ETHYL KETONE			
*	2-Butenal	CROTONALDEHYDE			
*	(*E*)-But-2-enal	CROTONALDEHYDE			
	Butene dimer	OCTENE (ALL ISOMERS)			
*	*cis*-Butenedioic anhydride	MALEIC ANHYDRIDE			
	BUTENE OLIGOMER	Chapter 17			
*	1-Butoxybutane	*n*-BUTYL ETHER			
*	2-Butoxyethanol	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
*	2-*tert*-Butoxyethanol	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
*	2-(2-Butoxyethoxy)ethanol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
*	2-(2-Butoxyethoxy)ethyl acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			

	Name	See	UN No.	MF AG	Rev.
*	2-Butoxyethyl acetate	ETHYLENE GLYCOL BUTYL ETHER ACETATE			
*	Butyl acetate	BUTYL ACETATE (ALL ISOMERS)			1993
*	BUTYL ACETATE (ALL ISOMERS)	Chapter 17		330	1993
	n-Butyl acetate	BUTYL ACETATE (ALL ISOMERS)			1993
*	*sec*-Butyl acetate	BUTYL ACETATE (ALL ISOMERS)			1993
*	*tert*-Butyl acetate	BUTYL ACETATE (ALL ISOMERS)			1993
	n-Butyl acrylate	BUTYL ACRYLATE (ALL ISOMERS)			1993
*	BUTYL ACRYLATE (ALL ISOMERS)	Chapter 17		330	1993
*	Butyl alcohol	*n*-BUTYL ALCOHOL			
	n-BUTYL ALCOHOL	Chapter 18	1120	305	
*	*sec*-BUTYL ALCOHOL	Chapter 18	1120	305	
*	*tert*-BUTYL ALCOHOL	Chapter 18	1120	305	
	n-Butyl aldehyde	BUTYRALDEHYDE (ALL ISOMERS)			
*	BUTYLAMINE (ALL ISOMERS)	Chapter 17		320	
	n-Butylamine	BUTYLAMINE (ALL ISOMERS)			1993
*	*sec*-Butylamine	BUTYLAMINE (ALL ISOMERS)			
*	*tert*-Butylamine	BUTYLAMINE (ALL ISOMERS)			
*	*tert*-Butylbenzene	BUTYLBENZENE (ALL ISOMERS)			
*	BUTYLBENZENE (ALL ISOMERS)	Chapter 17	2709	310	1993
	BUTYL BENZYL PHTHALATE	Chapter 17		330	
*	Butyl butanoate	BUTYL BUTYRATE (ALL ISOMERS)			1993
*	*n*-Butyl butyrate	BUTYL BUTYRATE (ALL ISOMERS)			1993
*	BUTYL BUTYRATE (ALL ISOMERS)	Chapter 17		330	1993
	n-Butylcarbinol	*n*-AMYL ALCOHOL			
	Butyl “carbitol”	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Butyl “carbitol” acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993

	Name	See	UN No.	MF AG	Rev.
	Butyl "cellosolve"	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Butyl "cellosolve" acetate	ETHYLENE GLYCOL BUTYL ETHER ACETATE			1993
	BUTYL/DECYL/CETYL/EICOSYL METHACRYLATE MIXTURE	Chapter 17		330	
*	Butyl/decyl/hexadecyl/icosyl methacrylate mixture	BUTYL/DECYL/CETYL/EICOSYL METHACRYLATE MIXTURE			
	Butyl diglycol acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	BUTYLENE GLYCOL	Chapter 18		308	
	alpha-Butylene glycol	BUTYLENE GLYCOL			
	beta-Butylene glycol	BUTYLENE GLYCOL			
	1,2-BUTYLENE OXIDE	Chapter 17	3022	365	1993
	Butyl ester	BUTYL ACETATE (ALL ISOMERS)			1993
*	Butyl ethanoate	BUTYL ACETATE (ALL ISOMERS)			1993
	Butyl ether	*n*-BUTYL ETHER			
	n-BUTYL ETHER	Chapter 17	1149	330	
	Butylethylacetic acid	OCTANOIC ACID (ALL ISOMERS)			
*	Butyl(ethyl)amine	*N*-ETHYLBUTYLAMINE			
	N-Butylethylamine	*N*-ETHYLBUTYLAMINE			
	Butylethylene	HEXENE (ALL ISOMERS)			
	Butylic ether	BUTYL ACETATE (ALL ISOMERS)			1993
*	BUTYL METHACRYLATE	Chapter 17		330	
*	Butyl 2-methoxyethyl ether	ETHYLENE GLYCOL METHYL BUTYL ETHER			
*	*tert*-Butyl methyl ether	METHYL *tert*-BUTYL ETHER			
*	Butyl octadecanoate	BUTYL STEARATE			1993
	Butyl phthalate	DIBUTYL PHTHALATE			
	n-BUTYL PROPIONATE	Chapter 17	1914	330	1993
*	BUTYL STEARATE	Chapter 18			
	n-Butyraldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
	BUTYRALDEHYDE (ALL ISOMERS)	Chapter 17			1993
*	BUTYRIC ACID	Chapter 17	2820	700	
	n-Butyric acid	BUTYRIC ACID			
	Butyric alcohol	*n*-BUTYL ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
	Butyric aldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
*	*gamma*-BUTYROLACTONE	Chapter 18		330	
	Cajeputene	DIPENTENE			
	CALCIUM ALKYL(C_9)PHENOL SULPHIDE/POLYOLEFIN PHOSPHOROSULPHIDE MIXTURE	Chapter 17			1993
	Calcium alkyl salicylate	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C_{13+})			1993
*	Calcium bis(*O*-alkylsalicylate)	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C_{13+})			1993
*	Calcium bromide/zinc bromide solution	DRILLING BRINES (CONTAINING ZINC SALTS)			
*	CALCIUM CARBONATE SLURRY	Chapter 18			
*	CALCIUM HYDROXIDE SLURRY	Chapter 18			
*	CALCIUM HYPOCHLORITE SOLUTION (15% OR LESS)	Chapter 17		741	
*	CALCIUM HYPOCHLORITE SOLUTION (MORE THAN 15%)	Chapter 17		741	
	CALCIUM LIGNOSULPHONATE SOLUTIONS	Chapter 18			1997
	CALCIUM LONG-CHAIN ALKARYL SULPHONATE (C_{11}–C_{50})	Chapter 18			
	CALCIUM LONG-CHAIN ALKYL PHENATE SULPHIDE (C_8–C_{40})	Chapter 18			
	CALCIUM LONG-CHAIN ALKYL PHENOLIC AMINE (C_8–C_{40})	Chapter 18			1993
	CALCIUM LONG-CHAIN ALKYL SALICYLATE (C_{13+})	Chapter 17			1993
*	CALCIUM NITRATE/MAGNESIUM NITRATE/POTASSIUM CHLORIDE SOLUTION	Chapter 18			
	Camphor, liquid	CAMPHOR OIL			
	CAMPHOR OIL	Chapter 17		331	1993
	Capric acid	DECANOIC ACID			
	alpha-Caproic acid	OCTANOIC ACID (ALL ISOMERS)			
	Caprolactam	*epsilon*-CAPROLACTAM (MOLTEN OR AQUEOUS SOLUTIONS)			
*	*epsilon*-CAPROLACTAM (MOLTEN OR AQUEOUS SOLUTIONS)	Chapter 18			
	Capryl alcohol	OCTANOL (ALL ISOMERS)			

	Name	See	UN No.	MF AG	Rev.
	Caprylic acid	OCTANOIC ACID (ALL ISOMERS)			
	Caprylyl acetate	*n*-OCTYL ACETATE			
	CARAMEL SOLUTIONS	Chapter 18			1997
	Carbinol	METHYL ALCOHOL			
	"Carbitol" acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	"Carbitol" solvent	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Carbolic acid	PHENOL			
	CARBOLIC OIL	Chapter 17		710	
	Carbon bisulphide	CARBON DISULPHIDE			
*	CARBON DISULPHIDE	Chapter 17	1131	210	
*	CARBON TETRACHLORIDE	Chapter 17	1846	340	
	CASHEW NUT SHELL OIL (UNTREATED)	Chapter 17		710	
	Castor oil	VEGETABLE OILS, N.O.S.			
	Caustic potash solution	POTASSIUM HYDROXIDE SOLUTION			
	Caustic soda	SODIUM HYDROXIDE SOLUTION			
	"Cellosolve" acetate	2-ETHOXYETHYL ACETATE			
	"Cellosolve" solvent	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	CETYL/EICOSYL METHACRYLATE MIXTURE	Chapter 17		330	
	Cetyl/stearyl alcohol	ALCOHOLS (C_{13+})			1993
	CHLORINATED PARAFFINS (C_{10}–C_{13})	Chapter 17			
	CHLORINATED PARAFFINS (C_{14}–C_{17}) (WITH 52% CHLORINE)	Chapter 18			
*	CHLOROACETIC ACID (80% OR LESS)	Chapter 17	1750	700	
	alpha-Chloroallyl chloride	1,3-DICHLOROPROPENE			
	Chloroallylene	ALLYL CHLORIDE			
*	CHLOROBENZENE	Chapter 17	1134	340	
	Chlorobenzol	CHLOROBENZENE			
	Chlorobromomethane	BROMOCHLOROMETHANE			1997
*	1-Chloro-2,3-epoxypropane	EPICHLOROHYDRIN			
	Chloroethanol-2	ETHYLENE CHLOROHYDRIN			

	Name	See	UN No.	MF AG	Rev.
*	2-Chloro-*N*-ethoxymethyl-6¢-ethyl-acet-*o*-toluidide	ACETOCHLOR			1997
	2-Chloro-*N*-ethoxymethyl-*N*-(2-ethyl-6-methylphenyl)acetamide	ACETOCHLOR			1997
*	2-Chloroethanol	ETHYLENE CHLOROHYDRIN			
*	2-Chloroethyl alcohol	ETHYLENE CHLOROHYDRIN			
	beta-Chloroethyl alcohol	ETHYLENE CHLOROHYDRIN			
*	CHLOROFORM	Chapter 17	1888	340	
	CHLOROHYDRINS (CRUDE)	Chapter 17		740	
	m-Chloromethylbenzene	*m*-CHLOROTOLUENE			
	o-Chloromethylbenzene	*o*-CHLOROTOLUENE			
	p-Chloromethylbenzene	*p*-CHLOROTOLUENE			
	Chloromethylethylene oxide	EPICHLOROHYDRIN			
	(2-Chloro-1-methylethyl) ether	2,2¢-DICHLOROISOPROPYL ETHER			
*	Chloromethyloxirane	EPICHLOROHYDRIN			
	4-CHLORO-2-METHYLPHENOXY-ACETIC ACID, DIMETHYLAMINE SALT SOLUTION	Chapter 17			1993
	o-CHLORONITROBENZENE	Chapter 17	1578	335	
*	1-Chloro-2-nitrobenzene	*o*-CHLORONITROBENZENE			
*	2- or 3-Chloropropanoic acid	2- or 3-CHLOROPROPIONIC ACID			
*	3-Chloropropene	ALLYL CHLORIDE			
*	2- or 3-CHLOROPROPIONIC ACID	Chapter 17		700	
	alpha- or *beta*-Chloropropionic acid	2- or 3-CHLOROPROPIONIC ACID			
	3-Chloropropylene	ALLYL CHLORIDE			
	alpha-Chloropropylene	ALLYL CHLORIDE			
	Chloropropylene oxide	EPICHLOROHYDRIN			
	CHLOROSULPHONIC ACID	Chapter 17	1754	700	
*	Chlorosulphuric acid	CHLOROSULPHONIC ACID			
*	*alpha*-Chlorotoluene	BENZYL CHLORIDE			
*	*m*-CHLOROTOLUENE	Chapter 17	2238	340	
*	*o*-CHLOROTOLUENE	Chapter 17	2238	340	
*	*p*-CHLOROTOLUENE	Chapter 17	2238	340	
*	CHLOROTOLUENES (MIXED ISOMERS)	Chapter 17	2238	340	
*	CHOLINE CHLORIDE SOLUTIONS	Chapter 18			

	Name	See	UN No.	MF AG	Rev.
	Cinene	DIPENTENE			
	Cinnamene	STYRENE MONOMER			
	Cinnamol	STYRENE MONOMER			
*	CITRIC ACID (70% OR LESS)	Chapter 18			
	CLAY SLURRY	Chapter 18			
	Cleaning solvents	WHITE SPIRIT, LOW (15 – 20%) AROMATIC			
	COAL SLURRY	Chapter 18			
	COAL TAR	Chapter 17		311	
	Coal tar distillate	COAL TAR NAPHTHA SOLVENT			
	COAL TAR NAPHTHA SOLVENT	Chapter 17	310		
	COAL TAR PITCH (MOLTEN)	Chapter 17			
	COBALT NAPHTHENATE IN SOLVENT NAPHTHA	Chapter 17			1993
	Cocoa butter	VEGETABLE OILS, N.O.S.			
	Coconut oil	VEGETABLE OILS, N.O.S.			
	COCONUT OIL FATTY ACID	Chapter 17			
	COCONUT OIL FATTY ACID METHYL ESTER	Chapter 18			
	Cod liver oil	ANIMAL AND FISH OILS, N.O.S.			
	Colamine	ETHANOLAMINE			
	Cologne spirits	ETHYL ALCOHOL			
	Columbian spirits	METHYL ALCOHOL			
	Corn acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Corn oil	VEGETABLE OILS, N.O.S.			
	Corn sugar solution	DEXTROSE SOLUTION			
	Cotton seed acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Cotton seed oil	VEGETABLE OILS, N.O.S.			
	CREOSOTE (COAL TAR)	Chapter 17		710	
	CREOSOTE (WOOD)	Chapter 17		710	
	Creosote salts	NAPHTHALENE (MOLTEN)			
*	CRESOLS (ALL ISOMERS)	Chapter 17	2076	710	1993
	CRESYLIC ACID, DEPHENOLIZED	Chapter 17			1993
	Cresylic acids	CRESOLS (ALL ISOMERS)			
	CRESYLIC ACID, SODIUM SALT SOLUTION	Chapter 17		700	
	Cresylols	CRESOLS (ALL ISOMERS)			
*	CROTONALDEHYDE	Chapter 17	1143	300	
	Crotonic aldehyde	CROTONALDEHYDE			

	Name	See	UN No.	MF AG	Rev.
*	Cumene	PROPYLBENZENE (ALL ISOMERS)			1993
	Cumol	PROPYLBENZENE (ALL ISOMERS)			1993
	Cyanoethylene	ACRYLONITRILE			
	2-Cyanopropan-2-ol	ACETONE CYANOHYDRIN			
*	1,5,9-CYCLODODECATRIENE	Chapter 17			1993
*	CYCLOHEPTANE	Chapter 17	2241	310	1993
*	CYCLOHEXANE	Chapter 17	1145	310	
*	Cyclohexanecarboxylic acid	NAPHTHENIC ACIDS			
*	CYCLOHEXANOL	Chapter 18		305	
*	CYCLOHEXANONE	Chapter 17	1915	300	
*	CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	Chapter 17			1993
	Cyclohexatriene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
*	CYCLOHEXYL ACETATE	Chapter 17	2243	330	1993
*	CYCLOHEXYLAMINE	Chapter 17	2357	320	
*	Cyclohexyldimethylamine	*N,N*-DIMETHYLCYCLOHEXYLAMINE			
*	Cyclohexyl(ethyl)amine	*N*-ETHYLCYCLOHEXYLAMINE			
	Cyclohexyl ketone	CYCLOHEXANONE			
	1,3-CYCLOPENTADIENE DIMER (MOLTEN)	Chapter 17			
*	CYCLOPENTANE	Chapter 17	1146	310	1993
*	CYCLOPENTENE	Chapter 17	2246	310	1993
*	*p*-CYMENE	Chapter 17	2046	310	
	Cymol	*p*-CYMENE			
	Dalapon (ISO)	2,2-DICHLOROPROPIONIC ACID			
	Dark mixed acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	"D-D Soil fumigant"	DICHLOROPROPENE/ DICHLOROPROPANE MIXTURES			
	Deanol	DIMETHYLETHANOLAMINE			
*	DECAHYDRONAPHTHALENE	Chapter 18	1147	310	
*	Decane	*n*-ALKANES (C_{10+})			1993
*	DECANOIC ACID	Chapter 17			

	Name	See	UN No.	MF AG	Rev.
	n-Decanol	DECYL ALCOHOL (ALL ISOMERS)			
*	Decan-1-ol	DECYL ALCOHOL (ALL ISOMERS)			
	DECENE	Chapter 17			
	Decoic acid	DECANOIC ACID			
*	DECYL ACETATE	Chapter 17			1993
*	DECYL ACRYLATE	Chapter 17			
*	Decyl alcohol	DECYL ALCOHOL (ALL ISOMERS)			
*	DECYL ALCOHOL (ALL ISOMERS)	Chapter 17		305	1993
*	Decylbenzene	ALKYL(C_{9+})BENZENES			1993
	Decylic acid	DECANOIC ACID			
*	Decyl octyl adipate	OCTYL DECYL ADIPATE			
	DECYLOXYTETRAHYDROTHIOPHENE DIOXIDE	Chapter 17			1993
*	1-Deoxy-1-methylamino-D-glucitol	*N*-METHYLGLUCAMINE SOLUTION (70% OR LESS)			1997
	Detergent alkylate	ALKYL(C_{9+})BENZENES			1993
	DEXTROSE SOLUTION	Chapter 18			
	Diacetic ester	ETHYL ACETOACETATE			
	Diacetone	DIACETONE ALCOHOL			
	DIACETONE ALCOHOL	Chapter 18	1148	305	
	DIALKYL (C_7–C_{13}) PHTHALATES	Chapter 18	1148	305	
	1,2-Diaminoethane	ETHYLENEDIAMINE			
	1,6-Diaminohexane solutions	HEXAMETHYLENEDIAMINE SOLUTION			
	Diaminotoluene	TOLUENEDIAMINE			
*	4,6-Diamino-3,5,5-trimethylcyclohex-2-enone	ISOPHORONEDIAMINE			
*	1,2-Dibromoethane	ETHYLENE DIBROMIDE			
*	DIBROMOMETHANE	Chapter 17	2664	345	1997
*	DIBUTYLAMINE	Chapter 17		320	
	Dibutyl carbinol	NONYL ALCOHOL (ALL ISOMERS)			
*	Dibutyl ether	*n*-BUTYL ETHER			
	n-Dibutyl ether	*n*-BUTYL ETHER			
	DIBUTYL HYDROGEN PHOSPHONATE	Chapter 17			1993
*	DIBUTYL PHTHALATE	Chapter 17		330	
*	1,2-Dichlorobenzene	DICHLOROBENZENE (ALL ISOMERS)			

	Name	See	UN No.	MF AG	Rev.
*	*m*-Dichlorobenzene	DICHLOROBENZENE (ALL ISOMERS)			
*	*o*-Dichlorobenzene	DICHLOROBENZENE (ALL ISOMERS)			
*	DICHLOROBENZENE (ALL ISOMERS)	Chapter 17		340	1993
	3,4-DICHLORO-1-BUTENE	Chapter 17			1997
*	3,4-Dichlorobut-1-ene	3,4-DICHLORO-1-BUTENE			1997
	2,2¢-Dichlorodiethyl ether	DICHLOROETHYL ETHER			
*	1,1-DICHLOROETHANE	Chapter 17	2362	340	
*	1,2-Dichloroethane	ETHYLENE DICHLORIDE			
	sym-Dichloroethane	ETHYLENE DICHLORIDE			
	Dichloroether	DICHLOROETHYL ETHER			
*	1,1-Dichloroethylene	VINYLIDENE CHLORIDE			
	DICHLOROETHYL ETHER	Chapter 17		340	
	sym-Dichloroethyl ether	DICHLOROETHYL ETHER			
	Dichloroethyl oxide	DICHLOROETHYL ETHER			
*	1,6-DICHLOROHEXANE	Chapter 17		340	1993
	2,2¢-DICHLOROISOPROPYL ETHER	Chapter 17	2490	340	
*	DICHLOROMETHANE	Chapter 17	1593	340	
*	2,4-DICHLOROPHENOL	Chapter 17	2021	711	
	2,4-DICHLOROPHENOXYACETIC ACID, DIETHANOLAMINE SALT SOLUTION	Chapter 17			
	2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% OR LESS)	Chapter 17			1993
	2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	Chapter 17			
*	1,1-DICHLOROPROPANE	Chapter 17		340	1993
*	1,2-DICHLOROPROPANE	Chapter 17	1279	340	
*	1,3-DICHLOROPROPANE	Chapter 17		340	
	Dichloropropane/dichloropropene mixtures	DICHLOROPROPENE/ DICHLOROPROPANE MIXTURES			
*	2,2-Dichloropropanoic acid	2,2-DICHLOROPROPIONIC ACID			
*	1,3-DICHLOROPROPENE	Chapter 17	2047	340	
	DICHLOROPROPENE/DICHLORO-PROPANE MIXTURES	Chapter 17		340	

	Name	See	UN No.	MF AG	Rev.
*	2,2-DICHLOROPROPIONIC ACID	Chapter 17		700	
	Dichloropropylene	1,3-DICHLOROPROPENE			
	1,4-Dicyanobutane	ADIPONITRILE			
	Dicyclopentadiene	1,3-CYCLOPENTADIENE DIMER (MOLTEN)			
*	Didecyl phthalate	DIALKYL (C_7–C_{13}) PHTHALATES			
*	Didodecyl phthalate	DIALKYL (C_7–C_{13}) PHTHALATES			
	DIETHANOLAMINE	Chapter 17		320	
*	DIETHYLAMINE	Chapter 17	1154	320	
*	2-Diethylaminoethanol	DIETHYLAMINOETHANOL			
	DIETHYLAMINOETHANOL	Chapter 17	2686	320	
*	2,6-DIETHYLANILINE	Chapter 17			1993
	DIETHYLBENZENE	Chapter 17	2049	310	
	Diethyl “carbitol”	DIETHYLENE GLYCOL DIETHYL ETHER			
	1,4-Diethylene dioxide	1,4-DIOXANE			
	Diethylene ether	1,4-DIOXANE			
	DIETHYLENE GLYCOL	Chapter 18		308	
	Diethylene glycol butyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol butyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	DIETHYLENE GLYCOL DIBUTYL ETHER	Chapter 18			
	DIETHYLENE GLYCOL DIETHYL ETHER	Chapter 18		330	
	Diethylene glycol ethyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol ethyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	Diethylene glycol methyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol methyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993

	Name	See	UN No.	MF AG	Rev.
	Diethylene glycol monobutyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol monobutyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	Diethylene glycol monoethyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol monoethyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	Diethylene glycol monomethyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Diethylene glycol monomethyl ether acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	DIETHYLENE GLYCOL PHTHALATE	Chapter 18			1993
	Diethylene oxide	1,4-DIOXANE			
	DIETHYLENETRIAMINE	Chapter 17	2079	320	
	DIETHYLENETRIAMINEPENTAACETIC ACID, PENTASODIUM SALT SOLUTION	Chapter 18			
	Diethylethanolamine	DIETHYLAMINOETHANOL			
	N,N-Diethylethanolamine	DIETHYLAMINOETHANOL			
*	DIETHYL ETHER	Chapter 17	1155	330	
	DI-(2-ETHYLHEXYL) ADIPATE	Chapter 18			
	DI-(2-ETHYLHEXYL)PHOSPHORIC ACID	Chapter 17	1902	700	
	Di-(2-ethylhexyl) phthalate	DIOCTYL PHTHALATE			
	Diethyl oxide	DIETHYL ETHER			
*	DIETHYL PHTHALATE	Chapter 17			
*	DIETHYL SULPHATE	Chapter 17	1594	315	
	DIGLYCIDYL ETHER OF BISPHENOL A	Chapter 17			
	DIGLYCIDYL ETHER OF BISPHENOL F	Chapter 17			
	Diglycol	DIETHYLENE GLYCOL			
	Diglycolamine	2-(2-AMINOETHOXY)ETHANOL			
*	DIHEPTYL PHTHALATE	Chapter 18			1993
	DI-*n*-HEXYL ADIPATE	Chapter 17			

	Name	See	UN No.	MF AG	Rev.
*	DIHEXYL PHTHALATE	Chapter 18			
	1,4-DIHYDRO-9,10-DIHYDROXY-ANTHRACENE, DISODIUM SALT SOLUTION	Chapter 18			
	2,3-Dihydroxybutane	BUTYLENE GLYCOL			
	2,2¢-Dihydroxydiethylamine	DIETHANOLAMINE			
	Di-(2-hydroxyethyl)amine	DIETHANOLAMINE			
	Dihydroxyethyl ether	DIETHYLENE GLYCOL			
	1,2-Dihydroxypropane	PROPYLENE GLYCOL			
*	DIISOBUTYLAMINE	Chapter 17	2361	320	
	Diisobutylcarbinol	NONYL ALCOHOL (ALL ISOMERS)			
	DIISOBUTYLENE	Chapter 17	2050	310	
	alpha-Diisobutylene	DIISOBUTYLENE			
	beta-Diisobutylene	DIISOBUTYLENE			
*	DIISOBUTYL KETONE	Chapter 18	1157	300	
*	DIISOBUTYL PHTHALATE	Chapter 17		330	
	2,4-Diisocyanatotoluene	TOLUENE DIISOCYANATE			
	Diisodecyl phthalate	DIALKYL (C_7–C_{13}) PHTHALATES			
	DIISONONYL ADIPATE	Chapter 18			
	Diisononyl phthalate	DIALKYL (C_7–C_{13}) PHTALATES			
	DIISOOCTYL PHTHALATE	Chapter 18			1993
	DIISOPROPANOLAMINE	Chapter 17		320	
*	DIISOPROPYLAMINE	Chapter 17	1158	320	
*	DIISOPROPYLBENZENE (ALL ISOMERS)	Chapter 17		310	
*	Diisopropyl ether	ISOPROPYL ETHER			
	DIISOPROPYLNAPHTHALENE	Chapter 18			
	Diisopropyl oxide	ISOPROPYL ETHER			
*	*N,N*-DIMETHYLACETAMIDE SOLUTION (40% OR LESS)	Chapter 17			
*	DIMETHYL ADIPATE	Chapter 17			
*	DIMETHYLAMINE SOLUTION (45% OR LESS)	Chapter 17	1160	320	
*	DIMETHYLAMINE SOLUTION (GREATER THAN 45% BUT NOT GREATER THAN 55%)	Chapter 17	1160	320	
*	DIMETHYLAMINE SOLUTION (GREATER THAN 55% BUT NOT GREATER THAN 65%)	Chapter 17	1160	320	
	Dimethylaminoethanol	DIMETHYLETHANOLAMINE			

	Name	See	UN No.	MF AG	Rev.
*	2-Dimethylaminoethanol	DIMETHYLETHANOLAMINE			
	Dimethylbenzenes	XYLENES			
*	1,3-Dimethylbutyl acetate	METHYL AMYL ACETATE			
	Dimethylcarbinol	ISOPROPYL ALCOHOL			
*	*N,N*-DIMETHYLCYCLOHEXYLAMINE	Chapter 17	2264	320	
	DIMETHYLETHANOLAMINE	Chapter 17	2051	320	
	1,1-Dimethylethanol	*tert*-BUTYL ALCOHOL			
	1,1-Dimethylethyl alcohol	*tert*-BUTYL ALCOHOL			
	Dimethyl ethyl carbinol	*tert*-AMYL ALCOHOL			
	sym-Dimethylethylene glycol	BUTYLENE GLYCOL			
*	DIMETHYLFORMAMIDE	Chapter 17	2265	321	
*	DIMETHYL GLUTARATE	Chapter 17			
*	2,6-Dimethyl-4-heptanone	DIISOBUTYL KETONE			
*	2,6-Dimethylheptan-4-one	DIISOBUTYL KETONE			
*	DIMETHYL HYDROGEN PHOSPHITE	Chapter 17			
	Dimethylhydroxybenzenes	XYLENOL			
*	1,1¢-Dimethyl-2,2¢-iminodiethanol	DIISOPROPANOLAMINE			
*	Dimethyl ketone	ACETONE			
	DIMETHYLOCTANOIC ACID	Chapter 17		700	
*	Dimethylphenols	XYLENOL			
*	DIMETHYL PHTHALATE	Chapter 17			
	DIMETHYLPOLYSILOXANE	Chapter 18			1993
*	2,2-DIMETHYLPROPANE-1,3-DIOL	Chapter 18			
*	2,2-Dimethylpropionic acid	TRIMETHYLACETIC ACID			
*	DIMETHYL SUCCINATE	Chapter 17			
	DINITROTOLUENE (MOLTEN)	Chapter 17	1600	335	
*	DINONYL PHTHALATE	Chapter 18			
*	Dioctyl adipate	DI-(2-ETHYLHEXYL) ADIPATE			
*	Dioctyl hydrogen phosphate	DI-(2-ETHYLHEXYL)PHOSPHORIC ACID			
	Dioctyl phosphoric acid	DI-(2-ETHYLHEXYL)PHOSPHORIC ACID			
*	DIOCTYL PHTHALATE	Chapter 18			1993
	1,4-Dioxan	1,4-DIOXANE			
*	1,4-DIOXANE	Chapter 17	1165	330	
*	1,3-Dioxolan-2-one	ETHYLENE CARBONATE			
	Dioxolone-2	ETHYLENE CARBONATE			
	Dioxyethylene ether	1,4-DIOXANE			

	Name	See	UN No.	MF AG	Rev.
	DIPENTENE	Chapter 17	2052	310	
	DIPHENYL	Chapter 17			
	DIPHENYLAMINE, REACTION PRODUCT WITH 2,2,4-TRIMETHYLPENTENE	Chapter 17			1993
	DIPHENYLAMINES, ALKYLATED	Chapter 17			1993
	DIPHENYL/DIPHENYL ETHER MIXTURES	Chapter 17			1993
	Diphenyl/diphenyl oxide mixtures	DIPHENYL/DIPHENYL ETHER MIXTURES			
	Diphenyl dodecyl ether disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION			
	Diphenyl dodecyl oxide disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION			
*	DIPHENYL ETHER	Chapter 17		330	
	DIPHENYL ETHER/DIPHENYL PHENYL ETHER MIXTURE	Chapter 17			
	DIPHENYLMETHANE DIISOCYANATE	Chapter 17	2489	370	
	DIPHENYLOL PROPANE-EPICHLOROHYDRIN RESINS	Chapter 17			
*	Diphenyl oxide	DIPHENYL ETHER			
	Diphenyl oxide/diphenyl phenyl ether mixture	DIPHENYL ETHER/DIPHENYL PHENYL ETHER MIXTURE			
*	Dipropylamine	DI-*n*-PROPYLAMINE			
	DI-*n*-PROPYLAMINE	Chapter 17	2383	320	
	n-Dipropylamine	DI-*n*-PROPYLAMINE			
	DIPROPYLENE GLYCOL	Chapter 18		308	
	Dipropylene glycol methyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Dipropylene glycol monomethyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Dipropylmethane	HEPTANE (ALL ISOMERS)			
	Disodium 1,4-dihydroanthracene-9,10-diyl dioxide	1,4-DIHYDRO-9,10-DIHYDROXY-ANTHRACENE, DISODIUM SALT SOLUTION			
*	DITRIDECYL ADIPATE	Chapter 18			1997
*	DITRIDECYL PHTHALATE	Chapter 18			1993

	Name	See	UN No.	MF AG	Rev.
*	DIUNDECYL PHTHALATE	Chapter 18			1993
*	Docosan-1-ol	ALCOHOLS (C_{13+})			1993
*	1-Docosanol	ALCOHOLS (C_{13+})			1993
*	DODECANE (ALL ISOMERS)	Chapter 18			
*	Dodecanoic acid	LAURIC ACID			
*	Dodecan-1-ol	DODECYL ALCOHOL			
*	1-Dodecanol	DODECYL ALCOHOL			
	n-Dodecanol	DODECYL ALCOHOL			
*	DODECENE (ALL ISOMERS)	Chapter 17		310	1993
	DODECENYLSUCCINIC ACID, DIPOTASSIUM SALT SOLUTION	Chapter 18			
*	DODECYL ALCOHOL	Chapter 17		305	
	n-Dodecyl alcohol	DODECYL ALCOHOL			
*	DODECYLAMINE/TETRADECYLAMINE MIXTURE	Chapter 17			1993
*	DODECYLDIMETHYLAMINE/TETRADECYL-DIMETHYLAMINE MIXTURE	Chapter 17			1993
	DODECYLBENZENE	Chapter 18			1993
	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION	Chapter 17		700	
	Dodecyl diphenyl oxide disulphonate solution	DODECYL DIPHENYL ETHER DISULPHONATE SOLUTION			
	Dodecylene	DODECENE (ALL ISOMERS)			
*	DODECYL METHACRYLATE	Chapter 17		330	
	Dodecyl 2-methyl-2-propenoate	DODECYL METHACRYLATE			
	Dodecyl 2-methylprop-2-enoate	DODECYL METHACRYLATE			
*	DODECYL/PENTADECYL METHACRYLATE MIXTURE	Chapter 17		330	
	DODECYLPHENOL	Chapter 17		710	
	DODECYLXYLENE	Chapter 18			
	DRILLING BRINE : CALCIUM BROMIDE SOLUTION	Chapter 18			
	DRILLING BRINE : CALCIUM CHLORIDE SOLUTION	Chapter 18			
	Drilling brine : potassium chloride solution	POTASSIUM CHLORIDE SOLUTION (10% OR MORE)			1993
	DRILLING BRINES (CONTAINING ZINC SALTS)	Chapter 17			
	DRILLING BRINE : SODIUM CHLORIDE SOLUTION	Chapter 18			
	Dutch liquid	ETHYLENE DICHLORIDE			

	Name	See	UN No.	MF AG	Rev.
	Dutch oil	ETHYLENE DICHLORIDE			
	Enanthic acid	*n*-HEPTANOIC ACID			
	Enanthyl alcohol	HEPTANOL (ALL ISOMERS)			
	EPICHLOROHYDRIN	Chapter 17	2023	740	
*	1,2-Epoxybutane	1,2-BUTYLENE OXIDE			
*	1,2-Epoxypropane	PROPYLENE OXIDE			
*	Ethanamine solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)			
*	1,2-Ethanediol	ETHYLENE GLYCOL			
*	Ethanoic acid	ACETIC ACID			
*	Ethanoic anhydride	ACETIC ANHYDRIDE			
*	Ethanol	ETHYL ALCOHOL			
	ETHANOLAMINE	Chapter 17	2491	320	
	Ether	DIETHYL ETHER			
	Ethinyl trichloride	TRICHLOROETHYLENE			
*	2-ETHOXYETHANOL	Chapter 18	1171	330	
*	2-(2-Ethoxyethoxy)ethanol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
*	2-(2-Ethoxyethoxy)ethyl acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
*	2-ETHOXYETHYL ACETATE	Chapter 17	1172	330	
*	1-Ethoxypropan-2-ol	PROPYLENE GLYCOL MONOALKYL ETHER			1993
*	ETHYL ACETATE	Chapter 18	1173	330	
*	ETHYL ACETOACETATE	Chapter 18		330	
*	ETHYL ACRYLATE	Chapter 17	1917	330	
*	ETHYL ALCOHOL	Chapter 18	1170	305	
*	ETHYLAMINE	Chapter 17	1036	320	
*	ETHYLAMINE SOLUTIONS (72% OR LESS)	Chapter 17	2270	320	
	Ethylaminocyclohexane	*N*-ETHYLCYCLOHEXYLAMINE			
	ETHYL AMYL KETONE	Chapter 17	2271	227	1993
*	ETHYLBENZENE	Chapter 17	1175	310	
	Ethyl benzol	ETHYLBENZENE			
*	Ethyl butanoate	ETHYL BUTYRATE			
*	*N*-ETHYLBUTYLAMINE	Chapter 17		320	
*	ETHYL BUTYRATE	Chapter 17	1180	330	1993
	Ethyl cyanide	PROPIONITRILE			

	Name	See	UN No.	MF AG	Rev.
*	ETHYLCYCLOHEXANE	Chapter 17		310	
*	*N*-ETHYLCYCLOHEXYLAMINE	Chapter 17		320	
	Ethyl(cyclohexyl)amine	*N*-ETHYLCYCLOHEXYLAMINE			
	Ethyldimethylmethane	PENTANE (ALL ISOMERS)			
	Ethylene alcohol	ETHYLENE GLYCOL			
	Ethylenebisiminodiacetic acid tetra-sodium salt solution	ETHYLENEDIAMINE-TETRAACETIC ACID, TETRASODIUM SALT SOLUTION			
	Ethylene bromide	ETHYLENE DIBROMIDE			
*	ETHYLENE CARBONATE	Chapter 18		330	
	Ethylenecarboxylic acid	ACRYLIC ACID			
	Ethylene chloride	ETHYLENE DICHLORIDE			
	ETHYLENE CHLOROHYDRIN	Chapter 17	1135	740	
	ETHYLENE CYANOHYDRIN	Chapter 17		215	
*	Ethylene diacetate	ETHYLENE GLYCOL DIACETATE			
*	ETHYLENEDIAMINE	Chapter 17	1604	320	
	ETHYLENEDIAMINETETRAACETIC ACID, TETRASODIUM SALT SOLUTION	Chapter 18			1993
*	ETHYLENE DIBROMIDE	Chapter 17	1605	345	
*	ETHYLENE DICHLORIDE	Chapter 17	1184	340	
	2,2¢-Ethylenedi-iminodi(ethylamine)	TRIETHYLENETETRAMINE			
	Ethylenedinitrilotetraacetic acid tet-rasodium salt solution	ETHYLENEDIAMINE-TETRAACETIC ACID, TETRASODIUM SALT SOLUTION			
*	2,2¢-Ethylenedioxydiethanol	TRIETHYLENE GLYCOL			
*	ETHYLENE GLYCOL	Chapter 18		308	
	ETHYLENE GLYCOL ACETATE	Chapter 18			
	Ethylene glycol acrylate	2-HYDROXYETHYL ACRYLATE			
	Ethylene glycol butyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Ethylene glycol *tert*-butyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	ETHYLENE GLYCOL BUTYL ETHER ACETATE	Chapter 17		330	
	ETHYLENE GLYCOL DIACETATE	Chapter 17			
	Ethylene glycol ethyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993

	Name	See	UN No.	MF AG	Rev.
	Ethylene glycol ethyl ether acetate	2-ETHOXYETHYL ACETATE			
	Ethylene glycol isopropyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	ETHYLENE GLYCOL METHYL BUTYL ETHER	Chapter 18		330	
	Ethylene glycol methyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	ETHYLENE GLYCOL METHYL ETHER ACETATE	Chapter 17		330	1993
	ETHYLENE GLYCOL MONOALKYL ETHERS	Chapter 17			1993
	Ethylene glycol monobutyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Ethylene glycol mono-*tert*-butyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Ethylene glycol monoethyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Ethylene glycol monoethyl ether acetate	2-ETHOXYETHYL ACETATE			
	Ethylene glycol monomethyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Ethylene glycol monomethyl ether acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE			
	Ethylene glycol monophenyl ether	ETHYLENE GLYCOL PHENYL ETHER			
	ETHYLENE GLYCOL PHENYL ETHER	Chapter 18		330	
	ETHYLENE GLYCOL PHENYL ETHER/DIETHYLENE GLYCOL PHENYL ETHER MIXTURE	Chapter 18			
	ETHYLENE OXIDE/PROPYLENE OXIDE MIXTURES WITH AN ETHYLENE OXIDE CONTENT OF NOT MORE THAN 30% IN WEIGHT	Chapter 17	2983	365	
	Ethylene trichloride	TRICHLOROETHYLENE			
*	ETHYLENE-VINYL ACETATE COPOLYMER (EMULSION)	Chapter 18			1993
*	Ethyl ethanoate	ETHYL ACETATE			
	Ethyl ether	DIETHYL ETHER			
	ETHYL 3-ETHOXYPROPIONATE	Chapter 17			1993
	Ethyl fluid	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
	Ethyl glycol	ETHYLENE GLYCOL MONOALKYL ETHERS			1993

	Name	See	UN No.	MF AG	Rev.
	2-Ethylhexaldehyde	OCTYL ALDEHYDES			
*	2-Ethylhexanal	OCTYL ALDEHYDES			
*	2-ETHYLHEXANOIC ACID	Chapter 18			
	2-Ethylhexanol	OCTANOL (ALL ISOMERS)			
	2-Ethylhexenal	2-ETHYL-3-PROPYLACROLEIN			
*	2-Ethylhex-2-enal	2-ETHYL-3-PROPYLACROLEIN			
	2-Ethylhexoic acid	OCTANOIC ACID (ALL ISOMERS)			
*	2-ETHYLHEXYL ACRYLATE	Chapter 17		330	
*	2-Ethylhexyl alcohol	OCTANOL (ALL ISOMERS)			
*	2-ETHYLHEXYLAMINE	Chapter 17	2276	320	
	2-ETHYL-2-(HYDROXYMETHYL)PROPANE-1,3-DIOL, C_8–C_{10} ESTER	Chapter 18			1997
*	5-Ethylidenebicyclo (2,2,1)hept-2-ene	ETHYLIDENENORBORNENE			
	Ethylidene chloride	1,1-DICHLOROETHANE			
*	Ethylidene dichloride	1,1-DICHLOROETHANE			
	ETHYLIDENENORBORNENE	Chapter 17		310	
*	ETHYL METHACRYLATE	Chapter 17	2277	330	
*	2-Ethyl-6-methylaniline	2-METHYL-6-ETHYLANILINE			
*	Ethyl methyl ketone	METHYL ETHYL KETONE			
*	5-Ethyl-2-methylpyridine	2-METHYL-5-ETHYLPYRIDINE			
	Ethyl oxide	DIETHYL ETHER			
	o-ETHYLPHENOL	Chapter 17		710	
*	2-Ethylphenol	*o*-ETHYLPHENOL			
	Ethyl phthalate	DIETHYL PHTHALATE			
	5-Ethyl-2-picoline	2-METHYL-5-ETHYLPYRIDINE			
*	Ethyl propenoate	ETHYL ACRYLATE			
*	ETHYL PROPIONATE	Chapter 18	1195	330	1993
	2-ETHYL-3-PROPYLACROLEIN	Chapter 17		300	
	Ethyl sulphate	DIETHYL SULPHATE			
	ETHYLTOLUENE	Chapter 17			1993
*	6-Ethyl-*o*-toluidine	2-METHYL-6-ETHYLANILINE			1993
*	Ethyl vinyl ether	VINYL ETHYL ETHER			
	FATTY ACID (SATURATED C_{13+})	Chapter 18			1993

	Name	See	UN No.	MF AG	Rev.
	Fatty alcohols (C_{12}–C_{20})	DODECYL ALCOHOL (Chapter 17) and ALCOHOLS (C_{13+}) (Chapter 18)			
	Fermentation alcohol	ETHYL ALCOHOL			
	FERRIC CHLORIDE SOLUTIONS	Chapter 17	2582	700	
	FERRIC HYDROXYETHYLETHYLENEDIAMINETRIACETIC ACID, TRISODIUM SALT SOLUTION	Chapter 18			
	FERRIC NITRATE/NITRIC ACID SOLUTION	Chapter 17			
	Fish acid oil	ANIMAL AND FISH ACID OILS AND DISTILLATES, N.O.S.			
	FISH SOLUBLES	Chapter 18			
	FLUOROSILICIC ACID (20-30%) IN WATER SOLUTION	Chapter 17	1778	700	1993
*	FORMALDEHYDE SOLUTIONS (45% OR LESS)	Chapter 17		300	
	Formalin	FORMALDEHYDE SOLUTIONS (45% OR LESS)			
*	FORMAMIDE	Chapter 18		321	
	Formdimethylamide	DIMETHYLFORMAMIDE			
*	FORMIC ACID	Chapter 17	1779	700	
	Formic aldehyde	FORMALDEHYDE SOLUTIONS (45% OR LESS)			
	FUMARIC ADDUCT OF ROSIN, WATER DISPERSION	Chapter 17			
	Fural	FURFURAL			
*	2-Furaldehyde	FURFURAL			
*	Furan-2,5-dione	MALEIC ANHYDRIDE			
*	2,5-Furandione	MALEIC ANHYDRIDE			
	FURFURAL	Chapter 17	1199	300	
	2-Furfuraldehyde	FURFURAL			
*	FURFURYL ALCOHOL	Chapter 17	2874	305	
	Furylcarbinol	FURFURYL ALCOHOL			
	Gaultheria oil	METHYL SALICYLATE			
	Glacial acetic acid	ACETIC ACID			
*	Glucitol solution	SORBITOL SOLUTION			
*	GLUCOSE SOLUTION	Chapter 18			1993
*	GLUTARALDEHYDE SOLUTIONS (50% OR LESS)	Chapter 17		300	
	GLYCERINE	Chapter 18			1993

	Name	See	UN No.	MF AG	Rev.
	GLYCERINE (83%), DIOXANED-IMETHANOL (17%) MIXTURE	Chapter 18			
*	Glycerol	GLYCERINE			
	GLYCEROL MONOOLEATE	Chapter 18			1997
*	Glycerol oleate	GLYCEROL MONOOLEATE			1997
	GLYCEROL POLYALKOXYLATE	Chapter 18			
*	Glycerol triacetate	GLYCERYL TRIACETATE			
	GLYCERYL TRIACETATE	Chapter 18			
	GLYCIDYL ESTER OF C_{10} TRIALKY-LACETIC ACID	Chapter 17			
	GLYCINE, SODIUM SALT SOLUTION	Chapter 18			
	Glycol	ETHYLENE GLYCOL			
	Glycol carbonate	ETHYLENE CARBONATE			
	Glycol chlorohydrin	ETHYLENE CHLOROHYDRIN			
	Glycol dichloride	ETHYLENE DICHLORIDE			
	Glycol monobutyl ether	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Glycyl alcohol	GLYCERINE			1993
*	GLYOXAL SOLUTION (40% OR LESS)	Chapter 18			
	Grain alcohol	ETHYL ALCOHOL			
	Grape sugar solution	DEXTROSE SOLUTION			
	Groundnut acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Groundnut oil	VEGETABLE OILS, N.O.S.			
	Hazelnut oil	VEGETABLE OILS, N.O.S.			
	Hendecanoic acid	UNDECANOIC ACID			
	Heptamethylene	CYCLOHEPTANE			
*	Heptane	HEPTANE (ALL ISOMERS)			
	n-Heptane	HEPTANE (ALL ISOMERS)			
	HEPTANE (ALL ISOMERS)	Chapter 17	1206	310	
	3-Heptanecarboxylic acid	OCTANOIC ACID (ALL ISOMERS)			
*	Heptanoic acid	*n*-HEPTANOIC ACID			
	n-HEPTANOIC ACID	Chapter 18			
*	HEPTANOL (ALL ISOMERS)	Chapter 17		305	1993
*	Heptan-2-one	METHYL AMYL KETONE			
*	2-Heptanone	METHYL AMYL KETONE			
	HEPTENE (ALL ISOMERS)	Chapter 17		311	
	Heptoic acid	*n*-HEPTANOIC ACID			

	Name	See	UN No.	MF AG	Rev.
*	HEPTYL ACETATE	Chapter 17			
*	Heptyl alcohol, all isomers	HEPTANOL (ALL ISOMERS)			
	Heptylcarbinol	OCTANOL (ALL ISOMERS)			
	Heptylene, mixed isomers	HEPTENE (ALL ISOMERS)			
	n-Heptylic acid	*n*-HEPTANOIC ACID			
*	Heptyl methyl ketone	METHYL HEPTYL KETONE			
*	1-Hexadecene	OLEFINS (C_{13+}, ALL ISOMERS)			1993
*	Hexadecyl and icosyl methacrylate mixture	CETYL/EICOSYL METHACRYLATE MIXTURE			
	Hexadecyl/octadecyl alcohol	ALCOHOLS (C_{13+})			1993
	Hexaethylene glycol	POLYETHYLENE GLYCOL			
	Hexahydroaniline	CYCLOHEXYLAMINE			
	Hexahydro-1-*H*-azepine	HEXAMETHYLENEIMINE			
	Hexahydrobenzene	CYCLOHEXANE			
	Hexahydrophenol	CYCLOHEXANOL			
	Hexahydrotoluene	METHYLCYCLOHEXANE			
	Hexamethylene	CYCLOHEXANE			
	HEXAMETHYLENEDIAMINE ADIPATE (50% IN WATER)	Chapter 18			
*	HEXAMETHYLENEDIAMINE SOLUTION	Chapter 17	1783	320	
	1,6-Hexamethylenediamine solution	HEXAMETHYLENEDIAMINE SOLUTION			
	HEXAMETHYLENE GLYCOL	Chapter 18			
	HEXAMETHYLENEIMINE	Chapter 17	2493	320	
*	HEXAMETHYLENETETRAMINE SOLUTIONS	Chapter 18			
	Hexanaphthene	CYCLOHEXANE			
	n-Hexane	HEXANE (ALL ISOMERS)			
*	HEXANE (ALL ISOMERS)	Chapter 17	1208	310	1993
*	Hexane-1,6-diamine solutions	HEXAMETHYLENEDIAMINE SOLUTION			
*	1,6-Hexanediamine solutions	HEXAMETHYLENEDIAMINE SOLUTION			1993
*	1,6-Hexanediol	HEXAMETHYLENE GLYCOL			
*	Hexane-1,6-diol	HEXAMETHYLENE GLYCOL			
*	HEXANOIC ACID	Chapter 18			1993
	HEXANOL	Chapter 18	2282	305	
*	Hexan-1-ol	HEXANOL			1993
*	Hexan-6-olide	*epsilon*-CAPROLACTAM (MOLTEN OR AQUEOUS SOLUTIONS)			

	Name	See	UN No.	MF AG	Rev.
*	2-Hexanone	METHYL BUTYL KETONE			
*	Hexan-2-one	METHYL BUTYL KETONE			
*	1-Hexene	HEXENE (ALL ISOMERS)			
	Hexene-1	HEXENE (ALL ISOMERS)			
*	Hex-1-ene	HEXENE (ALL ISOMERS)			
*	2-Hexene	HEXENE (ALL ISOMERS)			1993
*	HEXENE (ALL ISOMERS)	Chapter 17			1993
	Hexone	METHYL ISOBUTYL KETONE			
*	HEXYL ACETATE	Chapter 17	1233	330	
	sec-Hexyl acetate	METHYLAMYL ACETATE			
*	Hexyl alcohol	HEXANOL			
	Hexylene	HEXENE (ALL ISOMERS)			
	HEXYLENE GLYCOL	Chapter 18		308	
*	HYDROCHLORIC ACID	Chapter 17	1789	700	
	Hydrogencarboxylic acid	FORMIC ACID			
*	Hydrogen chloride, aqueous	HYDROCHLORIC ACID			
*	HYDROGEN PEROXIDE SOLUTIONS (OVER 8% BUT NOT OVER 60%)	Chapter 17	2014, 2984	735	1993
*	HYDROGEN PEROXIDE SOLUTIONS (OVER 60% BUT NOT OVER 70%)	Chapter 17	2015	735	
	Hydrogen sulphate	SULPHURIC ACID			
	Hydroxybenzene	PHENOL			
	4-Hydroxybutanoic acid lactone	*gamma*-BUTYROLACTONE			
	4-Hydroxybutyric acid lactone	*gamma*-BUTYROLACTONE			
	gamma-Hydroxybutyric acid lactone	*gamma*-BUTYROLACTONE			
	Hydroxydimethylbenzenes	XYLENOL			
*	2-Hydroxyethyl acetate	ETHYLENE GLYCOL ACETATE			
*	2-HYDROXYETHYL ACRYLATE	Chapter 17		330	
	2-Hydroxyethylamine	ETHANOLAMINE			
	N-(HYDROXYETHYL)ETHYLENEDIAMINETRIACETIC ACID, TRISODIUM SALT SOLUTION	Chapter 18			
	N-beta-Hydroxyethylethylenediamine	AMINOETHYLETHANOLAMINE			
	beta-Hydroxyethyl phenyl ether	ETHYLENE GLYCOL PHENYL ETHER			
	alpha-Hydroxyisobutyronitrile	ACETONE CYANOHYDRIN			
	4-Hydroxy-2-keto-4-methylpentane	DIACETONE ALCOHOL			
	4-Hydroxy-4-methylpentanone-2	DIACETONE ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
*	4-Hydroxy-4-methylpentan-2-one	DIACETONE ALCOHOL			
	2-(Hydroxymethyl)propane	ISOBUTYL ALCOHOL			
*	2-Hydroxy-2-methylpropiononitrile	ACETONE CYANOHYDRIN			
*	2-HYDROXY-4-(METHYL-THIO)BUTANOIC ACID	Chapter 17			1993
	2-Hydroxynitrobenzene (molten)	*o*-NITROPHENOL (MOLTEN)			
	1-Hydroxy-2-phenoxyethane	ETHYLENE GLYCOL PHENYL ETHER			
	alpha-Hydroxypropionic acid	LACTIC ACID			
	alpha-Hydroxypropionitrile	LACTONITRILE SOLUTION (80% OR LESS)			
	beta-Hydroxypropionitrile	ETHYLENE CYANOHYDRIN			
*	3-Hydroxypropiononitrile	ETHYLENE CYANOHYDRIN			
	2-Hydroxypropylamine	ISOPROPANOLAMINE			
	3-Hydroxypropylamine	*n*-PROPANOLAMINE			
	alpha-Hydroxytoluene	BENZYL ALCOHOL			
*	3-Hydroxy-2,2,4-trimethylpentyl isobutyrate	2,2,4-TRIMETHYL-1,3-PENTANEDIOL-1-ISOBUTYRATE			
*	ICOSA(OXYPROPANE-2,3-DIYL)S	Chapter 17			1997
*	2,2¢-[Iminobis(ethyleneimino)]diethylamine	TETRAETHYLENEPENTAMINE			
*	2,2¢-Iminodiethanol	DIETHANOLAMINE			
*	2,2¢-Iminodi(ethylamine)	DIETHYLENETRIAMINE			
*	1,1¢-Iminodipropan-2-ol	DIISOPROPANOLAMINE			
*	Iron(III) chloride solutions	FERRIC CHLORIDE SOLUTIONS			
*	Iron(III) nitrate/nitric acid solution	FERRIC NITRATE/NITRIC ACID SOLUTION			
	Isoamyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
	ISOAMYL ALCOHOL	Chapter 18	1105	305	
	Isobutaldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
	Isobutanal	BUTYRALDEHYDE (ALL ISOMERS)			1993
	Isobutanol	ISOBUTYL ALCOHOL			
	Isobutanolamine	2-AMINO-2-METHYL-1-PROPANOL (90% OR LESS)			
*	Isobutyl acetate	BUTYL ACETATE (ALL ISOMERS)			
*	Isobutyl acrylate	BUTYL ACRYLATE (ALL ISOMERS)			1993

	Name	See	UN No.	MF AG	Rev.
*	ISOBUTYL ALCOHOL	Chapter 18	1212	305	
	Isobutyl aldehyde	BUTYRALDEHYDE (ALL ISOMERS)			
*	Isobutylamine	BUTYLAMINE (ALL ISOMERS)			
	Isobutylcarbinol	ISOAMYL ALCOHOL			
*	ISOBUTYL FORMATE	Chapter 18	2393	330	
	Isobutyl isobutyrate	BUTYL BUTYRATE (ALL ISOMERS)			
*	Isobutyl methyl ketone	METHYL ISOBUTYL KETONE			
*	Isobutyraldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
	Isobutyric aldehyde	BUTYRALDEHYDE (ALL ISOMERS)			1993
*	3-Isocyanatomethyl-3,5,5-trimethyl-cyclohexyl isocyanate	ISOPHORONE DIISOCYANATE			
	ISO- & CYCLO-ALKANES (C_{10}–C_{11})	Chapter 18			1993
	ISO- & CYCLO-ALKANES (C_{12+})	Chapter 18			1993
	Isodecanol	DECYL ALCOHOL (ALL ISOMERS)			
	Isodecyl alcohol	DECYL ALCOHOL (ALL ISOMERS)			
	Isododecane	DODECANE (ALL ISOMERS)			
	Isodurene	TETRAMETHYLBENZENE (ALL ISOMERS)			
	Isoheptane	HEPTANE (ALL ISOMERS)			
	Isononanoic acid	NONANOIC ACID (ALL ISOMERS)			
	Isononanol	NONYL ALCOHOL (ALL ISOMERS)			
	Isooctanol	OCTANOL (ALL ISOMERS)			
*	Isopentane	PENTANE (ALL ISOMERS)			1993
	Isopentanol	ISOAMYL ALCOHOL			
	Isopentene	PENTENE (ALL ISOMERS)			
*	Isopentyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
*	Isopentyl alcohol	ISOAMYL ALCOHOL			
	ISOPHORONE	Chapter 18		300	
	ISOPHORONEDIAMINE	Chapter 17	2289	320	
	ISOPHORONE DIISOCYANATE	Chapter 17	2290	370	
*	ISOPRENE	Chapter 17	1218	310	
	Isopropanol	ISOPROPYL ALCOHOL			
	ISOPROPANOLAMINE	Chapter 17		320	

	Name	See	UN No.	MF AG	Rev.
*	ISOPROPYLAMINE (70% OR LESS) SOLUTION	Chapter 17		320	1997
	Isopropenylbenzene	*alpha*-METHYLSTYRENE			
*	2-Isopropoxyethanol	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
*	2-Isopropoxypropane	ISOPROPYL ETHER			
*	ISOPROPYL ACETATE	Chapter 18	1220	330	
	Isopropylacetone	METHYL ISOBUTYL KETONE			
*	ISOPROPYL ALCOHOL	Chapter 18	1219	305	
*	ISOPROPYLAMINE	Chapter 17	1221	320	
*	ISOPROPYLAMINE (70% OR LESS) SOLUTION	Chapter 17		320	1997
*	Isopropylbenzene	PROPYLBENZENE (ALL ISOMERS)			1993
	Isopropyl carbinol	ISOBUTYL ALCOHOL			
*	ISOPROPYLCYCLOHEXANE	Chapter 17			
	ISOPROPYL ETHER	Chapter 17	1159	330	
	Isopropylideneacetone	MESITYL OXIDE			
	4-Isopropyltoluene	*p*-CYMENE			
	4-Isopropyltoluol	*p*-CYMENE			
	Isovaleral	VALERALDEHYDE (ALL ISOMERS)			1993
*	Isovaleraldehyde	VALERALDEHYDE (ALL ISOMERS)			1993
	Isovaleric aldehyde	VALERALDEHYDE (ALL ISOMERS)			1993
	Isovalerone	DIISOBUTYL KETONE			
	Kaolin clay slurry	KAOLIN SLURRY			
	KAOLIN SLURRY	Chapter 18			
	Ketohexamethylene	CYCLOHEXANONE			
	Ketone propane	ACETONE			
	Ketopropane	ACETONE			
*	LACTIC ACID	Chapter 18		700	
*	LACTONITRILE SOLUTION (80% OR LESS)	Chapter 17			
	Lanolin	ANIMAL AND FISH OILS, N.O.S.			
	LARD	Chapter 18			
	Lard acid oil	ANIMAL AND FISH ACID OILS AND DISTILLATES, N.O.S.			
	LATEX, AMMONIA (1% OR LESS)-INHIBITED	Chapter 18			

	Name	See	UN No.	MF AG	Rev.
	LATEX : CARBOXYLATED STYRENE-BUTADIENE COPOLYMER	Chapter 18		725	
	LATEX : STYRENE-BUTADIENE RUBBER	Chapter 18		725	
*	LAURIC ACID	Chapter 17			
	Lauryl alcohol	DODECYL ALCOHOL			
	Lauryl methacrylate	DODECYL METHACRYLATE			
	Lead alkyls, n.o.s.	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
	Lead tetraethyl	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
	Lead tetramethyl	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
	LIGNINSULPHONIC ACID, SODIUM SALT SOLUTION	Chapter 18			
	Limonene	DIPENTENE			
	Linseed oil	VEGETABLE OILS, N.O.S.			
	LIQUID CHEMICAL WASTES	Chapter 17			1993
	LONG-CHAIN ALKARYL POLYETHER (C_{11}–C_{20})	Chapter 17			1993
	LONG-CHAIN ALKARYL SULPHONIC ACID (C_{16}–C_{60})	Chapter 18			
	LONG-CHAIN ALKYLPHENATE/ PHENOL SULPHIDE MIXTURE	Chapter 18			1993
	LONG-CHAIN POLYETHERAMINE IN ALKYL(C_2–C_4)BENZENES	Chapter 17			1993
	LONG-CHAIN POLYETHERAMINE IN AROMATIC SOLVENT	Chapter 17			1993
	Lye, potash	POTASSIUM HYDROXIDE SOLUTION			
	Lye, soda	SODIUM HYDROXIDE SOLUTION			
*	MAGNESIUM CHLORIDE SOLUTION	Chapter 18			
*	MAGNESIUM HYDROXIDE SLURRY	Chapter 18			
	MAGNESIUM LONG-CHAIN ALKARYL SULPHONATE (C_{11}–;C_{50})	Chapter 18			
	MAGNESIUM LONG-CHAIN ALKYL SALICYLATE (C_{11+})	Chapter 17			1993
*	MALEIC ANHYDRIDE	Chapter 17	2215	700	

	Name	See	UN No.	MF AG	Rev.
*	*dl-p*-Mentha-1,8-diene	DIPENTENE			
	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION	Chapter 17		375	
	MESITYL OXIDE	Chapter 17	1229	300	
	Metaformaldehyde	1,3,5-TRIOXANE			1993
	METAM SODIUM SOLUTION	Chapter 17			
*	METHACRYLIC ACID	Chapter 17	2531	700	
	alpha-Methacrylic acid	METHACRYLIC ACID			
	Methacrylic acid, dodecyl ester	DODECYL METHACRYLATE			
	Methacrylic acid, lauryl ester	DODECYL METHACRYLATE			
	METHACRYLIC RESIN IN ETHYLENE DICHLORIDE	Chapter 17			1993
	METHACRYLONITRILE	Chapter 17	3079	215	
*	Methanal	FORMALDEHYDE SOLUTIONS (45% OR LESS)			
	Methanamide	FORMAMIDE			
	Methanecarboxylic acid	ACETIC ACID			
*	Methanoic acid	FORMIC ACID			
*	Methanol	METHYL ALCOHOL			
*	3-METHOXYL-1-BUTANOL	Chapter 18			
*	3-Methoxybutan-1-ol	3-METHOXY-1-BUTANOL			
*	3-METHOXYBUTYL ACETATE	Chapter 18		330	
*	2-Methoxyethanol	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
*	2-(2-Methoxyethoxy)ethanol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER			1993
*	2-[2-(2-Methoxyethoxy)ethoxy]ethanol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER			1993
*	2-(2-Methoxyethoxy)ethyl acetate	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER ACETATE			1993
*	2-Methoxyethyl acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE			
*	3-Methoxy-3-methylbutan-1-ol	3-METHYL-3-METHOXYBUTANOL			
*	3-Methoxy-3-methylbutyl acetate	3-METHYL-3-METHOXY-BUTYL ACETATE			
*	*N*-(2-METHOXY-1-METHYLETHYL)-2-ETHYL-6-METHYLCHLOROACETANILIDE	Chapter 17			1997

	Name	See	UN No.	MF AG	Rev.
*	1-Methoxypropan-2-ol	PROPYLENE GLYCOL MONO-ALKYL ETHER			
*	1-(2-Methoxypropoxy)propan-2-ol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER			1993
*	3-[3-(3-Methoxypropoxy)propoxy]-propan-1-ol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER			1993
	Methoxytriglycol	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–;C_6) ETHER			1993
	Methylacetaldehyde	PROPIONALDEHYDE			
*	METHYL ACETOACETATE	Chapter 18	1231	330	
	Methylacetic acid	PROPIONIC ACID			
*	METHYL ACETOACETATE	Chapter 18			
	beta-Methylacrolein	CROTONALDEHYDE			
*	METHYL ACRYLATE	Chapter 17	1919	330	
*	2-Methylacrylic acid	METHACRYLIC ACID			
	2-Methylacrylic acid, dodecyl ester	DODECYL METHACRYLATE			
	2-Methylacrylic acid, lauryl ester	DODECYL METHACRYLATE			
*	METHYL ALCOHOL	Chapter 18	1230	306	
*	METHYLAMINE SOLUTIONS (42% OR LESS)	Chapter 17	1235	320	
	1-Methyl-2-aminobenzene	*o*-TOLUIDINE			
	2-Methyl-1-aminobenzene	*o*-TOLUIDINE			
	METHYLAMYL ACETATE	Chapter 17	1233	330	
	METHYLAMYL ALCOHOL	Chapter 17	2053	305	
	METHYL AMYL KETONE	Chapter 18	1110	300	1993
*	2-Methylaniline	*o*-TOLUIDINE			1993
	o-Methylaniline	*o*-TOLUIDINE			
	2-Methylbenzenamine	*o*-TOLUIDINE			
	o-Methylbenzenamine	*o*-TOLUIDINE			
	Methylbenzene	TOLUENE			
	Methylbenzenediamine	TOLUENEDIAMINE			
	Methylbenzol	TOLUENE			
*	2-Methyl-1,3-butadiene	ISOPRENE			
	3-Methyl-1, 3-butadiene	ISOPRENE			
*	2-Methylbutane	PENTANE (ALL ISOMERS)			
*	2-Methylbutan-2-ol	*tert*-AMYL ALCOHOL			
*	2-Methyl-2-butanol	*tert*-AMYL ALCOHOL			
	2-Methyl-4-butanol	ISOAMYL ALCOHOL			
*	3-Methyl-1-butanol	ISOAMYL ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
*	3-Methylbutan-1-ol	ISOAMYL ALCOHOL			
	3-Methylbutan-3-ol	*tert*-AMYL ALCOHOL			
*	3-Methylbut-1-ene	PENTENE (ALL ISOMERS)			
	Methylbutenes	PENTENE (ALL ISOMERS)			
	METHYLBUTENOL	Chapter 18			
*	1-Methylbutyl acetate	AMYL ACETATE (ALL ISOMERS)			
	2-Methyl-2-butyl alcohol	*tert*-AMYL ALCOHOL			
	2-Methyl-4-butyl alcohol	ISOAMYL ALCOHOL			
	3-Methyl-1-butyl alcohol	ISOAMYL ALCOHOL			
	3-Methyl-3-butyl alcohol	*tert*-AMYL ALCOHOL			
	METHYL *tert*-BUTYL ETHER	Chapter 18	2398	330	
	METHYL BUTYL KETONE	Chapter 18			
*	2-Methyl-3-butyn-2-ol	METHYLBUTYNOL			
*	2-Methylbut-3-yn-2-ol	METHYLBUTYNOL			
	METHYLBUTYNOL	Chapter 18			
*	3-Methylbutyraldehyde	VALERALDEHYDE (ALL ISOMERS)			1993
*	METHYL BUTYRATE	Chapter 17	1237	330	
	2-*beta*-Methyl "carbitol"	POLY(2–8) ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Methyl "carbitol" acetate	POLY(2–8) ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE			1993
	Methyl "cellosolve"	ETHYLENE GLYCOL MONOALKYL ETHERS			1993
	Methyl "cellosolve" acetate	ETHYLENE GLYCOL METHYL ETHER ACETATE			1993
	Methylchloroform	1,1,1-TRICHLOROETHANE			
*	Methyl cyanide	ACETONITRILE			
*	METHYLCYCLOHEXANE	Chapter 17	2296	310	
	Methyl-1,3-cyclopentadiene dimer	METHYLCYCLOPENTADIENE DIMER			
	METHYLCYCLOPENTADIENE DIMER	Chapter 17			
	METHYLDIETHANOLAMINE	Chapter 17			1993
	Methylenebis (phenylene isocyanate)	DIPHENYLMETHANE DIISOCYANATE			
	Methylenebis (phenyl isocyanate)	DIPHENYLMETHANE DIISOCYANATE			
	Methylene bromide	DIBROMOMETHANE			1997
	Methylene chloride	DICHLOROMETHANE			

	Name	See	UN No.	MF AG	Rev.
*	Methylene dichloride	DICHLOROMETHANE			
*	Methylenedi-*p*-phenylene diisocyanate	DIPHENYLMETHANE DIISOCYANATE			
	4,4¢-Methylenediphenyl isocyanate	DIPHENYLMETHANE DIISOCYANATE			
	2-METHYL-6-ETHYLANILINE	Chapter 17		335	
	Methylethylcarbinol	*sec*-BUTYL ALCOHOL			
	Methylethylene glycol	PROPYLENE GLYCOL			
	METHYL ETHYL KETONE	Chapter 18	1193	300	
	2-METHYL-5-ETHYLPYRIDINE	Chapter 17	2300	325	
*	METHYL FORMATE	Chapter 17	1243	330	
	N-METHYLGLUCAMINE SOLUTION (70% OR LESS)	Chapter 18			1997
	Methyl glycol	PROPYLENE GLYCOL			
*	5-Methyl-3-heptanone	ETHYL AMYL KETONE			
*	5-Methylheptan-3-one	ETHYL AMYL KETONE			
	METHYL HEPTYL KETONE	Chapter 17			
*	5-Methylhexan-2-one	METHYL AMYL KETONE			
	Methylhexylcarbinol	OCTANOL (ALL ISOMERS)			
	2-METHYL-2-HYDROXY-3-BUTYNE	Chapter 17			1993
	Methyl isoamyl ketone	METHYL AMYL KETONE			
	Methyl isobutenyl ketone	MESITYL OXIDE			
	Methylisobutylcarbinol	METHYLAMYL ALCOHOL			
	Methylisobutylcarbinol acetate	METHYLAMYL ACETATE			
	METHYL ISOBUTYL KETONE	Chapter 18	1245	300	
*	2-Methyllactonitrile	ACETONE CYANOHYDRIN			
*	METHYL METHACRYLATE	Chapter 17	1247	330	
*	Methyl methanoate	METHYL FORMATE			
	3-METHYL-3-METHOXYBUTANOL	Chapter 18			
	3-METHYL-3-METHOXYBUTYL ACETATE	Chapter 18			
	METHYLNAPHTHALENE (MOLTEN)	Chapter 17		310	1993
	(*o*- and *p*-) Methylnitrobenzene	(*o*- and *p*-) NITROTOLUENE			
*	8-Methylnonan-1-ol	DECYL ALCOHOL (ALL ISOMERS)			
	Methylolpropane	*n*-BUTYL ALCOHOL			
*	2-Methylpentane	HEXANE (ALL ISOMERS)			1993
*	2-Methylpentane-2,4-diol	HEXYLENE GLYCOL			
*	2-Methyl-2, 4-pentanediol	HEXYLENE GLYCOL			
	Methylpentan-2-ol	METHYLAMYL ALCOHOL			
	4-Methylpentanol-2	METHYLAMYL ALCOHOL			
*	4-Methylpentan-2-ol	METHYLAMYL ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
	4-Methyl-2-pentanol acetate	METHYLAMYL ACETATE			
*	4-Methylpentan-2-one	METHYL ISOBUTYL KETONE			
*	4-Methyl-2-pentanone	METHYL ISOBUTYL KETONE			
	2-Methylpentene	HEXENE (ALL ISOMERS)			
*	2-Methylpent-1-ene	HEXENE (ALL ISOMERS)			
*	2-Methyl-1-pentene	HEXENE (ALL ISOMERS)			
*	4-Methyl-1-pentene	HEXENE (ALL ISOMERS)			1993
*	4-Methylpent-3-en-2-one	MESITYL OXIDE			
*	4-Methyl-3-penten-2-one	MESITYL OXIDE			
*	Methylpentyl acetates	METHYLAMYL ACETATE			
*	Methyl pentyl ketone	METHYL AMYL KETONE			
	Methylphenylenediamine	TOLUENEDIAMINE			
	Methylphenylene diisocyanate	TOLUENE DIISOCIANATE			
	2-Methyl-2-phenylpropane	BUTYLBENZENES (ALL ISOMERS)			
	Methyl phosphite	TRIMETHYL PHOSPHITE			
*	2-Methylpropanal	BUTYRALDEHYDE (ALL ISOMERS)			1993
*	2-Methylpropan-1-ol	ISOBUTYL ALCOHOL			
*	2-Methyl-1-propanol	ISOBUTYL ALCOHOL			
*	2-Methyl-2-propanol	*tert*-BUTYL ALCOHOL			
*	2-Methylpropan-2-ol	*tert*-BUTYL ALCOHOL			
*	2-Methylpropenoic acid	METHACRYLIC ACID			
*	2-Methylpropyl acrylate	BUTYL ACRYLATE (ALL ISOMERS)			1993
	2-Methyl-1-propyl alcohol	ISOBUTYL ALCOHOL			
	2-Methyl-2-propyl alcohol	*tert*-BUTYL ALCOHOL			
	Methylpropylbenzene	*p*-CYMENE			
	Methylpropylcarbinol	*sec*-AMYL ALCOHOL			
	1-Methyl-1-propylethylene	HEXENE (ALL ISOMERS)			
*	METHYL PROPYL KETONE	Chapter 18	1249	300	1993
*	2-METHYLPYRIDINE	Chapter 17	2313	325	
*	3-METHYLPYRIDINE	Chapter 17	2313	325	1993
*	4-METHYLPYRIDINE	Chapter 17	2313	325	
	alpha-Methylpyridine	2-METHYLPYRIDINE			
	N-Methylpyrrolidinone	*N*-METHYL-2-PYRROLIDONE			
*	1-Methylpyrrolidin-2-one	*N*-METHYL-2-PYRROLIDONE			
	N-METHYL-2-PYRROLIDONE	Chapter 18		325	

	Name	See	UN No.	MF AG	Rev.
*	1-Methyl-2-pyrrolidone	*N*-METHYL-2-PYRROLIDONE			
*	METHYL SALICYLATE	Chapter 17			
	Methylstyrene	VINYLTOLUENE			
*	*alpha*-METHYLSTYRENE	Chapter 17	2303	310	
	Middle oil	CARBOLIC OIL			
	Milk acid	LACTIC ACID			
	Mineral jelly	PETROLATUM			
	Mineral wax	PETROLATUM			
	Mixed acid oil	[1]			
		[1] Either ANIMAL AND FISH ACID OILS AND DISTILLATES, N.O.S. or VEGETABLE ACID OILS AND DISTILLATES, N.O.S. should be used for this substance, depending on its origin.			
	Mixed general acid oil	[1]			
	Mixed hard acid oil	[1]			
	Mixed soft acid oil	[1]			
	MOLASSES	Chapter 18			
	Monochlorobenzene	CHLOROBENZENE			
	Monochlorobenzol	CHLOROBENZENE			
	Monoethanolamine	ETHANOLAMINE			
	Monoethylamine	ETHYLAMINE			
	Monoethylamine solutions, 72% or less	ETHYLAMINE SOLUTIONS (72% OR LESS)			
	Monoisopropanolamine	ISOPROPANOLAMINE			
	Monoisopropylamine	ISOPROPYLAMINE			
	Monomethylamine solutions, 42% or less	METHYLAMINE SOLUTIONS (42% OR LESS)			
	Monopropylamine	*n*-PROPYLAMINE			
*	MORPHOLINE	Chapter 17	2054	322	
	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)	Chapter 17	1649	111	1993
	Muriatic acid	HYDROCHLORIC ACID			
	MYRCENE	Chapter 18			
	Naphtha, coal tar	COAL TAR NAPHTHA SOLVENT			
*	NAPHTHALENE (MOLTEN)	Chapter 17	2304	314	

	Name	See	UN No.	MF AG	Rev.
	NAPHTHALENESULPHONIC ACID-FORM-ALDEHYDE COPOLYMER, SODIUM SALT SOLUTION	Chapter 18			
	Naphtha safety solvent	WHITE SPIRIT, LOW (15–20%) AROMATIC		700	
	NAPHTHENIC ACIDS	Chapter 17			
	Neatsfoot oil	ANIMAL AND FISH OILS, N.O.S.			
	NEODECANOIC ACID	Chapter 17			
	Neodecanoic acid vinyl ester	VINYL NEODECANOATE			
	Neopentanoic acid	TRIMETHYLACETIC ACID			
	NITRATING ACID (MIXTURE OF SULPHURIC AND NITRIC ACIDS)	Chapter 17	1796	700	
*	Nitric acid, fuming	NITRIC ACID (70% AND OVER)			
*	NITRIC ACID (70% AND OVER)	Chapter 17	2031, 2032	610 / 700	
	Nitric acid, red fuming	NITRIC ACID (70% AND OVER)			
*	NITRIC ACID (LESS THAN 70%)	Chapter 17	2031	700	
	NITRILOTRIACETIC ACID, TRISODIUM SALT SOLUTION	Chapter 18			
*	2,2¢,2ð-Nitrilotriethanol	TRIETHANOLAMINE			
*	1,1¢,1ð-Nitrilotri-2-propanol	TRIISOPROPANOLAMINE			
*	1,1¢,1ð-Nitrilotripropan-2-ol	TRIISOPROPANOLAMINE			
*	NITROBENZENE	Chapter 17	1662	335	
	o-Nitrochlorobenzene	*o*-CHLORONITROBENZENE			
*	NITROETHANE	Chapter 17	2842	335	1997
	NITROETHANE (80%)/NITROPROPANE (20%)	Chapter 17			1997
*	*o*-NITROPHENOL (MOLTEN)	Chapter 17	1663	710	
*	2-Nitrophenol (molten)	*o*-NITROPHENOL (MOLTEN)			
*	1- or 2-NITROPROPANE	Chapter 17	2608	335	
	NITROPROPANE (60%) NITROETHANE (40%) MIXTURE	Chapter 17		335	
*	*o*-or *p*-NITROTOLUENES	Chapter 17	1664	335	
*	NONANE (ALL ISOMERS)	Chapter 17	1920	310	1993
	n-Nonane	NONANE (ALL ISOMERS)			
*	NONANOIC ACID (ALL ISOMERS)	Chapter 18			1993
*	Nonanols	NONYL ALCOHOL (ALL ISOMERS)			1993

	Name	See	UN No.	MF AG	Rev.
*	Nonan-2-one	METHYL HEPTYL KETONE			
*	NONENE (ALL ISOMERS)	Chapter 17			1993
	NON-NOXIOUS LIQUID, N.O.S. (18) (TRADE NAME..., CONTAINS...) APPENDIX III	Chapter 18			
*	NONYL ACETATE	Chapter 17			1993
*	NONYL ALCOHOL (ALL ISOMERS)	Chapter 17		305	
	Nonylcarbinol	DECYL ALCOHOL (ALL ISOMERS)			
	Nonylene	NONENE (ALL ISOMERS)			1993
	Nonyl hydride	NONANE (ALL ISOMERS)			
*	NONYL METHACRYLATE MONOMER	Chapter 18			
	NONYLPHENOL	Chapter 17		710	
	NONYLPHENOL POLY(4+)ETHOXYLATES	Chapter 17			1996
	NOXIOUS LIQUID, N.F., (1) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 1, CAT. A	Chapter 17			
	NOXIOUS LIQUID, F., (2) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 1, CAT. A	Chapter 17			
	NOXIOUS LIQUID, N.F., (3) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. A	Chapter 17			
	NOXIOUS LIQUID, F., (4) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. A	Chapter 17			
	NOXIOUS LIQUID, N.F., (5) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. B	Chapter 17			
	NOXIOUS LIQUID, N.F., (6) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. B, M.P. 15× C+	Chapter 17			
	NOXIOUS LIQUID, F., (7) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. B	Chapter 17			
	NOXIOUS LIQUID, F., (8) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 2, CAT. B, M.P. 15× C+	Chapter 17			
	NOXIOUS LIQUID, N.F., (9) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. A	Chapter 17			

	Name	See	UN No.	MF AG	Rev.
	NOXIOUS LIQUID, F., (10) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. A	Chapter 17			
	NOXIOUS LIQUID, N.F., (11) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. B	Chapter 17			
	NOXIOUS LIQUID, N.F., (12) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. B, M.P. 15× C+	Chapter 17			
	NOXIOUS LIQUID, F., (13) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. B	Chapter 17			
	NOXIOUS LIQUID, F., (14) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. B, M.P. 15× C+	Chapter 17			
	NOXIOUS LIQUID, N.F., (15) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. C	Chapter 17			
	NOXIOUS LIQUID, F., (16) N.O.S. (TRADE NAME..., CONTAINS...) S.T. 3, CAT. C	Chapter 17			
	NOXIOUS LIQUID, N.O.S. (17) (TRADE NAME..., CONTAINS...) CAT. D	Chapter 18			
	Nutmeg butter	VEGETABLE OILS, N.O.S.			
*	1-Octadecanol	ALCOHOLS (C_{13+})			
*	Octadecan-1-ol	ALCOHOLS (C_{13+})			
*	*cis*-9-Octadecenoic acid	OLEIC ACID			1993
*	*(Z)*-Octadec-9-enoic acid	OLEIC ACID			1993
*	Octanal	OCTYL ALDEHYDES			
*	OCTANE (ALL ISOMERS)	Chapter 17	1262	310	1993
*	OCTANOIC ACID (ALL ISOMERS)	Chapter 18			1993
*	Octan-1-ol	OCTANOL (ALL ISOMERS)			
*	OCTANOL (ALL ISOMERS)	Chapter 17		305	1993
*	OCTENE (ALL ISOMERS)	Chapter 17			1993
	Octoic acid	OCTANOIC ACID (ALL ISOMERS)			
*	Octyl acetate	*n*-OCTYL ACETATE			
	n-OCTYL ACETATE	Chapter 17			
*	Octyl acrylate	2-ETHYLHEXYL ACRYLATE			
*	Octyl alcohol	OCTANOL (ALL ISOMERS)			
*	OCTYL ALDEHYDES	Chapter 17	1191	300	1993

	Name	See	UN No.	MF AG	Rev.
	Octylcarbinol	NONYL ALCOHOL (ALL ISOMERS)			
	OCTYL DECYL ADIPATE	Chapter 18			
	Octyl decyl phthalate	DIALKYL (C_7–C_{13}) PHTHALATES			
	Octylic acid	OCTANOIC ACID (ALL ISOMERS)			
*	Octyl nitrate	ALKYL (C_7–C_9) NITRATES			1993
*	Octyl nitrates (all isomers)	ALKYL (C_7–C_9) NITRATES			1993
	Octyl phthalate	DIALKYL (C_7–C_{13}) PHTHALATES			
	Oil of mirbane	NITROBENZENE			
	Oil of vitriol	SULPHURIC ACID			
	Oiticica oil	VEGETABLE OILS, N.O.S.			
	OLEFIN-ALKYL ESTER COPOLYMER (MOLECULAR WEIGHT 2000+)	Chapter 18			
	OLEFIN MIXTURES (C_5–C_7)	Chapter 17			
	OLEFIN MIXTURES (C_5–C_{15})	Chapter 17			
	OLEFINS (C_{13+}, ALL ISOMERS)	Chapter 18			1993
	alpha-OLEFINS (C_6–C_{18}) MIXTURES	Chapter 17			
*	OLEIC ACID	Chapter 18			1993
	OLEUM	Chapter 17	1831	700	
	OLEYLAMINE	Chapter 17			1993
	Olive oil	VEGETABLE OILS, N.O.S.			
*	Orthophosphoric acid	PHOSPHORIC ACID			
*	1,4-Oxazinane	MORPHOLINE			
	2,2¢-Oxybispropane	ISOPROPYL ETHER			
*	2,2¢-Oxydiethanol	DIETHYLENE GLYCOL			
*	1,1¢-Oxydipropan-2-ol	DIPROPYLENE GLYCOL			
	Oxymethylene	FORMALDEHYDE SOLUTIONS (45% OR LESS)			
	PALM KERNEL ACID OIL	Chapter 17			1993
	Palm nut oil	VEGETABLE OILS, N.O.S.			
	Palm oil	VEGETABLE OILS, N.O.S.			
	Palm oil fatty acid	PALM KERNEL ACID OIL			
	PALM OIL FATTY ACID METHYL ESTER	Chapter 18			
	Palm oil methyl ester	PALM OIL FATTY ACID METHYL ESTER			
	PALM STEARIN	Chapter 18			
	Paraffin	PARAFFIN WAX			
	n-Paraffins (C_{10}–C_{20})	*n*-ALKANES (C_{10+})			1993

	Name	See	UN No.	MF AG	Rev.
	Paraffin scale	PARAFFIN WAX			
	PARAFFIN WAX	Chapter 18			
	PARALDEHYDE	Chapter 17	1264	300	
	Peanut oil	VEGETABLE OILS, N.O.S.			
	Pear oil	AMYL ACETATE (ALL ISOMERS)			1993
	Peel oil (oranges and lemons)	VEGETABLE OILS, N.O.S.			
	Pelargonic acid	NONANOIC ACID (ALL ISOMERS)			
	Pelargonic alcohol	NONYL ALCOHOL (ALL ISOMERS)			
*	PENTACHLOROETHANE	Chapter 17	1669	340	
	Pentadecanol	ALCOHOLS (C_{13+})			1993
*	1-Pentadecene	OLEFINS (C_{13+}, ALL ISOMERS)			1993
*	Pentadec-1-ene	OLEFINS (C_{13+}, ALL ISOMERS)			1993
*	Penta-1,3-diene	1,3-PENTADIENE			
*	1,3-PENTADIENE	Chapter 17		310	
	Pentaethylene glycol	POLYETHYLENE GLYCOL			
	PENTAETHYLENEHEXAMINE	Chapter 18			
	Pentalin	PENTACHLOROETHANE			
	Pentamethylene	CYCLOPENTANE			
*	Pentanal	VALERALDEHYDE (ALL ISOMERS)			1993
*	Pentane	PENTANE (ALL ISOMERS)			
	n-Pentane	PENTANE (ALL ISOMERS)			
*	PENTANE (ALL ISOMERS)	Chapter 17	1265	310	1993
*	Pentanedial solutions, 50% or less	GLUTARALDEHYDE SOLUTIONS (50% OR LESS)			
*	PENTANOIC ACID	Chapter 18			
	n-Pentanol	*n*-AMYL ALCOHOL			
*	Pentan-1-ol	*n*-AMYL ALCOHOL			
*	1-Pentanol	*n*-AMYL ALCOHOL			
*	Pentan-2-ol	*sec*-AMYL ALCOHOL			1993
*	2-Pentanol	*sec*-AMYL ALCOHOL			1993
*	Pentan-3-ol	*sec*-AMYL ALCOHOL			1993
*	3-Pentanol	*sec*-AMYL ALCOHOL			1993
	sec-Pentanol	*sec*-AMYL ALCOHOL			
	tert-Pentanol	*tert*-AMYL ALCOHOL			
	1-Pentanol acetate	AMYL ACETATE (ALL ISOMERS)			1993

	Name	See	UN No.	MF AG	Rev.
	n-Pentene	PENTENE (ALL ISOMERS)			1993
*	Pentenes	PENTENE (ALL ISOMERS)			
*	PENTENE (ALL ISOMERS)	Chapter 17			
*	Pent-1-ene	PENTENE (ALL ISOMERS)			
*	Pentyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
	sec-Pentyl acetate	AMYL ACETATE (ALL ISOMERS)			1993
*	Pentyl alcohol	*n*-AMYL ALCOHOL			
	sec-Pentyl alcohol	*sec*-AMYL ALCOHOL			
*	*tert*-Pentyl alcohol	*tert*-AMYL ALCOHOL			
	n-PENTYL PROPIONATE	Chapter 17			1993
*	PERCHLOROETHYLENE	Chapter 17	1897	340	
*	Perchloromethane	CARBON TETRACHLORIDE			
*	Perhydroazepine	HEXAMETHYLENEIMINE			
	Perilla oil	VEGETABLE OILS, N.O.S.			
	PETROLATUM	Chapter 18			
	Petroleum jelly	PETROLATUM			
	Phene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
*	PHENOL	Chapter 17	2312	710	
*	2-Phenoxyethanol	ETHYLENE GLYCOL PHENYL ETHER			
	Phenylamine	ANILINE			
*	1-Phenylbutane	BUTYLBENZENE (ALL ISOMERS)			1993
*	2-Phenylbutane	BUTYLBENZENE (ALL ISOMERS)			1993
	Phenylcarbinol	BENZYL ALCOHOL			
	Phenyl “cellosolve”	ETHYLENE GLYCOL PHENYL ETHER			
*	Phenyl chloride	CHLOROBENZENE			
*	1-Phenyldecane	ALKYL(C_{9+})BENZENES			1993
*	1-Phenyldodecane	ALKYL(C_{9+})BENZENES			1993
*	Phenylethane	ETHYLBENZENE			
	Phenyl ether	DIPHENYL ETHER			
	Phenylethylene	STYRENE MONOMER			
	Phenyl hydride	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
	Phenylic acid	PHENOL			

	Name	See	UN No.	MF AG	Rev.
	Phenylmethane	TOLUENE			
	Phenylmethanol	BENZYL ALCOHOL			
	Phenylmethyl acetate	BENZYL ACETATE			
*	1-Phenylpropane	PROPYLBENZENE (ALL ISOMERS)			1993
*	2-Phenylpropane	PROPYLBENZENE (ALL ISOMERS)			1993
*	1-Phenyltetradecane	ALKYL(C_{9+})BENZENES			1993
*	1-Phenyltridecane	ALKYL(C_{9+})BENZENES			1993
*	1-Phenylundecane	ALKYL(C_{9+})BENZENES			1993
	1-PHENYL-1-XYLYLETHANE	Chapter 17			
*	PHOSPHORIC ACID	Chapter 17	1805	700	
*	PHOSPHORUS, YELLOW OR WHITE	Chapter 17		200	
*	PHTHALIC ANHYDRIDE (MOLTEN)	Chapter 17	2214	700	
	2-Picoline	2-METHYLPYRIDINE			
	alpha-Picoline	2-METHYLPYRIDINE			
	3-Picoline	3-METHYLPYRIDINE			
	beta-Picoline	3-METHYLPYRIDINE			
	4-Picoline	4-METHYLPYRIDINE			
	gamma-Picoline	4-METHYLPYRIDINE			
	Pilchard oil	ANIMAL AND FISH OILS, N.O.S.			
	Pimelic ketone	CYCLOHEXANONE			
	alpha-PINENE	Chapter 17	2368	313	1993
	beta-PINENE	Chapter 17		313	1993
	PINE OIL	Chapter 17	1272		1993
*	2-Piperazin-1-ylethylamine	*N*-AMINOETHYLPIPERAZINE			
	Piperylene	1,3-PENTADIENE			
*	Pivalic acid	TRIMETHYLACETIC ACID			
*	POLYALKYL (C_{18}–C_{22}) ACRYLATE IN XYLENE	Chapter 17			1993
	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER	Chapter 18			
	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER ACETATE	Chapter 18			
	Poly(2–8)alkylene (C_2–C_3) glycols/ Polyalkylene (C_2–C_{10}) glycol monoalkyl (C_1–C_4) ethers and their borate esters	BRAKE FLUID BASE MIX			
	POLYALKYLENE OXIDE POLYOL	Chapter 17			1993

	Name	See	UN No.	MF AG	Rev.
	POLYALUMINIUM CHLORIDE SOLUTION	Chapter 18			
*	POLYBUTENE	Chapter 18			
	POLYBUTENYL SUCCINIMIDE	Chapter 18			1997
	POLY(2+)CYCLIC AROMATICS	Chapter 17			1993
	POLYETHER (MOLECULAR WEIGHT 2000+)	Chapter 18			
	POLYETHYLENE GLYCOL	Chapter 18			
	POLYETHYLENE GLYCOL DIMETHYL ETHER	Chapter 18			
*	Polyethyleneimines	POLYETHYLENE POLYAMINES			
	POLYETHYLENE POLYAMINES	Chapter 17		320	
	POLYFERRIC SULPHATE SOLUTION	Chapter 17			
	POLYGLYCERIN, SODIUM SALT SOLUTION (CONTAINING LESS THAN 3% SODIUM HYDROXIDE)	Chapter 18			1993
	POLYGLYCEROL	Chapter 18			
*	Poly(iminoethylene)s	POLYETHYLENE POLYAMINES			
*	Polyisobutylene	POLY(4+)ISOBUTYLENE			1993
	POLY(4+)ISOBUTYLENE	Chapter 18			
	POLYMETHYLENE-POLYPHENYL ISOCYANATE	Chapter 17		370	
	POLYOLEFIN AMIDE ALKENEAMINE (C_{28+})	Chapter 18			
	POLYOLEFIN AMIDE ALKENEAMINE BORATE (C_{28}–C_{250})	Chapter 18			
	POLYOLEFIN AMIDE ALKENEAMINE/MOLYBDENUM OXYSULPHIDE MIXTURE	Chapter 18			1993
	POLYOLEFIN AMIDE ALKENEAMINE POLYOL	Chapter 18			1993
	POLYOLEFINAMINE IN ALKYL(C_2–C_4)BENZENES	Chapter 17			1993
	POLYOLEFINAMINE IN AROMATIC SOLVENT	Chapter 17			1993
	POLYOLEFIN ANHYDRIDE	Chapter 18			1993
	POLYOLEFIN ESTER (C_{28}–C_{250})	Chapter 18			1993
	POLYOLEFIN (MOLECULAR WEIGHT 300+)	Chapter 18			1993
	POLYOLEFIN PHENOLIC AMINE (C_{28}–C_{250})	Chapter 18			1993

	Name	See	UN No.	MF AG	Rev.
	POLYOLEFIN PHOSPHOROSULPHIDE, BARIUM DERIVATIVE (C_{28}–C_{250})	Chapter 17			1993
	POLY(20)OXYETHYLENE SORBITAN MONOOLEATE	Chapter 18			1993
*	Polypropylene	POLY(5+)PROPYLENE			1993
	Polyphenyl-polymethylene isocyanate	POLYMETHYLENE-POLYPHENYL ISOCYANATE			
	POLY(5+)PROPYLENE	Chapter 18			
	POLYPROPYLENE GLYCOL	Chapter 18			
	POLYSILOXANE	Chapter 18			
	Poppy oil	VEGETABLE OILS, N.O.S.			1993
	Potassium chloride drilling brine	POTASSIUM CHLORIDE SOLUTION (10% OR MORE)			1993
*	POTASSIUM CHLORIDE SOLUTION (10% OR MORE)	Chapter 17			1993
*	POTASSIUM HYDROXIDE SOLUTION	Chapter 17	1814	705	
*	POTASSIUM OLEATE	Chapter 17			1993
*	Propanal	PROPIONALDEHYDE			
*	Propane-1,2-diol	PROPYLENE GLYCOL			
*	1,2-Propanediol	PROPYLENE GLYCOL			
*	Propanenitrile	PROPIONITRILE			
*	1,2,3-Propanetriol	GLYCERINE			1993
*	Propanoic acid	PROPIONIC ACID			
	Propanol	*n*-PROPYL ALCOHOL			
*	Propan-1-ol	*n*-PROPYL ALCOHOL			
*	1-Propanol	*n*-PROPYL ALCOHOL			
	n-Propanol	*n*-PROPYL ALCOHOL			
*	Propan-2-ol	ISOPROPYL ALCOHOL			
*	2-Propanol	ISOPROPYL ALCOHOL			
	n-PROPANOLAMINE	Chapter 17		320	
*	Propan-2-one	ACETONE			
*	2-Propanone	ACETONE			
*	Propenamide solution, 50% or less	ACRYLAMIDE SOLUTION (50% OR LESS)			
	Propenenitrile	ACRYLONITRILE			1993
	Propene oxide	PROPYLENE OXIDE			
*	Propenoic acid	ACRYLIC ACID			
	1-Propenol-3	ALLYL ALCOHOL			
*	Prop-2-en-1-ol	ALLYL ALCOHOL			

	Name	See	UN No.	MF AG	Rev.
*	2-Propen-1-ol	ALLYL ALCOHOL			
	Propenyl alcohol	ALLYL ALCOHOL			
	beta-PROPIOLACTONE	Chapter 17		330	
*	PROPIONALDEHYDE	Chapter 17	1275	300	
*	PROPIONIC ACID	Chapter 17	1848	700	
	Propionic aldehyde	PROPIONALDEHYDE			
*	PROPIONIC ANHYDRIDE	Chapter 17	2496	700	
	PROPIONITRILE	Chapter 17	2404	215	
	beta-Propionolactone	*beta*-PROPIOLACTONE			
*	Propiononitrile	PROPIONITRILE			
*	Propyl acetate	*n*-PROPYL ACETATE			
	n-PROPYL ACETATE	Chapter 18	1276	330	
	Propylacetone	METHYL BUTYL KETONE			
*	Propyl alcohol	*n*-PROPYL ALCOHOL			
	2-Propyl alcohol	ISOPROPYL ALCOHOL			
	n-PROPYL ALCOHOL	Chapter 18	1274	305	
	sec-Propyl alcohol	ISOPROPYL ALCOHOL			
	Propyl aldehyde	PROPIONALDEHYDE			
*	Propylamine	*n*-PROPYLAMINE			
	n-PROPYLAMINE	Chapter 17	1277	320	
	n-Propylbenzene	PROPYLBENZENE (ALL ISOMERS)			1993
*	PROPYLBENZENE (ALL ISOMERS)	Chapter 17		310	1993
	Propylcarbinol	*n*-BUTYL ALCOHOL			
	n-PROPYL CHLORIDE	Chapter 17	1278	340	
	Propylene aldehyde	CROTONALDEHYDE			
	PROPYLENE-BUTYLENE COPOLYMER	Chapter 18			
	Propylene chloride	1,2-DICHLOROPROPANE			
*	Propylene dichloride	1,2-DICHLOROPROPANE			
	PROPYLENE DIMER	Chapter 17			
*	PROPYLENE GLYCOL	Chapter 18		308	
	1,2-Propylene glycol	PROPYLENE GLYCOL			
	Propylene glycol *n*-butyl ether	PROPYLENE GLYCOL MONOALKYL ETHER			1993
	Propylene glycol ethyl ether	PROPYLENE GLYCOL MONOALKYL ETHER			1993
	Propylene glycol methyl ether	PROPYLENE GLYCOL MONOALKYL ETHER			1993
	PROPYLENE GLYCOL METHYL ETHER ACETATE	Chapter 18			1993

	Name	See	UN No.	MF AG	Rev.
	PROPYLENE GLYCOL MONOALKYL ETHER	Chapter 18			
	Propylene glycol propyl ether	PROPYLENE GLYCOL MONOALKYL ETHER			1993
	PROPYLENE OXIDE	Chapter 17	1280	365	
	PROPYLENE TETRAMER	Chapter 17	2850	310	
	PROPYLENE TRIMER	Chapter 17	2057	310	
	Propylethylene	PENTENE (ALL ISOMERS)			
	N-Propyl-1-propanamine	DI-*n*-PROPYLAMINE			
	Pseudobutylene glycol	BUTYLENE GLYCOL			
	Pseudocumene	TRIMETHYLBENZENE (ALL ISOMERS)			
*	PYRIDINE	Chapter 17	1282	325	
	Pyrolysis gasoline, containing 10% or more benzene	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
	Pyrolysis gasoline (steam-cracked naphtha)	BENZENE AND MIXTURES HAVING 10% BENZENE OR MORE			
	Pyromucic aldehyde	FURFURAL			
	Raisin seed oil	VEGETABLE OILS, N.O.S.			
	Rape seed acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Rape seed oil	VEGETABLE OILS, N.O.S.			
	Rice bran oil	VEGETABLE OILS, N.O.S.			
	ROSIN	Chapter 17			
	Rosin, fumaric adduct in water dispersion	FUMARIC ADDUCT OF ROSIN, WATER DISPERSION			
	ROSIN SOAP (DISPROPORTIONATED) SOLUTION	Chapter 17			
	Rubbing alcohol	ISOPROPYL ALCOHOL			
	Safety solvent	WHITE SPIRIT, LOW (15-20%) AROMATIC			
	Safflower acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Safflower oil	VEGETABLE OILS, N.O.S.			
	Salad oil	VEGETABLE OILS, N.O.S.			
	Saturated fatty acid (C_{13} and above)	FATTY ACID (SATURATED C_{13+})			
	Sesame oil	VEGETABLE OILS, N.O.S.			
	Sludge acid	SULPHURIC ACID, SPENT			
*	SODIUM ACETATE SOLUTIONS	Chapter 18			

	Name	See	UN No.	MF AG	Rev.
	Sodium alkylbenzene sulphonate	ALKYLBENZENESULPHONIC ACID, SODIUM SALT SOLUTION			
	SODIUM ALKYL (C_{14}–C_{17}) SULPHONATES 60-65% SOLUTION	Chapter 17			1993
	SODIUM ALUMINATE SOLUTION	Chapter 17	1819	705	1993
	SODIUM ALUMINOSILICATE SLURRY	Chapter 18			
*	SODIUM BENZOATE	Chapter 18			
*	Sodium 1,3-benzothiazole-2-thiolate solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION			
	Sodium 1,3-benzothiazol-2-yl sulphide solution	MERCAPTOBENZOTHIAZOL, SODIUM SALT SOLUTION			
	Sodium bichromate	SODIUM DICHROMATE SOLUTION (70% OR LESS)			
	SODIUM BOROHYDRIDE (15% OR LESS)/SODIUM HYDROXIDE SOLUTION	Chapter 17		705	
*	SODIUM CARBONATE SOLUTION	Chapter 18			1993
*	SODIUM CHLORATE SOLUTION (50% OR LESS)	Chapter 17	2428	745	
	Sodium cresylate	CRESYLIC ACID, SODIUM SALT SOLUTION			
*	SODIUM DICHROMATE SOLUTION (70% OR LESS)	Chapter 17		155	
*	*di*Sodium 1,4-dihydroanthracene-9,10-diyl dioxide	1,4-DIHYDRO-9,10-DIHYDROXY-ANTHRACENE, DISODIUM SALT SOLUTION			1993
*	Sodium glycinate solution	GLYCINE, SODIUM SALT SOLUTION			
	Sodium hydrate	SODIUM HYDROXIDE SOLUTION			
	SODIUM HYDROGEN SULPHIDE (6% OR LESS)/SODIUM CARBONATE (3% OR LESS) SOLUTION	Chapter 17			1993
*	SODIUM HYDROGEN SULPHITE SOLUTION (45% OR LESS)	Chapter 17	2693	635	1993
*	SODIUM HYDROSULPHIDE SOLUTION (45% OR LESS)	Chapter 17	2949	225	
	SODIUM HYDROSULPHIDE/ AMMONIUM SULPHIDE SOLUTION	Chapter 17			

	Name	See	UN No.	MF AG	Rev.
*	SODIUM HYDROXIDE SOLUTION	Chapter 17	1824	705	
*	SODIUM HYPOCHLORITE SOLUTION (15% OR LESS)	Chapter 17	1791	741	
	Sodium lignosulphonate	LIGNINSULPHONIC ACID, SODIUM SALT SOLUTION			
*	Sodium methyldithiocarbamate solution	METAM SODIUM SOLUTION			
*	SODIUM NITRITE SOLUTION	Chapter 17		235	1993
	SODIUM PETROLEUM SULPHONATE	Chapter 17			1993
	SODIUM POLY(4+)ACRYLATE SOLUTIONS	Chapter 18			
*	SODIUM SILICATE SOLUTION	Chapter 17			1993
*	SODIUM SULPHATE SOLUTIONS	Chapter 18			
*	SODIUM SULPHIDE SOLUTION (15% OR LESS)	Chapter 17		225	1993
*	SODIUM SULPHITE SOLUTION (25% OR LESS)	Chapter 17			1993
	Sodium sulphydrate	SODIUM HYDROSULPHIDE SOLUTION (45% OR LESS)			
	Sodium tartrates and mono-/di-succinate solution	SODIUM TARTRATES/ SODIUM SUCCINATES SOLUTION			1993
*	SODIUM TARTRATES/SODIUM SUCCINATES SOLUTION	Chapter 17			1993
*	Sodium tetrahydroborate (15% or less)/sodium hydroxide solution	SODIUM BOROHYDRIDE (15% OR LESS)/SODIUM HYDROXIDE SOLUTION			
*	SODIUM THIOCYANATE SOLUTION (56% OR LESS)	Chapter 17			
	Sodium tolyl oxides	CRESYLIC ACID, SODIUM SALT SOLUTION			1993
	SORBITOL SOLUTION	Chapter 18			1993
	Soya acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Soya bean oil	VEGETABLE OILS, N.O.S.			
	Sperm oil	ANIMAL AND FISH OILS, N.O.S.			
	Spirits of wine	ETHYL ALCOHOL			
	Stoddard solvent	WHITE SPIRIT, LOW (15-20%) AROMATIC			
*	STYRENE MONOMER	Chapter 17	2055	310	
	Suberane	CYCLOHEPTANE			

	Name	See	UN No.	MF AG	Rev.
	SULPHOHYDROCARBON (C_3–C_{88})	Chapter 18			
	SULPHO HYDROCARBON LONG-CHAIN (C_{18+}) ALKYLAMINE MIXTURE	Chapter 17			1993
	SULPHOLANE	Chapter 18		6351	
				[1] Indicates fire risk only	
*	SULPHURIC ACID	Chapter 17	1830	700	
*	Sulphuric acid, fuming	OLEUM			
*	SULPHURIC ACID, SPENT	Chapter 17	1832	700	
	Sulphuric chlorohydrin	CHLOROSULPHONIC ACID			
	Sulphuric ether	DIETHYL ETHER			
*	SULPHUR (MOLTEN)	Chapter 17	2448	6351	
	Sunflower oil	VEGETABLE OILS, N.O.S.			
	Sunflower seed acid oil	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.			
	Sweet-birch oil	METHYL SALICYLATE			
	Talleol	TALL OIL (CRUDE AND DISTILLED)			
	TALL OIL (CRUDE AND DISTILLED)	Chapter 17		700	
	TALL OIL FATTY ACID, BARIUM SALT	Chapter 17			1993
	TALL OIL FATTY ACID (RESIN ACIDS LESS THAN 20%)	Chapter 17			
	TALL OIL SOAP (DISPROPORTIONATED) SOLUTION	Chapter 17			
	Tallol	TALL OIL (CRUDE AND DISTILLED)			
	TALLOW	Chapter 18			
	TALLOW FATTY ACID	Chapter 18			
	Tar acids	CRESOLS (ALL ISOMERS)			
	Tar camphor	NAPHTHALENE, MOLTEN			
*	3,6,9,12-Tetraazatetradecane-1,14-diamine	PENTAETHYLENEHEXAMINE			
*	1,3,5,7-Tetraazatricyclo[3.3.1.$1^{3,7}$]-decane	HEXAMETHYLENETE-TRAMINE SOLUTIONS			

	Name	See	UN No.	MF AG	Rev.
	TETRACHLOROETHANE	Chapter 17	1702	340	
*	Tetrachloroethylene	PERCHLOROETHYLENE			
*	Tetrachloromethane	CARBON TETRACHLORIDE			
*	Tetradecan-1-ol	ALCOHOLS (C_{13+})			1993
*	1-Tetradecanol	ALCOHOLS (C_{13+})			1993
	Tetradecene	OLEFINS (C_{13+}, ALL ISOMERS)			1993
	Tetradecylbenzene	ALKYL(C_{9+})BENZENES			1993
	TETRAETHYLENE GLYCOL	Chapter 18			
	TETRAETHYLENEPENTAMINE	Chapter 17	2320	320	
*	Tetraethyllead	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
*	TETRAHYDROFURAN	Chapter 17	2056	330	
*	3a,4,7,7a-Tetrahydro-4,7-methanoindene	DICYCLOPENTADIENE			
	TETRAHYDRONAPHTHALENE	Chapter 17		310	
*	1,2,3,4-Tetrahydronapthalene	TETRAHYDRONAPHTHALENE			
	Tetrahydro-1,4-oxazine	MORPHOLINE			
	Tetrahydrothiophene-1-dioxide	SULPHOLANE			
*	Tetrahydrothiophene 1,1-dioxide	SULPHOLANE			
	Tetralin	TETRAHYDRONAPHTHALENE			
*	1,2,3,5-Tetramethylbenzene	TETRAMETHYLBENZENE (ALL ISOMERS)			1993
*	TETRAMETHYLBENZENE (ALL ISOMERS)	Chapter 17			
	Tetramethylene cyanide	ADIPONITRILE			
*	Tetramethylene dicyanide	ADIPONITRILE			
	Tetramethylene glycol	BUTYLENE GLYCOL			
	Tetramethylene oxide	TETRAHYDROFURAN			
	Tetramethylene sulphone	SULPHOLANE			
*	Tetramethyllead	MOTOR FUEL ANTI-KNOCK COMPOUNDS (CONTAINING LEAD ALKYLS)			1993
	Tetrapropylbenzene	ALKYL(C_{9+})BENZENES			1993
	Thiophan sulphone	SULPHOLANE			
*	TOLUENE	Chapter 17	1294	310	
	TOLUENEDIAMINE	Chapter 17	1709	335	
	TOLUENE DIISOCYANATE	Chapter 17	2078	370	
*	2-Toluidine	*o*-TOLUIDINE			1993

	Name	See	UN No.	MF AG	Rev.
*	*o*-TOLUIDINE	Chapter 17	1708	335	
	Toluol	TOLUENE			
	o-Tolylamine	*o*-TOLUIDINE			
	(*m*-, *o*- and *p*-)Tolyl chlorides	(*m*-, *o*- and *p*-)CHLOROTOLUENES			
	Tolylenediisocyanate	TOLUENE DIISOCYANATE			
	Toxilic anhydride	MALEIC ANHYDRIDE			
	Triacetin	GLYOXAL SOLUTION (40% OR LESS)			
*	3,6,9-Triazaundecamethylenediamine	TETRAETHYL-ENEPENTAMINE			
*	TRIBUTYL PHOSPHATE	Chapter 17		330	
*	1,2,4-TRICHLOROBENZENE	Chapter 17	2321	340	
*	1,1,1-TRICHLOROETHANE	Chapter 17	2831	340	
*	1,1,2-TRICHLOROETHANE	Chapter 17		340	
	beta-Trichloroethane	1,1,2-TRICHLOROETHANE			
	Trichloroethene	TRICHLOROETHYLENE			
*	TRICHLOROETHYLENE	Chapter 17	1710	340	
*	Trichloromethane	CHLOROFORM			
*	1,2,3-TRICHLOROPROPANE	Chapter 17		340	
*	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	Chapter 17			
	TRICRESYL PHOSPHATE (CONTAINING LESS THAN 1% *ortho*-ISOMER)	Chapter 17		355	
	TRICRESYL PHOSPHATE (CONTAINING 1% OR MORE *ortho*-ISOMER)	Chapter 17	2574	355	
*	TRIDECANE	Chapter 18			
*	TRIDECANOIC ACID	Chapter 17			1993
	Tridecanol	ALCOHOLS (C_{13+})			
	Tridecene	OLEFINS (C_{13+}, ALL ISOMERS)			1993
	Tridecoic acid	TRIDECANOIC ACID			1993
*	TRIDECYL ACETATE	Chapter 18			
*	Tridecyl alcohol	ALCOHOLS (C_{13+})			
*	Tridecylbenzene	ALKYL(C_{9+})BENZENES			1993
	Tridecylic acid	FATTY ACID (SATURATED C_{13+})			1993
	TRIETHANOLAMINE	Chapter 17		320	
*	TRIETHYLAMINE	Chapter 17	1296	320	
	TRIETHYLBENZENE	Chapter 17		310	

	Name	See	UN No.	MF AG	Rev.
	TRIETHYLENE GLYCOL	Chapter 18		308	
	Triethylene glycol butyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Triethylene glycol monobutyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Triethylene glycol ethyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Triethylene glycol methyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	TRIETHYLENETETRAMINE	Chapter 17	2259	320	
*	TRIETHYL PHOSPHATE	Chapter 18			
*	TRIETHYL PHOSPHITE	Chapter 17	2323	330	
	Triformol	1,3,5-TRIOXANE			1993
	Tri(2-hydroxyethyl)amine	TRIETHANOLAMINE			
	Trihydroxypropane	GLYCERINE			1993
	TRIISOPROPANOLAMINE	Chapter 18		320	
	TRIISOPROPYLATED PHENYL PHOSPHATES	Chapter 17			1993
	Trimethoxyphosphine	TRIMETHYL PHOSPHITE			
	TRIMETHYLACETIC ACID	Chapter 17		700	
*	TRIMETHYLAMINE SOLUTION (30% OR LESS)	Chapter 17	1297	320	1993
	Trimethylaminomethane	BUTYLAMINE (ALL ISOMERS)			
*	1,2,4-Trimethylbenzene	TRIMETHYLBENZENE (ALL ISOMERS)			1993
*	TRIMETHYLBENZENE (ALL ISOMERS)	Chapter 17		310	1993
	uns-Trimethylbenzene	TRIMETHYLBENZENE (ALL ISOMERS)			1993
	Trimethylcarbinol	*tert*-BUTYL ALCOHOL			
*	3,5,5-Trimethylcyclohex-2-en-1-one	ISOPHORONE			
*	Trimethylene chloride	1,3-DICHLOROPROPANE			
	Trimethylene dichloride	1,3-DICHLOROPROPANE			
*	3,3¢-Trimethylenedioxydipropan-1-ol	TRIPROPYLENE GLYCOL			
*	TRIMETHYLHEXAMETHYLENEDIAMINE (2,2,4- and 2,4,4-ISOMERS)	Chapter 17	2327	320	

	Name	See	UN No.	MF AG	Rev.
*	TRIMETHYLHEXAMETHYLENE DIISOCYANATE (2,2,4- and 2,4,4-ISOMERS)	Chapter 17	2328	370	
	TRIMETHYLOLPROPANE POLYETHOXYLATE	Chapter 18			
	2,2,4-TRIMETHYL-1,3-PENTANE-DIOL-1-ISOBUTYRATE	Chapter 17			
	2,2,4-TRIMETHYL-1,3-PENTANE-DIOL DIISOBUTYRATE	Chapter 18			
	2,4,4-Trimethylpentene-1	DIISOBUTYLENE			1993
*	2,4,4-Trimethylpent-1-ene	DIISOBUTYLENE			
	2,4,4-Trimethylpentene-2	DIISOBUTYLENE			1993
*	2,4,4-Trimethylpent-2-ene	DIISOBUTYLENE			
*	TRIMETHYL PHOSPHITE	Chapter 17	2329	330	
*	2,4,6-Trimethyl-1,3,5-trioxane	PARALDEHYDE			
*	1,3,5-TRIOXANE	Chapter 17			1993
	sym-Trioxane	1,3,5-TRIOXANE			1993
	Trioxin	1,3,5-TRIOXANE			1993
	Tripropylene	PROPYLENE TRIMER			
	TRIPROPYLENE GLYCOL	Chapter 18		308	
	Tripropylene glycol methyl ether	POLY(2–8)ALKYLENE GLYCOL MONOALKYL (C_1–C_6) ETHER			1993
	Tris(dimethylphenyl) phosphate	TRIXYLYL PHOSPHATE			
	Tris(hydroxymethyl)aminomethane	2-AMINO-2-HYDROXYMETHYL-1,-3-PROPANEDIOL SOLUTION (40% OR LESS)			
	Tris(2-hydroxypropyl)amine	TRIISOPROPANOLAMINE			
	Tris(2-hydroxy-1-propyl)amine	TRIISOPROPANOLAMINE			
*	Trisodium nitrilotriacetate solution	NITRILOTRIACETIC ACID, TRISODIUM SALT SOLUTION			
*	Tritolyl phosphate, containing 1% or more *ortho*-isomer	TRICRESYL PHOSPHATE (CONTAINING 1% OR MORE *ortho*-ISOMER)			
*	Tritolyl phosphate, containing less than 1% *ortho*-isomer	TRICRESYL PHOSPHATE (CONTAINING LESS THAN 1% *ortho*-ISOMER)			
	Trixylenyl phosphate	TRIXYLYL PHOSPHATE			
	TRIXYLYL PHOSPHATE	Chapter 17		355	
	Tucum oil	VEGETABLE OILS, N.O.S.			
	Tung oil	VEGETABLE OILS, N.O.S.			
	TURPENTINE	Chapter 17	1299	313	

	Name	See	UN No.	MF AG	Rev.
	Turpentine oil	TURPENTINE			
	Turps	TURPENTINE			
*	Undecane	*n*-ALKANES (C_{10+})			1993
*	UNDECANOIC ACID	Chapter 17			
*	1-UNDECENE	Chapter 17			
*	UNDECYL ALCOHOL	Chapter 17			
*	Undecylbenzene	ALKYL(C_{9+})BENZENES			1993
	n-Undecylic acid	UNDECANOIC ACID			
	Urea, ammonia liquor	UREA/AMMONIUM NITRATE SOLUTION (CONTAINING AQUA AMMONIA)			
	Urea, ammonium carbamate solutions	UREA/AMMONIUM NITRATE SOLUTION (CONTAINING AQUA AMMONIA)			
	UREA AMMONIUM MONO- AND DI-HYDROGEN PHOSPHATE/ POTASSIUM CHLORIDE SOLUTION	Chapter 18			
*	UREA/AMMONIUM NITRATE SOLUTION	Chapter 18		235	
	UREA/AMMONIUM NITRATE SOLUTION (CONTAINING AQUA AMMONIA)	Chapter 17		725	
*	UREA/AMMONIUM NITRATE SOLUTION	Chapter 18			
	UREA FORMALDEHYDE RESIN SOLUTION	Chapter 18			
	Urea resin solution	UREA FORMALDEHYDE RESIN SOLUTION			
*	UREA SOLUTION	Chapter 18			
	Valeral	VALERALDEHYDE (ALL ISOMERS)			1993
	VALERALDEHYDE (ALL ISOMERS)	Chapter 17	2[ems p4]058	300	1993
	n-Valeraldehyde	VALERALDEHYDE (ALL ISOMERS)			1993
*	Valeric acid	PENTANOIC ACID			
	n-Valeric acid	PENTANOIC ACID			
	Valeric aldehyde	VALERALDEHYDE (ALL ISOMERS)			1993
	Varnoline	WHITE SPIRIT, LOW (15-20%) AROMATIC			

	Name	See	UN No.	MF AG	Rev.
	VEGETABLE ACID OILS AND DISTILLATES, N.O.S.	Chapter 18			
	VEGETABLE OILS, N.O.S.	Chapter 18			
	VEGETABLE PROTEIN SOLUTION (HYDROLYSED)	Chapter 18			
	Vinegar acid	ACETIC ACID			
	Vinegar naphtha	ETHYL ACETATE			
*	VINYL ACETATE	Chapter 17	1 [ems p4]301	330	
*	Vinylbenzene	STYRENE MONOMER			1993
	Vinylcarbinol	ALLYL ALCOHOL			
*	Vinyl cyanide	ACRYLONITRILE			
	VINYL ETHYL ETHER	Chapter 17	1 [ems p4]302	330	
	Vinylformic acid	ACRYLIC ACID			
	VINYLIDENE CHLORIDE	Chapter 17	1 [ems p4]303	340	
	VINYL NEODECANOATE	Chapter 17		330	
	VINYLTOLUENE	Chapter 17	2 [ems p4]618	310	
	Vinyl trichloride	1,1,2-TRICHLOROETHANE			
	Walnut oil	VEGETABLE OILS, N.O.S.			
	WATER	Chapter 18			
	Water-based fish meal extract	FISH SOLUBLES			
	WAXES	Chapter 18			1993
	Whale oil	ANIMAL AND FISH OILS, N.O.S.			1993
	White caustic	SODIUM HYDROXIDE SOLUTION			
	WHITE SPIRIT, LOW (15-20%) AROMATIC	Chapter 17	1 [ems p4]300	311	
	Wine	ALCOHOLIC BEVERAGES, N.O.S.			
	Wintergreen oil	METHYL SALICYLATE			
	Wood alcohol	METHYL ALCOHOL			
	Wood tar creosote	CREOSOTE (WOOD)			
*	XYLENES	Chapter 17	1 [ems p4]307	310	

	Name	See	UN No.	MF AG	Rev.
*	XYLENOL	Chapter 17	2[ems p4]261	710	
	Xylols	XYLENES			
	ZINC ALKARYL DITHIOPHOSPHATE (C_7–C_{16})	Chapter 17			1993
	ZINC ALKENYL CARBOXAMIDE	Chapter 18			1997
*	ZINC ALKYL DITHIOPHOSPHATE (C_3–C_{14})	Chapter 17			1993
	Zinc bromide drilling brine	DRILLING BRINES (CONTAINING ZINC SALTS)			

Stricter rules on carrying vegetable oils in bulk by ship are among the changes introduced by amendments to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), which enter into force on 1 January 2007.

The revised Annex II regulations on carriage of noxious liquid substances carried in bulk (including chemicals and vegetable oils) introduce significant changes to the way certain products may be transported, in order to protect the marine environment from harm.

Revised Annex I regulations on carriage of oil by ship update and re-order the regulations as well as introducing some new rules.

Revised MARPOL Annex I (oil)

The revised MARPOL Annex I Regulations for the prevention of pollution by oil incorporates the various amendments adopted since MARPOL entered into force in 1983, including the amended regulation 13G (regulation 20 in the revised annex) and regulation 13H (regulation 21 in the revised annex) on the phasing-in of double hull requirements for oil tankers.

It also separates, in different chapters, the construction and equipment provisions from the operational requirements and makes clear the distinctions between the requirements for new ships and those for existing ships. The revision provides a more user-friendly, simplified Annex I.

New requirements in the revised Annex I include the following:

- Regulation 22 Pump-room bottom protection: on oil tankers of 5,000 tonnes deadweight and above constructed on or after 1 January 2007, the pump-room shall be provided with a double bottom.
- Regulation 23 Accidental oil outflow performance - applicable to oil tankers delivered on or after 1 January 2010; construction requirements to provide adequate protection against oil pollution in the event of stranding or collision.

Revised MARPOL Annex II (noxious liquid substances carried in bulk)

The revised Annex II Regulations for the control of pollution by noxious liquid substances in bulk includes a new four-category categorization system for noxious and liquid substances.

The new categories are:

- **Category X**: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment;
- **Category Y**: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to 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 a limitation on the quality and quantity of the discharge into the marine environment;
- **Category Z**: Noxious Liquid Substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment; and
- **Other Substances**: substances which have been evaluated and found to fall outside Categories X, Y or Z because they are considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning of deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing these substances are not subject to any discharge requirements of MARPOL Annex II.

The revised annex includes a number of other significant changes. Improvements in ship technology, such as efficient stripping techniques, has made possible significantly lower permitted discharge levels of certain products which have been incorporated into Annex II. For ships constructed on or after 1 January 2007, the maximum permitted residue in the tank and its associated piping left after discharge will be set at a maximum of 75 litres for products in categories X, Y and Z - compared with previous limits which set a maximum of 100 or 300 litres, depending on the product category.

Alongside the revision of Annex II, the marine pollution hazards of thousands of chemicals have been evaluated by the Evaluation of Hazardous Substances Working Group, giving a resultant GESAMP Hazard Profile which indexes the substance according to its bio-accumulation; bio-degradation; acute toxicity; chronic toxicity; long-term health effects; and effects on marine wildlife and on benthic habitats.

Transport of vegetable oils

As a result of the hazard evaluation process and the new categorization system, vegetable oils which were previously categorized as being unrestricted will now be required to be carried in chemical tankers.

The revised Annex includes, under regulation 4 Exemptions specifically regulation 4.1.3, a provision for the Administration to exempt ships certified to carry individually identified vegetable oils, subject to certain provisions relating to the location of the cargo tanks carrying the identified vegetable oil.

An MEPC resolution, MEPC.148(54) Guidelines for the transport of vegetable oils in deep tanks or in independent tanks specially designed for the carriage of such vegetable oils on board dry cargo ships, allows general dry cargo ships that are currently certified to carry vegetable oil in bulk, to continue to carry these vegetable oils on specific trades. The guidelines also take effect on 1 January 2007.

Consequential amendments to the IBC Code
An amended International Bulk Chemical Code (IBC Code) reflecting the changes to MARPOL Annex II, also enters into force on 1 January 2007. The amendments incorporate revisions to the categorization of certain products relating to their properties as potential marine pollutants, as well as revisions to ship type and carriage requirements following their evaluation by the Evaluation of Hazardous Substances Working Group.

Ships constructed after 1986 carrying substances identified in chapter 17 of the IBC Code must follow the requirements for design, construction, equipment and operation of ships contained in the Code.

Further information: The 2006 consolidated edition of MARPOL includes the revised texts of **Annexes I and II** (adopted in October 2004), which entered into force on 1 January 2007 (see Publications). The revised **IBC Code** is also be available from IMO Publications.