

ANNEX 6  
Resolution MEPC.20(22)  
ADOPTION OF THE CODE FOR THE CONSTRUCTION  
AND OF SHIPS CARRYING DANGEROUS  
CHEMICALS IN BULK (BCH CODE)  
adopted on 5 December 1985

ANNEX 6

Resolution MEPC 20(22)

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

adopted on 5 December 1985

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

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

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

NOTING ALSO that the BCH Code was adopted by the Assembly by resolution  
A.212(VII) and subsequently incorporated ten sets of amendments adopted by the  
Maritime Safety Committee,

HAVING CONSIDERED the proposed text of the BCH Code which incorporates  
amendments from the marine pollution point of view developed by the Committee  
in pursuance of resolution 15 of the International Conference on marine  
Pollution, 1973,

1. ADOPTS the BCH Code, the text of which is given in the Annex to the  
present resolution, for the purposes of Annex II of MARPOL 73/78;
2. REQUESTS the Secretary-General to transmit a copy of the present  
resolution together with the text of the BCH Code to all Members of the  
Organization and to all Parties to MARPOL 73/78 which are not Members of the  
Organization.

ANNEX

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

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

Preamble

Paragraph 1

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

Paragraph 7

Existing paragraph 7 is replaced by the following:

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

Paragraph 8

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

1.1 Purpose

In the existing text, the words "or noxious" are inserted between the words  
"dangerous" and "chemical".

In the existing text the words "the neighbourhood" are replaced by the words "to the environment".

The following sentence is added to the existing text:

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

## 1.2 Scope

1.2.1 In the existing text of the first sentence, the words "and noxious" are inserted between the words "dangerous" and "chemical" and the words "(c) products which may present a hazard to the environment, if accidentally released." are added.

## 1.3 Hazards

The existing text of 1.3 is designated as 1.3.1 and in the first line the words "relating to human life" are inserted between the words "substances" and "considered".

New paragraph 1.3.2 is added to the existing text as follows:

"1.3.2 Hazards of chemicals and other substances relating to the marine environment considered by this Code are:

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

#### 1.4 Definitions

In the existing text of paragraph 1.4.15 after the words "propylene oxide" the words "and ethylene oxide/propylene oxide mixtures with an ethylene oxide content of not more than 30 per cent by weight" are added.

The following definitions are added to the existing text:

"1.4.16A Noxious liquid substance means any substance designated in appendix II to Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) or provisionally assessed under the provisions of regulation 3(4) of that Annex as falling into category A, B, C or D."

"1.4.16B Standards for Procedures and Arrangements means the Standards for the Procedures and Arrangements for the Discharge of Noxious Liquid Substances, called for by Annex II of MARPOL 73/78, adopted by the Marine Environment Protection Committee at its twenty-second session by resolution MEPC 18(22) and as may be amended by the Organization."

#### 1.5 Equivalentts

1.5.2 In the existing text the words "other Parties to MARPOL 73/78 and" are inserted after the words "circulate the same to".

#### 1.6 Certification

1.6.3.1 In the existing text the words "to a chemical tanker" the words "engaged in international voyages" are added.

#### 1.7 Effective date

1.7.2 The following sentence is added to the existing text of paragraph 1.7.2

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

## 1.8 New products

In the first line of the existing text between the words "chemicals" and "which" the following words are added:

"and noxious liquid substances of category A, B or C, either of".

## 2.2 Ship types

The following sentence is added to the existing texts of subparagraphs 2.2.4(a)(iii) and 2.2.4(b)(iii)

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

## 2.6 Cargo segregation

2.6.2 The first line of the existing text is amended to read:

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

## Chapter IV - Special requirements

The existing text of section 4.7 is replaced by the following:

"4.7 Propylene oxide and mixtures of ethylene oxide/propylene oxide with an ethylene oxide content of not more than 30 per cent by weight.

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

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

- (i) mineral acids (e.g. sulphuric, hydrochloric, nitric);
  - (ii) carboxylic acids and anhydrides (e.g. formic, acetic);
  - (iii) halogenated carboxylic acids (e.g. chloroacetic);
  - (iv) sulphonic acids (e.g. benzene sulphonic);
  - (v) caustic alkalis (e.g. sodium hydroxide, potassium hydroxide);
  - (vi) ammonia and ammonia solutions;
  - (vii) amines and amine solutions;
  - (viii) oxidizing substances.
- (b) Before loading, tanks should be thoroughly and effectively cleaned, to remove all traces of previous cargoes from tanks and associated pipework, except where the immediately prior cargo has been propylene oxide or ethylene oxide/propylene oxide mixtures. Particular care should be taken in the case of ammonia in tanks made of steel other than stainless steel.
- (c) In all cases, the effectiveness of cleaning procedures for tanks and associated pipework should be checked by suitable testing or inspection, to ascertain that no traces of acidic or alkaline materials remain that might create a hazardous situation in the presence of these products.
- (d) Tanks should be entered and inspected prior to each initial loading of these products to ensure freedom from contamination, heavy rust deposits and visible structural defects. When cargo tanks are in continuous service for these products, such inspections should be performed at intervals of not more than two years.

- (e) Tanks for the carriage of these products should be of steel or stainless steel construction.
  - (f) Tanks for the carriage of these products may be used for other cargoes after thorough cleaning of tanks and associated pipework systems by washing or purging.
- 4.7.3 (a) All valves, flanges, fittings and accessory equipment should be of a type suitable for use with the products and should be constructed of steel or stainless steel or other material acceptable to the Administration. The chemical composition of all material used should be submitted to the Administration for approval prior to fabrication. Discs or disc faces, seats and other wearing parts of valves should be made of stainless steel containing not less than 11 per cent chromium.
- (b) Gaskets should be constructed of materials which do not react with, dissolve in, or lower the auto-ignition temperature of, these products, and which are fire resistant and possess adequate mechanical behaviour. The surface presented to the cargo should be polytetrafluorethylene (PTFE), or materials giving a similar degree of safety by their inertness. Spirally-wound stainless steel, with a filler of PTFE or similar fluorinated polymer, may be accepted by the Administration.
  - (c) Insulation and packing, if used, should be of a material which does not react with, dissolve in, or lower the auto-ignition temperature of, these products.
  - (d) The following materials are generally found unsatisfactory for gaskets, packing and similar uses in containment systems for these products and would require testing before being approved by the Administration:
    - (i) Neoprene or natural rubber, if it comes into contact with the products.

(ii) Asbestos, or binders used with asbestos.

(iii) Materials containing oxides of magnesium, such as mineral wools.

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

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

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

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

(c) During discharging operations, the pressure in the cargo tank must be maintained above  $0.07 \text{ kp/cm}^2$  gauge.

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

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

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

4.7.10 Cargo tanks, void spaces and other enclosed spaces, adjacent to an integral gravity cargo tank carrying propylene oxide, should either contain a compatible cargo (those cargoes specified in 4.7.2 are examples of substances considered incompatible) or be inerted by injection of a suitable inert gas. Any hold space in which an independent cargo tank is located should be inerted. Such inerted spaces and tanks should be monitored for these products and oxygen. The oxygen content of these spaces should be maintained below 2 per cent. Portable sampling equipment is satisfactory.

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

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

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

4.7.14 (a) Tanks for the carriage of propylene oxide with a design pressure less than  $0.6 \text{ kp/cm}^2$  gauge and tanks for the carriage of ethylene oxide/propylene oxide mixtures with a design pressure less than  $1.2 \text{ kp/cm}^2$  gauge should have a cooling system to maintain the cargo below the reference temperature.\*

(b) The refrigeration requirement for tanks with a design pressure less than  $0.6 \text{ kp/cm}^2$  gauge may be waived by the Administration for ships operating in restricted areas or on voyages of

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\* See 1.4.15.

restricted duration, and account may be taken in such cases of any insulation of the tanks. The area and times of year for which such carriage would be permitted should be included in the conditions of the Certificate of Fitness.

- 4.7.15 (a) Any cooling system should maintain the liquid temperature below the boiling temperature at the containment pressure. At least two complete cooling plants automatically regulated by variations within the tanks should be provided. Each cooling plant should be complete with the necessary auxiliaries for proper operation. The control system should also be capable of being manually operated. An alarm should be provided to indicate malfunctioning of the temperature controls. The capacity of each cooling system should be sufficient to maintain the temperature of the liquid cargo below the reference temperature\* of the system.
- (b) An alternative arrangement may consist of three cooling plants, any two of which should be sufficient to maintain the liquid temperatures below the reference temperature\*.
- (c) Cooling media which are separated from the products by a single wall only should be non-reactive with the products.
- (d) Cooling systems requiring compression of the products should not be used.

4.7.16 Pressure relief valve settings should not be less than  $0.2 \text{ kp/cm}^2$  gauge and for pressure tanks not greater than  $7.0 \text{ kp/cm}^2$  gauge for the carriage of propylene oxide and not greater than  $5.3 \text{ kp/cm}^2$  gauge for carriage of propylene oxide/ethylene oxide mixtures.

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\* See 1.4.15.

- 4.7.17 (a) The piping system for tanks to be loaded with these products should be separated (as defined in 1.4.13) from piping systems for all other tanks, including empty tanks. If the piping system for the tanks to be loaded is not independent (as defined in 1.4.14), the required piping separation should be accomplished by the removal of spool pieces, valves, or other pipe sections, and the installation of blank flanges at these locations. The required separation applies to all liquid and vapour piping, liquid and vapour vent lines and any other possible connections, such as common inert gas supply lines.
- (b) These products may be transported only in accordance with cargo handling plans that have been approved by the Administration. Each intended loading arrangement should be shown on a separate cargo handling plan. Cargo handling plans should show the entire cargo piping system and the locations for installation of blank flanges needed to meet the above piping separation requirements. A copy of each approved cargo handling plan should be maintained on board the ship. The Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should be endorsed to include reference to the approved cargo handling plans.
- (c) Before each initial loading of these products and before every subsequent return to such service, certification verifying that the required piping separation has been achieved should be obtained from a responsible person acceptable to the Port Administration and carried on board the ship. Each connection between a blank flange and a pipeline flange should be fitted with a wire and seal by the responsible person to ensure that inadvertent removal of the blank flange is impossible.
- 4.7.18 (a) No cargo tanks should be more than 98 per cent liquid full at the reference temperature.\*

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\* See 4.7.14(a).

(b) The maximum volume to which a cargo tank should be loaded is:

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

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

$V$  = volume of the tank

$d_R$  = relative density of cargo at the reference  
temperature\*

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

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

4.7.19 The cargo should be carried under a suitable protective padding of nitrogen gas. An automatic nitrogen make-up system should be installed to prevent the tank pressure falling below 0.07 kp/cm<sup>2</sup> gauge in the event of product temperature fall due to ambient conditions or maloperation of refrigeration systems. Sufficient nitrogen should be available on board to satisfy the demand of the automatic pressure control. Nitrogen of commercially pure quality (99.9 per cent by volume) should be used for padding. A battery of nitrogen bottles connected to the cargo tanks through a pressure reduction valve satisfies the intention of the expression "automatic" in this context.

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\* See 1.4.15.

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

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

4.7.22 A remotely operated, controlled closing-rate, shut-off valve should be provided at each cargo hose connection used during cargo transfer."

4.20 Hydrogen peroxide solutions over 60% but not over 70%

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

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

4.20.14 The following text is added after the existing paragraph 4.20.13.

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

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

4.20.16 Hydrogen peroxide should be carried in tanks thoroughly and effectively cleaned of all traces of previous cargoes and their vapours or ballast. Procedures for inspection, cleaning, passivation and loading of

tanks should be in accordance with MSC/Circ.394. A certificate should be on board the vessel indicating that the procedures in the Circular have been followed. The passivation requirement may be waived by an Administration for domestic shipments of short duration. Particular care in this respect is essential to ensure the safe carriage of hydrogen peroxide.

- .1 When hydrogen peroxide is carried no other cargoes should be simultaneously carried.
- .2 Tanks which have contained hydrogen peroxide may be used for other cargoes after cleaning in accordance with the procedures outlined in MSC/Circ.394.
- .3 Consideration in design should provide minimum internal tank structure, free draining, no entrapment and ease of visual inspection.

4.20.17 Cargo tanks and associated equipment should be either pure aluminium (99,5%) or solid stainless steel of types suitable for use with hydrogen peroxide (e.g. 304, 304L, 316, 316L, 316Ti). Aluminium should not be used for piping on deck. All non-metallic materials of construction for the containment system should neither be attacked by hydrogen peroxide nor contribute to its decomposition.

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

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

4.20.20 Fixed oxygen monitors (or gas sampling lines) should be provided in void spaces adjacent to tanks to detect leakage of the cargo into these spaces. The enhancement of flammability by oxygen enrichment should be recognized. Remote readouts, continuous monitoring (if gas sampling lines are

used, intermittent sampling is satisfactory) and visible and audible alarms similar to those for the temperature sensors should also be located on the navigating bridge. The visible and audible alarms should activate if the oxygen concentrations in these void spaces exceed 30% by volume. Two portable oxygen monitors should also be available as back-up systems.

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

4.20.22 Cargo tank venting systems with filtration should have pressure vacuum relief valves for normal controlled venting, and a device for emergency venting, should tank pressure rise rapidly as a result of an uncontrolled decomposition rate, as stipulated in 4.20.20. These venting systems should be designed in such a manner that there is no introduction of sea water into the cargo tank even under heavy sea conditions. Emergency venting should be sized on the basis of tank design pressure and tank size.

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

- .1 The product should be diluted from the original concentration to 35 per cent by weight within five minutes of the spill.
- .2 The rate and estimated size of the spill should be based upon maximum anticipated loading and discharge rates, the time required to stop flow of cargo in the event of tank overfill or a piping/hose failure, and the time necessary to begin application of dilution water with actuation at the cargo control location or on the navigating bridge.

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

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

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

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

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

## 5.2 Cargo information

The following paragraphs 5.2.5, 5.2.6, 5.2.7 and 5.2.9 and a footnote for paragraph 5.2.7 are added to the existing text:

5.2.5 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and

if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

5.2.6 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 60 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 60 mPa.s should be specified in the shipping document.

5.2.7 Where column "k" in the table of chapter VI refers to this paragraph and the possibility exists that it will be unloaded within Special Areas\*, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

5.2.8 Where column "k" in the table of chapter VI refers to this paragraph, the cargo's melting point should be indicated in the shipping document.

VA New Chapter VA is added to the existing text as follows:

"CHAPTER VA - ADDITIONAL MEASURES FOR THE PROTECTION  
OF THE MARINE ENVIRONMENT

5A.1 GENERAL

5A.1.1 The requirements of this chapter apply to ships carrying products noted as category A, B or C noxious liquid substances in chapter VI.

5A.2 CONDITION OF CARRIAGE

5A.2.1 The condition of carriage for products listed in the Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should reflect the requirements of regulation 5A of Annex II of MARPOL 73/78.

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\* Special areas are defined in regulation 1(7) of Annex II to MARPOL 73/78".

5A.2.2 A category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

### 5A.3 PROCEDURES AND ARRANGEMENTS MANUAL

5A.3.1 Each ship should be provided with a Procedures and Arrangements Manual developed for the ship in accordance with the provisions of the Standards for the Procedures and Arrangements and approved by the Administration.

5A.3.2 Each ship should be fitted with equipment and arrangements identified in its Procedures and Arrangements Manual.

## CHAPTER VI - SUMMARY OF MINIMUM REQUIREMENTS

Existing text of chapter VI is replaced by the following:

### "EXPLANATORY NOTES

|                                  |   |
|----------------------------------|---|
| Product name<br>(column a)*      | The product names are not always identical with the names given in previous issues of the Code, or the IBC Code for explanation see index of chemicals.   |
| UN number<br>(column b)          | This is the number relating to each product shown in the recommendations proposed by the United Nations Committee of Experts on the Transport of Dangerous Goods (the "Orange Book"), New York, 1977, ST/SG/AC.10/1/Rev.1. UN numbers are given for information only.             |
| Pollution category<br>(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.  |
| Hazards<br>(column d)            | S means that the product is included in the Code because of its safety hazards;<br>P means that the product is included in the Code because of its pollution hazards; and<br>S/P means that the product is included in the Code because of both its safety and pollution hazards. |
| Ship type<br>(column e)          | 1, 2 or 3 indicates ship types I, II, or III respectively as discussed in chapter II, part A - Physical Protection.   |
| Tank type<br>(column f)          | 1: Independent tank                      G: Gravity tank<br>2: Integral tank                            P: Pressure tank  |

\* Note by the Secretariat:

References to columns a through m in other chapters of the Code will be amended according to the column designations shown here.

|   |  |
|---|--|
| Tank vents<br>(column g)                    | Open: open venting<br>Cont: controlled venting<br>SR: safety relief valve  |
| Tank environmental<br>control<br>(column h) | Inert: Inerting (see 2.19.2(a))<br>Pad: Liquid or gas (2.12.2(b))<br>Dry: Drying (see 2.19.2(c))<br>Vent: Natural or forced (2.19.2(d))  |
| Electrical<br>requirements<br>(column i)    | St: Standard electrical systems (products having<br>a flashpoint exceeding 60°C (closed cup test)).<br>SP: Special requirements (products having a<br>flashpoint not exceeding 60°C (closed cup<br>test)).   |
| Gauging<br>(column j)                       | O: Open<br>R: Restricted<br>C: Closed  |
| Vapour detection<br>(column k)              | F: Flammable vapours<br>T: Toxic vapours   |
| Fire protection<br>(column l)               | A: Alcohol resistant foam<br>B: Regular foam. Encompasses all non-alcohol<br>resistant type foams including fluoroprotein<br>and aqueous film forming foam (AFFF)<br>C: Water-spray<br>D: Dry chemical<br>No: No special requirements under this Code. |

Fire-extinguishing media considered to be suitable  
for certain products are listed for information in  
column (i) of the summary of minimum requirements.

"No" indicates nil requirement.

| a   | b         | c                  | d       | e         | f         | g          | h                          | i                       | j       | k                | l               | m  |
|---|-----------|--------------------|---------|-----------|-----------|------------|----------------------------|-------------------------|---------|------------------|-----------------|--|
| Product name  | UN number | Pollution category | Hazards | Ship type | Tank type | Tank vents | Tank environmental control | Electrical requirements | Gauging | Vapour detection | Fire protection | Special requirement  |
| Acetic acid   | 2789      | C                  | S/P     | 3         | 2G        | Cont.      | No                         | SP                      | R       | F                | A               | 4.8.2 to 4.8.4,<br>4.8.6 to 4.8.8,<br>4.12.6, 4.17,<br>5.2.8 |
| Acetic anhydride  | 1715      | C                  | S/P     | 2         | 2G        | Cont.      | No                         | SP                      | R       | F-T              | A               | 4.8.2 to 4.8.4,<br>4.8.6 to 4.8.8,<br>4.12.6, 4.17           |
| Acetone cyanohydrin   | 1541      | A                  | S/P     | 2         | 2G        | Cont.      | No                         | St                      | C       | T                | A               | 4.4, 4.9, 4.12.6,<br>4.13, 4.14, 4.17,<br>4.18               |
| Acetonitrile  | 1648      | III                | S       | 2         | 2G        | Cont.      | No                         | SP                      | R       | F-T              | A               | 4.9  |
| Acrylamide solution<br>(50% or less)                          | 2074      | D                  | S       | 2         | 2G        | Open       | No                         | ST                      | C       | No               | No              | 4.9.3, 4.10, 4.14.1,<br>4.15.1, 4.18.1                       |
| Acrylic acid  | 2218      | D                  | S       | 3         | 2G        | Cont.      | No                         | SP                      | R       | F-T              | A               | 4.10, 4.12.6,<br>4.18.1                                      |
| Acrylonitrile   | 1093      | B                  | S/P     | 2         | 2G        | Cont.      | No                         | SP                      | C       | F-T              | A               | 4.9, 4.10, 4.12.3,<br>4.13.1, 4.14, 4.17                     |
| Adiponitrile  | 2205      | D                  | S       | 3         | 2G        | Cont.      | No                         | St                      | R       | T                | A               | -  |
| Alkyl acrylate -<br>vinyl pyridine<br>copolymer in<br>toluene |           | (C)                | P       | 3         | 2G        | Cont.      | No                         | SP                      | R       | F                | B               | 4.14.1   |

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| a   | b            | c   | d   | e | f  | g    | h  | i  | j | k   | l     | m   |
|---|--------------|-----|-----|---|----|------|----|----|---|-----|-------|---|
| Alkyl benzene sulphonic acid                  | 2584<br>2586 | C   | S/P | 3 | 2G | Open | No | St | O | No  | B     | -   |
| Allyl alcohol                                 | 1098         | B   | S/P | 2 | 2G | Cont | No | SP | C | F-T | A     | 4.9, 4.13.1, 4.14,<br>4.17                                |
| Allyl chloride                                | 1100         | B   | S/P | 2 | 2G | Cont | No | SP | C | F-T | A     | 4.9, 4.13.1, 4.14,<br>4.17                                |
| 2 (2-Aminoethoxy) ethanol                     | 3055         | D   | S   | 3 | 2G | Open | No | St | O | No  | A,C,D | 4.12.2, 4.14.1  |
| Aminoethyl ethanolamine                       |              | (D) | S   | 3 | 2G | Open | No | St | O | No  | A     | 4.12.1  |
| N-Aminoethyl piperazine                       | 2815         | D   | S   | 3 | 2G | Cont | No | St | R | T   | A,C,D | 4.12.2, 4.14.1  |
| Ammonia aqueous,<br>(28% or less)             | 2672<br>(O)  | C   | S/P | 3 | 2G | Cont | No | SP | R | T   | C     | 4.12.4, 4.12.9, 4.17 <sup>a</sup>                         |
| Ammonium nitrate<br>solution, (93% or less)   | 2426         | D   | S   | 2 | 1G | Open | No | St | O | No  | No    | 4.8.4, 4.8.6, 4.12.10,<br>4.13.2, 4.14.1, 4.19            |
| Ammonium sulphide -<br>solution (45% or less) | 2683         | B   | S/P | 2 | 2G | No   | No | SP | C | F-T | A,C   | 4.9, 4.11, 4.12.1,<br>4.13.1, 4.14, 4.15.1,<br>4.17, 4.18 |

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|---|-------------|---|-----|---|----|------|----|----|---|-----|-----|----------------------------------|
| m-Amyl acetate  | 1104        | C | P   | 3 | 2G | Cont | No | SP | R | F   | A   | 4.14.1                           |
| sec-Amyl acetate  | 1104        | C | P   | 3 | 2G | Cont | No | SP | R | F   | A   | 4.14.1                           |
| Amyl acetate,<br>commercial                                   | 1104        | C | P   | 3 | 2G | Cont | No | SP | R | F   | A   | 4.14.1                           |
| Aniline   | 1547        | C | S/P | 2 | 2G | Cont | No | St | C | T   | A   | 4.9, 4.13.1, 4.14,               |
| Benzene and mixtures<br>having 10% benzene<br>content or more | 1114<br>(r) | C | S/P | 3 | 2G | Cont | No | SP | R | F-T | B   | 4.9.1, 4.13.1, 5.2.8             |
| Benzenesulphonyl<br>chloride                                  | 2225        | D | S   | 3 | 2G | Cont | No | St | R | T   | B,D | 4.12.1, 4.14.1                   |
| Benzyl alcohol  |             | C | P   | 3 | 2G | Open | No | St | O | No  | A   |                                  |
| Benzyl chloride   | 1738        | B | S/P | 2 | 2G | Cont | No | St | C | T   | B   | 4.9, 4.10, 4.13.1,<br>4.14, 4.17 |
| n-Butyl acetate   | 1123        | C | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                           |

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|---|--------------|---|-----|---|----|------|-------|----|---|-----|--------|--|
| n-Butyl acrylate                                      | 2348         | D | S   | 2 | 2G | Cont | No    | SP | R | F-T | A      | 4.10, 4.18.1, 4.18.2                                   |
| Butylamine (all isomers)                              | 1125<br>1214 | C | S/P | 2 | 2G | Cont | No    | SP | R | F-T | A      | 4.9, 4.12.1, 4.12.2,<br>4.13.1, 4.14.1, 4.17           |
| Butyl benzyl phthalate                                |              | A | P   | 2 | 2G | Open | No    | St | O | No  | B      | 4.14.1   |
| Butyl/Decyl/Cetyl/<br>Ficosyl methacrylate<br>mixture |              | D | S   | 3 | 2G | Cont | No    | St | R | No  | A,C, D | 4.10, 4.18.1, 4.18.2                                   |
| n-Butyl ether   | 1149         | C | S/P | 3 | 2G | Cont | Inert | SP | R | F-T | A,D    | 4.2.7, 4.9   |
| Butyl methacrylate                                    |              | D | S   | 3 | 2G | Cont | No    | SP | R | F-T | A,D    | 4.10, 4.18.1, 4.18.2                                   |
| n-Butyraldehyde                                       | 1129         | B | S/P | 3 | 2G | Cont | No    | SP | O | F-T | A      | 4.15.1   |
| Butyric acid  | 2820         | B | S/P | 3 | 2G | Cont | No    | St | R | No  | A      | 4.8.2, 4.8.3, 4.8.4,<br>4.8.6, 4.8.7, 4.8.8,<br>4.12.6 |

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|------------------------------------|------|-----|-----|---|----|------|-------|----------|---|-----|-------|---|
| Calcium hypochlorite solution      |      | B   | SP  | 3 | 2G | Cont | No    | St       | R | No  | No    | 4.15.1  |
| Calcium naphthenate in mineral oil |      | A   | P   | 3 | 2G | Open | No    | St       | O | No  | B     |   |
| Camphor oil                        | 1130 | B   | S/P | 2 | 2G | Cont | No    | SP       | O | F   | B     | 4.14.1  |
| Carbolic oil                       |      | A   | S/P | 2 | 2G | Cont | No    | SP       | C | F-T | A     | 4.9, 4.14   |
| Carbon disulphide                  | 1131 | A   | S/P | 2 | 1G | Cont | Inert | Use None | C | F-T | C     | 4.1, 4.9, 4.14, 4.17  |
| Carbon tetrachloride               | 1846 | B   | S/P | 3 | 2G | Cont | No    | St       | C | T   | No    | 4.9, 4.13.1, 4.14.1, 4.17   |
| Cashew nut shell oil (untreated)   |      | D   | S   | 3 | 2G | Cont | No    | St       | R | T   | B     |   |
| Cetyl/Eicosyl methacrylate mixture |      | III | S   | 3 | 2G | Open | No    | St       | O | No  | A,C,D | 4.10, 4.18.1, 4.18.2  |
| Chloroacetic acid (80% or less)    | 1750 | C   | S/P | 2 | 2G | Cont | No    | St       | C | No  | No    | 4.8.2, 4.8.4, 4.8.6, 4.8.7, 4.8.8, 4.9.3, 4.12.6 (aluminium not permitted), 4.14, 5.2.8 |
| Chlorobenzene                      | 1134 | B   | S/P | 2 | 2G | Cont | No    | SP       | R | F-T | B     | 4.14.1  |

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|-----------------------------------|-------------|-----|-----|---|----|------|----|----|---|-----|-----|--|
| Chloroform                        | 1888        | B   | S/P | 3 | 2G | Cont | No | St | R | T   | No  | 4.9, 4.17                                  |
| Chlorohydrins, crude              |             | (D) | S   | 2 | 2G | Cont | No | SP | C | F-T | A   | 4.9, 4.14                                  |
| 2- or 3-Chloropropionic acid      | 2511<br>(k) | (C) | S/P | 3 | 2G | Open | No | St | O | No  | A   | 4.8.2 to 4.8.4, 4.8.6<br>to 4.8.8, 4.12.6  |
| Chlorosulphonic acid              | 1754        | C   | S/P | 1 | 2G | Cont | No | St | C | T   | No  | 4.8.2 to 4.8.8, 4.9,<br>4.14, 4.15.2, 4.17 |
| m-Chlorotoluene                   | 2238        | B   | S/P | 3 | 2G | Cont | No | SP | R | F-T | B,C |  |
| o-Chlorotoluene                   | 2238        | A   | S/P | 3 | 2G | Cont | No | SP | R | F-T | B,C |  |
| p-Chlorotoluene                   | 2238        | B   | S/P | 2 | 2G | Cont | No | SP | R | F-T | B,C | 4.14.1, 5.2.8                              |
| Chlorotoluenes<br>(mixed isomers) | 2238        | A   | S/P | 2 | 2G | Cont | No | SP | R | F-T | B,C | 4.14.1                                     |

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|--------------------------|------|-----|-----|---|----|------|----|----|---|-----|-----|---------------------------|
| Coal tar naphtha solvent |      | B   | S   | 3 | 2G | Cont | No | SP | R | F-T | A,D |                           |
| Creosote (coal tar)      |      | (C) | S/P | 3 | 2G | Open | No | St | O | No  | B,D |                           |
| Creosote (wood)          |      | A   | S/P | 2 | 2G | Open | No | St | O | No  | B,D | 4.14.1                    |
| Cresols (mixed isomers)  | 2076 | A   | S/P | 2 | 2G | Open | No | St | O | No  | B   | 4.14.1                    |
| Crotonaldehyde           | 1143 | B   | S/P | 2 | 2G | Cont | No | SP | R | F-T | A   | 4.9, 4.13.1, 4.15.1, 4.17 |
| Cyclohexane              | 1145 | C   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1, 5.2.8             |
| Cyclohexanol             |      | C   | P   | 3 | 2G | Open | No | St | O | No  | A   | 5.2.6, 5.2.8              |
| Cyclohexanone            | 1915 | D   | S   | 3 | 2G | Cont | No | SP | R | F-T | A   | 4.12.5                    |
| Cyclohexylamine          | 2357 | C   | S/P | 3 | 2G | Cont | No | SP | R | F-T | A,D | 4.12.1, 4.12.2            |
| p-Cymene                 | 2046 | C   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                    |
| Decene                   |      | B   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                    |

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|--------------------------------|------|---|-----|---|----|------|-----|----|---|-----|-------|---|
| Decyl acrylate                 |      | A | S/P | 2 | 2G | Open | No  | St | O | No  | D,A,C | 4.10, 4.12.2, 4.14.1,<br>4.18.1, 4.18.2 |
| Decyl alcohol<br>(all isomers) |      | B | P   | 3 | 2G | Open | No  | St | O | No  | B     | 5.2.8 (p)                               |
| Dibutylamine                   |      | C | S/P | 3 | 2G | Cont | No  | SP | R | F-T | B,D   | 4.12.4                                  |
| Dibutyl phthalate              |      | A | P   | 2 | 2G | Open | No  | St | O | No  | B     | 4.14.1                                  |
| o-Dichlorobenzene              | 1591 | B | S/P | 2 | 2G | Cont | No  | St | R | T   | B,D   | 4.12.5, 4.14.1                          |
| 1,1-Dichloroethane             | 2362 | B | S/P | 3 | 2G | Cont | No  | SP | R | F-T | B     | 4.17                                    |
| Dichloroethyl ether            | 1916 | B | S/P | 2 | 2G | Cont | No  | SP | R | F-T | A     | 4.12.5                                  |
| 2,2-Dichloroisopropyl<br>ether | 2490 | C | S/P | 2 | 2G | Cont | No  | St | R | T   | B,C,D | 4.9, 4.12.5, 4.13.1,<br>4.14            |
| 2,4-Dichlorophenol             | 2021 | A | S/P | 2 | 2G | Cont | Dry | St | R | T   | B,C,D | 4.12.1, 4.14.1                          |

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|---|------|-----|-----|---|----|------|-----|----|---|-----|-------|--|
| 2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution              |      | (A) | S/P | 3 | 2G | Open | No  | St | O | No  | No    | 14.12.1  |
| 2,4-Dichlorophenoxyacetic acid, dimethylamine salt (70% or less) solution |      | (A) | S/P | 3 | 2G | Open | No  | St | O | No  | No    | 14.12.1  |
| 2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt, solution        |      | (A) | S/P | 3 | 2G | Open | No  | St | O | No  | No    | 14.12.1  |
| 1,2-Dichloropropane   | 1279 | B   | S/P | 2 | 2G | Cont | No  | SP | R | F-T | B     | 4.9  |
| 1,3-Dichloropropane   |      | B   | S/P | 2 | 2G | Cont | No  | SP | R | F-T | B     | 4.9  |
| 1,3-Dichlorocyclohexene   | 2047 | P   | S/P | 2 | 2G | Cont | No  | SP | C | F-T | B     | 4.9, 4.13, 4.14, 4.17  |
| Dichloropropene/<br>Dichloropropane mixtures                              |      | B   | S/P | 2 | 2G | Cont | No  | SP | C | F-T | B,C,D | 4.9, 4.13, 4.14, 4.17  |
| 2,2-Dichloropropionic acid  |      | D   | S   | 3 | 2G | Cont | Dry | St | R | No  | A     | 4.8.2, 4.8.4, 4.8.6 to 4.8.8, 4.12.6 (aluminium not permitted) |
| Diethanolamine  |      | III | S   | 3 | 2G | Open | No  | St | O | No  | A     | 4.12.2   |

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|-----------------------------------|------|-----|-----|---|----|------|-------|----|---|-----|-------|-------------------------------|
| Diethylamine                      | 1154 | C   | S/P | 3 | 2G | Cont | No    | SP | R | F-T | A     | 4.12.1, 4.9, 4.17             |
| Diethylaminoethanol               | 2686 | C   | S/P | 3 | 2G | Cont | No    | SP | R | F-T | A,D   | 4.12.1, 4.12-2                |
| Diethylbenzene                    | 2049 | C   | P   | 3 | 2G | Cont | No    | SP | R | F   | B     | 4.14.1                        |
| Diethylene glycol methyl ether    |      | C   | P   | 3 | 2G | Open | No    | St | O | No  | A     |                               |
| Diethylenetriamine                | 2079 | (D) | S   | 3 | 2G | Open | No    | St | O | No  | A     | 4.12.2                        |
| Diethyl ether                     | 1155 | III | S   | 2 | 1G | Cont | Inert | SP | C | F-T | A     | 4.2, 4.11, 4.12.9, 4.14, 4.17 |
| Di-(2-ethylhexyl) phosphoric acid | 1902 | C   | S/P | 3 | 2G | Open | No    | St | O | No  | B,C,D | 4.12.2                        |
| Diethyl phthalate                 |      | C   | P   | 3 | 2G | Open | No    | St | O | No  | B     |                               |
| Diethyl sulphate                  | 1594 | (B) | S/P | 2 | 2G | Cont | No    | St | C | T   | A,D   | 4.12.3, 4.14.1                |
| Diglycidyl ether of Bisphenol A   |      | B   | P   | 3 | 2G | Open | No    | St | O | No  | B     |                               |
| Diisobutylamine                   | 2361 | (C) | S/P | 2 | 2G | Cont | No    | SP | R | F-T | B,D   | 4.9.3, 4.12.1, 4.14.1         |

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|--|------|---|-----|---|----|------|----|----|---|-----|-------|--|
| Diisobutylene  | 2050 | B | P   | 3 | 2G | Cont | No | SP | R | F   | B     | 4.14.1                                   |
| Diisobutyl phthalate   |      | B | P   | 3 | 2G | Open | No | St | O | No  | B     | 5.2.5                                    |
| Diisopropanolamine   |      | C | S/P | 3 | 2G | Open | No | St | O | No  | A     | 4.12.2, 5.2.6, 5.2.8                     |
| Diisopropylamine   | 1158 | C | S/P | 2 | 2G | Cont | No | SP | C | F-T | A     | 4.9, 4.12.2, 4.14,<br>4.17               |
| Diisopropylbenzene<br>(all isomers)                                      |      | A | P   | 2 | 2G | Open | No | St | O | No  | B     | 4.14.1                                   |
| Dimethylamine solution<br>(45% or less)                                  | 1160 | C | S/P | 3 | 2G | Cont | No | SP | R | F-T | C,D   | 4.9, 4.12.1, 4.17                        |
| Dimethylamine solution<br>(greater than 45% but<br>not greater than 55%) | 1160 | C | S/P | 2 | 2G | Cont | No | SP | C | F-T | A,C,D | 4.9, 4.12.1, 4.13.1,<br>4.14, 4.17       |
| Dimethylamine solution<br>(greater than 55% but<br>not greater than 65%) | 1160 | C | S/P | 2 | 2G | Cont | No | SP | C | F-T | A,C,D | 4.9, 4.11, 4.12.1,<br>4.13.1, 4.14, 4.17 |
| N,N-Dimethylcyclohexyl-<br>amine   | 2264 | C | S/P | 2 | 2G | Cont | No | SP | R | F-T | A,C   | 4.9, 4.12.1, 4.13.1,<br>4.14.1           |
| Dimethylethanolamine   | 2051 | D | S   | 3 | 2G | Cont | No | SP | R | F-T | A,D   | 4.12.2                                   |

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|--|------|-----|-----|---|-----------|------|-----|-----------------|---|----------------|---------------------|---|
| Dimethylformamide                            | 2265 | D   | S   | 3 | 2G        | Cont | No  | SP              | R | F-T            | A,D                 |   |
| Dimethyl hydrogen phosphite                  |      |     | S   | 3 | 2G        | Cont | No  | St              | R | T              | A,D                 | 4.9.1   |
| Dimethyl phthalate                           |      | C   | P   | 3 | 2G        | Open | No  | St              | O | No             | B                   |   |
| Dinitrotoluene (molten)                      |      | B   | S/P | 2 | 2G<br>(1) | Cont | No  | St              | C | T              | B                   | 4.9, 4.13.1, 4.14*,<br>5.2.5, 5.2.8, SA.2.2 (m)                 |
| 1,4-Dioxane                                  | 1165 | D   | S   | 2 | 2G        | Cont | No  | SP              | C | F-T            | A                   | 4.9, 4.14   |
| Dipentene                                    | 2052 | C   | P   | 3 | 2G        | Cont | No  | SP              | R | F              | B                   | 4.14.1  |
| Diphenyl ether                               |      | A   | P   | 3 | 2G        | Open | No  | St              | O | No             | B                   |   |
| Diphenylmethane diisocyanate                 | 2489 | (B) | S/P | 2 | 2G        | Cont | Dry | St <sup>b</sup> | C | T <sup>b</sup> | C <sup>c</sup><br>D | 4.9, 4.12.5, 4.13.1,<br>4.14.1, 4.15.2, 5.2.7,<br>5.2.8, SA.2.2 |
| Diphenyl oxide/Diphenyl phenyl ether mixture |      | A   | P   | 3 | 2G        | Open | No  | St              | O | No             | B                   |   |
| Di-n-propylamine                             | 2383 | C   | S/P | 3 | 2G        | Cont | No  | SP              | R | F-T            | A                   | 4.9.3, 4.12.2, 4.14.1   |

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|--|------|-----|-----|---|----|------|----|----|---|-----|-------|-------------------------------|
| Dodecene, all isomers                        |      | B   | P   | 3 | 2G | Open | No | St | O | No  | B     |                               |
| Dodecyl alcohol                              |      | B   | P   | 3 | 2G | Open | No | St | O | No  | B     | 5.2.5, 5.2.8<br>5A.2.2        |
| Dodecylbenzene                               |      | C   | P   | 3 | 2G | Open | No | St | O | No  | B     | 5.2.8                         |
| Dodecyl diphenyl oxide disulphonate solution |      | B   | S/P | 3 | 2G | Open | No | St | O | No  |       | 5.2.5, 5.2.8                  |
| Dodecyl methacrylate                         |      | III | S   | 3 | 2G | Open | No | St | O | No  | A,C   | 4.10                          |
| Dodecyl/Pentadecyl methacrylate mixture      |      | III | S   | 3 | 2G | Open | No | St | O | No  | A,C,D | 4.10, 4.18.1, 4.18.2          |
| Dodecyl phenol                               |      | A   | P   | 1 | 2G | Open | No | St | O | No  | B     | 4.14                          |
| Epichlorohydrin                              | 2023 | C   | S/P | 2 | 2G | Cont | No | SP | C | F-T | A     | 4.9, 4.13.1, 4.14, 4.17       |
| Ethanolamine                                 | 2491 | D   | S   | 3 | 2G | Open | No | St | O | F-T | A     | 4.12.2                        |
| 2-Ethoxyethyl acetate                        | 1172 | C   | P   | 3 | 2G | Cont | No | SP | R | F   | A     | 4.14.1                        |
| Ethyl acrylate                               | 1917 | B   | S/P | 2 | 2G | Cont | No | SP | R | F-T | A     | 4.10, 4.17, 4.18.1,<br>4.18.2 |

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| a   | b    | c   | d   | e | f  | g    | h     | i  | j | k   | l   | m  |
|---|------|-----|-----|---|----|------|-------|----|---|-----|-----|--|
| Ethylamine  |      | C   | S/P | 2 | 1G | Cont | No    | SP | C | F-T | C,D | 4.9, 4.11, 4.12.2,<br>4.17               |
| Ethylamine solutions,<br>(72% or less )   | 2270 | C   | S/P | 2 | 2G | Cont | No    | SP | C | F-T | A,C | 4.9, 4.11, 4.12.1,<br>4.13.1, 4.14, 4.17 |
| Ethyl benzene   | 1175 | C   | P   | 3 | 2G | Cont | No    | SP | R | F   | B   | 4.14.1                                   |
| N-Ethylbutylamine   |      | (C) | S/P | 3 | 2G | Cont | No    | SP | R | F-T | A   | 4.9.3, 4.12.1, 4.14.1                    |
| N-Ethylcyclohexylamine  |      | D   | S   | 3 | 2G | Cont | No    | SP | R | F-T | A,C | 4.12.1, 4.14.1                           |
| Ethylene chlorohydrin   | 1135 | C   | S/P | 2 | 2G | Cont | No    | SP | C | F-T | D   | 4.9, 4.13.1, 4.14, 4.17                  |
| Ethylene cyanohydrin  |      | (D) | S   | 3 | 2G | Open | No    | St | O | No  | A   |  |
| Ethylenediamine   | 1604 | C   | S/P | 2 | 2G | Cont | No    | SP | R | F-T | A   | 4.12.2, 5.2.8                            |
| Ethylene dibromide  | 1605 | B   | S/P | 2 | 2G | Cont | No    | St | C | T   | No  | 4.9, 4.14.1, 4.17,<br>5.2.8              |
| Ethylene dichloride   | 1184 | B   | S/P | 2 | 2G | Cont | No    | SP | R | F-T | B   | 4.12.4, 4.14.2                           |
| Ethylene oxide/Propylene<br>oxide mixture with an<br>ethylene content of not<br>more than 30% by weight | 2983 | D   | S   | 2 | 1G | Cont | Inert | SP | C | F-T | A,C | 4.7, 4.9, 4.11, 4.14                     |

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|---|-------------------|-----|-----|---|----|------|----|----|---|-----|----------|---|
| 2-Ethylhexyl acrylate                             |                   | D   | S   | 3 | 2G | Open | No | St | O | No  | A        | 4.10, 4.18.1, 4.18.2                            |
| 2-Ethylhexylamine                                 | 2276              | B   | S/P | 2 | 2G | Cont | No | SP | R | F-T | A        | 4.9, 4.12.2                                     |
| Ethylidene norbornene                             |                   | B   | S/P | 3 | 2G | Cont | No | SP | R | F-T | B,C<br>D | 4.9.1, 4.12.4, 4.14.1,<br>4.15.1                |
| Ethyl methacrylate                                | 2277              | (D) | S   | 3 | 2G | Cont | No | SP | R | F-T | B,D      | 4.10, 4.18.1, 4.18.2                            |
| 2-Ethyl-3-propylacrolein                          |                   | B   | S/P | 3 | 2G | Cont | No | SP | R | F-T | A        | 15.2.8  |
| Ethyltoluene                                      |                   | (B) | P   | 3 | 2G | Cont | No | SP | R | F   | A        | 4.14.1  |
| Fatty alcohols(C <sub>12</sub> -C <sub>20</sub> ) |                   | B   | P   | 3 | 2G | Open | No | St | O | No  | B        | 5.2.5, 5.2.6                                    |
| Formaldehyde solutions<br>(45% or less)           | 1198 <sup>d</sup> | C   | S/P | 3 | 2G | Cont | No | SP | R | F-T | A        | 4.15.1, 4.17 <sup>e</sup>                       |
| Formic acid                                       | 1779              | D   | S   | 3 | 2G | Cont | No | SP | R | T   | A        | 4.8.2 to 4.8.4, 4.8.6<br>to 4.8.8, 4.12.7, 4.17 |
| Fumaric adduct of rosin,<br>water dispersion      |                   | B   | P   | 3 | 2G | Open | No | St | O | No  | No       |   |

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|---|------|-----|-----|---|----|------|----|----|---|-----|-----|-----------------------|
| Furfural                                    | 1199 | C   | S/P | 3 | 2G | Cont | No | SP | R | F-T | A   | 4.15.1                |
| Furfuryl alcohol                            | 2874 | C   | P   | 3 | 2G | Open | No | St | O | No  | A   |                       |
| Glutaraldehyde solutions<br>(50% or less)   |      | D   | S   | 3 | 2G | Open | No | St | O | No  | No  | 4.15.1                |
| Glycidyl ester of<br>tridecylacetic<br>acid |      | B   | P   | 3 | 2G | Open | No | St | O | No  | B   |                       |
| Heptanol (all isomers)<br>(q)               |      | (C) | P   | 3 | 2G | Cont | No | SP | R | F   | A   | 4.14.1                |
| Heptene (mixed isomers)                     |      | C   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                |
| Heptyl acetate                              |      | (B) | P   | 3 | 2G | Open | No | St | O | No  | B   |                       |
| Hexamethylenediamine<br>solution            | 1783 | C   | S/P | 3 | 2G | Cont | No | St | R | T   | A   | 4.12.2, 4.14.1, 5.2.8 |
| Hexamethyleneimine                          | 2493 | C   | S/P | 2 | 2G | Cont | No | SP | R | F-T | A,C | 4.12.1, 4.12.2        |
| 1-Hexene                                    | 2370 | C   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                |
| Hexyl acetate                               | 1233 | B   | P   | 3 | 2G | Cont | No | SP | R | F   | B   | 4.14.1                |

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|---|--------------|---|-----|---|----|------|-----|----|---|-----|---------------------|-------------------------------------|
| Hydrochloric acid                                       | 1789         | D | S   | 3 | 1G | Cont | No  | St | R | T   | No                  | 4.8, 4.17 <sup>f</sup>              |
| Hydrogen peroxide solutions (over 60% but not over 70%) | 2015         | C | S/P | 2 | 2G | Cont | No  | St | C | No  | No                  | 4.14.1, 4.20.1 to 4.20.14           |
| Hydrogen peroxide solutions (over 8% but not over 60%)  | 2014<br>2984 | C | S/P | 3 | 2G | Cont | No  | St | C | No  | No                  | 4.13.2, 4.14.1, 4.20.15, 4.20.27    |
| 2-Hydroxyethyl acrylate                                 |              | B | S/P | 2 | 2G | Cont | No  | St | C | T   | A                   | 4.9, 4.10, 4.14.1, 4.18.1, 4.18.2   |
| Isoamyl acetate   | 1104         | C | P   | 3 | 2G | Cont | No  | SP | R | F   | A                   | 4.14.1                              |
| Isobutyl acetate  | 1213         | C | P   | 3 | 2G | Cont | No  | SP | R | F   | B                   | 4.14.1                              |
| Isobutyl acrylate                                       | 2527         | D | S   | 2 | 2G | Cont | No  | SP | R | F-T | A                   | 4.10, 4.18.1, 4.18.2                |
| Isobutyraldehyde  | 2045         | C | S/P | 3 | 2G | Cont | No  | SP | O | F-T | A                   | 4.15.1                              |
| Isophorone diamine                                      | 2289         | D | S   | 3 | 2G | Cont | No  | St | R | T   | A                   | 4.12.2                              |
| Isophorone diisocyanate                                 | 2290         | B | S/P | 2 | 2G | Cont | Dry | St | C | T   | C <sup>C</sup><br>D | 4.9, 4.12.5, 4.13.1, 4.14.1, 4.15.2 |

| a  | b    | c   | d   | e | f  | g    | h     | i  | j | k   | l                   | m  |
|--|------|-----|-----|---|----|------|-------|----|---|-----|---------------------|--|
| Isoprene                                       | 1218 | C   | S/P | 3 | 2G | Cont | No    | SP | R | F   | B                   | 4.10, 4.11, 4.18.1<br>4.18.2             |
| Isopropanolamine                               |      | C   | S/P | 3 | 2G | Open | No    | SP | O | F-T | A                   | 4.12.2                                   |
| Isopropylamine                                 | 1221 | C   | S/P | 2 | 2G | Cont | No    | SP | C | F-T | C,D                 | 4.9, 4.11, 4.12.2,<br>4.14, 4.17         |
| Isopropylbenzene                               | 1918 | B   | P   | 3 | 2G | Cont | No    | SP | R | F   | B                   | 4.14.1                                   |
| Isopropyl ether                                | 1159 | D   | S   | 3 | 2G | Cont | Inert | SP | R | F   | A                   | 4.2.7, 4.10.3, 4.14.1                    |
| Isovaleraldehyde                               | 2058 | C   | S/P | 3 | 2G | Cont | Inert | SP | R | F-T | A                   | 4.2.7, 4.15.1                            |
| Maleic anhydride                               | 2215 | D   | S   | 3 | 2G | Cont | No    | St | R | No  | A <sup>B</sup><br>C |  |
| Mercaptobenzothiazol,<br>sodium salt, solution |      | (B) | S/P | 3 | 2G | Open | No    | St | O | No  | No                  | 4.12.1, 5.2.8                            |
| Mesityl oxide                                  | 1229 | D   | S   | 3 | 2G | Cont | No    | SP | R | F-T | A                   | 4.14.1                                   |
| Methacrylic acid                               | 2531 | D   | S   | 3 | 2G | Cont | No    | St | R | T   | A                   | 4.10, 4.12.6, 4.18.1                     |
| Methacrylonitrile                              |      | (B) | S/P | 2 | 2G | Cont | No    | SP | C | F-T | A                   | 4.9, 4.10, 4.12.4,<br>4.13.1, 4.14, 4.17 |

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|---|------|-----|-----|---|----|------|----|----|---|-----|-------|------------------------------------|
| Methyl acrylate                         | 1919 | C   | S/P | 2 | 2G | Cont | No | SP | R | F-T | B     | 4.10, 4.17, 4.18.1,<br>4.18.2      |
| Methylamine solutions,<br>(42% or less) | 1235 | C   | S/P | 2 | 2G | Cont | No | SP | C | F-T | A,C,D | 4.9, 4.12.1, 4.13.1,<br>4.14, 4.17 |
| Methylamyl acetate                      | 1233 | (C) | P   | 3 | 2G | Cont | No | SP | R | F   | B     | 4.14.1                             |
| Methylamyl alcohol                      | 2053 | (C) | P   | 3 | 2G | Cont | No | SP | R | F   | A     | 4.14.1                             |
| Methyl amyl ketone                      | 1110 | (C) | P   | 3 | 2G | Cont | No | SP | R | F   | A     | 4.14.1                             |
| Methylene chloride                      | 1593 | D   | S   | 3 | 2G | Cont | No | St | R | T   | No    |                                    |
| 2-Methyl-6-ethyl-<br>aniline            |      | C   | S/P | 3 | 2G | Open | No | St | O | No  | B,C,D |                                    |
| 2-Methyl-5-ethyl-<br>pyridine           | 2300 | (B) | S/P | 3 | 2G | Open | No | St | O | No  | D     | 4.12.4                             |
| Methyl formate                          | 1243 | D   | S   | 2 | 2G | Cont | No | SP | R | F-T | A     | 4.9, 4.11, 4.14, 4.17              |
| 2-Methyl-2-hydroxy-<br>3-butyne         |      | III | S   | 3 | 2G | Cont | No | SP | R | F-T | A,C,D | 4.12.8, 4.14.1                     |

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|---------------------------------|------|-----|-----|---|----|------|----|----|---|-----|-------|--------------------------------|
| Methyl methacrylate             | 1247 | D   | S   | 2 | 2G | Cont | No | SP | R | F-T | B     | 4.10, 4.18.1, 4.18.2           |
| 2-Methyl-1-pentene              | 2288 | C   | P   | 3 | 2G | Cont | No | SP | R | F   | B     | 4.14.1                         |
| 2-Methylpyridine                | 2313 | B   | S/P | 2 | 2G | Cont | No | SP | C | F   | A,C   | 4.9.3, 4.12.4, 4.14<br>5.2.8   |
| 4-Methylpyridine                | 2313 | B   | S/P | 2 | 2G | Cont | No | SP | C | F-T | A,C,D | 4.9.3, 4.12.4, 4.14<br>5.2.8   |
| N-Methyl-2-pyrrolidone          |      | B   | P   | 3 | 2G | Open | No | St | O | No  | A     |                                |
| Methyl salicylate               |      | (B) | P   | 3 | 2G | Open | No | St | O | No  | B     |                                |
| alpha-Methylstyrene             | 2303 | A   | S/P | 2 | 2G | Cont | No | SP | R | F-T | D     | 4.10, 4.14.1, 4.18.1<br>4.18.2 |
| Morpholine                      | 2054 | D   | S   | 3 | 2G | Cont | No | SP | R | F   | A     | 4.12.2                         |
| Motor fuel anti-knock compounds | 1649 | A   | S/P | 2 | 1G | Cont | No | SP | C | F-T | C,B   | 4.6, 4.9, 4.13.2, 4.14<br>4.17 |
| Naphthalene (molten)            | 2304 | A   | S/P | 2 | 2G | Cont | No | SP | R | No  | A,D   | 4.14.1                         |
| Neodecanoic acid                |      | (B) | P   | 3 | 2G | Open | No | St | O | No  | B     |                                |

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|---|---------------------------|-----|-----|---|----|------|----|----|---|-----|------------|---------------------------------------|
| Nitrating acid (mixture of sulphuric and nitric acid) | 1796                      | (C) | S/P | 2 | 2G | Cont | No | St | C | T   | No         | 4.8, 4.13.1, 4.14, 4.15.2, 4.17       |
| Nitric acid (70% and over)                            | 2031<br>2032 <sup>n</sup> | C   | S/P | 2 | 2G | Cont | No | St | C | T   | No         | 4.8, 4.14, 4.17                       |
| Nitric acid (less than 70%)                           | 2031                      | C   | S/P | 2 | 2G | Cont | No | St | R | T   | No         | 4.8, 4.14, 4.17                       |
| Nitrobenzene  | 1662                      | B   | S/P | 2 | 2G | Cont | No | St | C | T   | D          | 4.9, 4.13, 4.14, 5.2.8                |
| o-Nitrochlorobenzene                                  | 1578                      | B   | S/P | 2 | 2G | Cont | No | St | C | T   | B,C,D      | 4.9, 4.13, 4.14, 5.2.5, 5.2.8, 5A.2.2 |
| o-Nitrophenol (molten)                                | 1663                      | B   | S/P | 2 | 2G | Cont | No | St | C | T   | A,C,D      | 4.9, 4.14.1, 5.2.5, 5.2.8, 5A.2.2     |
| 1- or 2-Nitropropane                                  | 2608                      | D   | S   | 3 | 2G | Cont | No | SP | R | F-T | A          |                                       |
| Nitropropane (60%)/ Nitroethane (40%) mixture         | 1993                      | D   | S   | 3 | 2G | Cont | No | SP | R | F-T | A,C<br>(n) | 4.12.4                                |
| (o- and p-) Nitro-toluenes                            | 1664                      | C   | S/P | 2 | 2G | Cont | No | St | C | T   | B          | 4.9, 4.13.1, 4.14, 5.2.8              |

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|--|------|---|-----|---|----|-------|----|----|---|-----|----|--|
| Nonene   |      | B | P   | 3 | 2G | Cont. | No | SP | R | F   | B  | 4.14.1   |
| Nonyl alcohol  |      | C | P   | 3 | 2G | Open  | No | St | O | No  | B  |  |
| Nonylphenol  |      | A | P   | 2 | 2G | Open  | No | St | O | No  | A  | 4.14.1   |
| Octanol (all isomers)                                    |      | C | P   | 3 | 2G | Open  | No | St | O | No  | B  |  |
| Octene (all isomers)                                     |      | B | P   | 3 | 2G | Cont. | No | SP | R | F   | B  | 4.14.1   |
| Olefins, straight chain mixtures                         |      | B | P   | 3 | 2G | Cont. | No | SP | R | F   | B  | 4.14.1, 5.2.5, 5.2.8                                     |
| alpha-Olefins (C <sub>6</sub> -C <sub>18</sub> mixtures) |      | B | P   | 3 | 2G | Cont. | No | SP | R | F   | B  | 4.14.1, 5.2.5, 5.2.8                                     |
| Oleum  | 1831 | C | S/P | 2 | 2G | Cont. | No | St | C | T   | No | 4.8.2 to 4.8.8, 4.9.1, 4.13.1, 4.14, 4.15.2, 4.17, 5.2.6 |
| Paraldehyde  | 1264 | C | S/P | 3 | 2G | Cont. | No | SP | R | F   | A  | 5.2.8  |
| Pentachloroethane  | 1669 | B | S/P | 2 | 2G | Cont. | No | St | R | T   | No | 4.9, 4.13.1, 4.14.1                                      |
| 1,3-Pentadiene   |      | C | S/P | 3 | 2G | Cont. | No | SP | R | F-T | B  | 4.10, 4.18   |

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|-------------------------------------|---------------------------|---|-----|---|----|------|--------------------------|----|---|----------------|---------------------|-----------------------------------|
| n-Pentane                           | 1265                      | C | P   | 3 | 2G | Cont | No                       | SP | R | F              | B                   | 4.14.1                            |
| Pentene, all isomers                |                           | C | P   | 3 | 2G | Cont | No                       | SP | R | F              | B                   | 4.14.1                            |
| Perchloroethylene                   | 1897                      | B | S/P | 3 | 2G | Cont | No                       | St | R | T              | No                  | 4.9.1, 4.9.2                      |
| Phenol                              | 2312                      | B | S/P | 2 | 2G | Cont | No                       | St | C | T              | A                   | 4.9, 4.14, 5.2.5<br>5.2.8, 5A.2.2 |
| 1-Phenyl-1-xylyl ethane             |                           | C | P   | 3 | 2G | Open | No                       | St | O | No             | B                   |                                   |
| Phosphoric acid                     | 1805                      | D | S   | 3 | 2G | Open | No                       | St | O | No             | No                  | 4.8.1 to 4.8.4, 4.8.6<br>to 4.8.8 |
| Phosphorus, yellow or white         | 2447                      | A | S/P | 1 | 1G | Cont | Pad + (vent<br>or inert) | St | C | No             | No                  | 4.5, 4.14, 4.17                   |
| Phthalic anhydride                  | 2214                      | C | S/P | 3 | 2G | Cont | No                       | St | R | No             | D                   | 5.2.8                             |
| Pinene                              | 2368                      | A | P   | 3 | 2G | Cont | No                       | SP | R | F              | B                   | 4.14.1                            |
| Polyethylene polyamines             | 2734 <sup>i</sup><br>2735 | C | S/P | 3 | 2G | Open | No                       | St | O | No             | A                   | 4.12.2, 5.2.8                     |
| Polymethylene polyphenyl isocyanate | 2206 <sup>i</sup><br>2207 | D | S   | 2 | 2G | Cont | Dry                      | St | C | T <sup>b</sup> | C <sup>c</sup><br>D | 4.9, 4.12.5, 4.14.1,<br>4.15.2    |

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|------------------------------|------|-----|-----|---|----|------|-------|----|---|-----|-----|--|
| Potassium hydroxide solution | 1814 | C   | S/P | 3 | 2G | Open | No    | St | O | No  | No  | 4.12.1 Copper, brass and bronze may be used, 5.2.8 |
| n-Propanolamine              |      | C   | S/P | 3 | 2G | Open | No    | St | O | No  | A,D | 4.12.2, 5.2.8                                      |
| beta-Propiolactone           |      | D   | S   | 2 | 2G | Cont | No    | St | R | T   | A   |  |
| Propionaldehyde              | 1275 | D   | S   | 3 | 2G | Cont | No    | SP | R | F-T | A   | 4.13.1, 4.15.1, 4.17                               |
| Propionic acid               | 1848 | D   | S   | 3 | 2G | Cont | No    | SP | R | F   | A   | 4.8.2 to 4.8.4, 4.8.6 to 4.8.8, 4.12.6, 4.17       |
| Propionic anhydride          | 2496 | C   | S/P | 3 | 2G | Cont | No    | St | R | T   | A   | 4.12.6   |
| Propionitrile                | 2404 | C   | S/P | 2 | 1G | Cont | No    | SP | C | F-T | A,D | 4.9, 4.13, 4.14, 4.17                              |
| n-Propylamine                | 1277 | C   | S/P | 2 | 2G | Cont | Inert | SP | C | F-T | C,D | 4.9, 4.12.2, 4.14, 4.17                            |
| Propylene dimer              |      | (C) | P   | 3 | 2G | Cont | No    | SP | R | F   | B   | 4.14.1   |
| Propylene oxide              | 1280 | D   | S   | 2 | 2G | Cont | Inert | SP | C | F-T | A,C | 4.7, 4.9.1, 4.11, 4.14                             |
| Propylene trimer             |      | B   | P   | 3 | 2G | Cont | No    | SP | R | F   | B   | 4.14.1   |

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CHEMICALS IN BULK (BCH CODE)  
adopted on 5 December 1985

| a   | b    | c   | d   | e | f  | g    | h                    | i  | j | k   | l   | m  |
|---|------|-----|-----|---|----|------|----------------------|----|---|-----|-----|--|
| Pyridine  | 1282 | B   | S/P | 3 | 2G | Cont | No                   | SP | R | F   | A   | 4.12.4   |
| Rosin   |      | A   | P   | 3 | 2G | Open | No                   | St | O | No  | B   |  |
| Rosin soap<br>(disproportionated<br>solution)                     |      | B   | P   | 3 | 2G | Open | No                   | St | O | No  | A   |  |
| Sodium borohydride,<br>(15% or less)/Sodium<br>hydroxide solution |      | C   | S/P | 3 | 2G | Open | No                   | St | O | No  | No  | 4.12.1, 5.2.6  |
| Sodium chlorate solution<br>(50% or less)                         |      | III | S   | 3 | 2G | Open | No                   | St | O | No  | No  | 4.14.1, 4.15.1, 4.21                                       |
| Sodium dichromate<br>solution, (70% or less)                      |      | B   | S/P | 2 | 2G | Open | No                   | St | C | No  | No  | 4.9.3, 4.12.2, 4.14  |
| Sodium hydrosulphide<br>solution, (45% or less)                   | 2949 | B   | S/P | 3 | 2G | Cont | Vent or<br>pad (gas) | St | R | T   | No  | 4.15.1, 5.2.8  |
| Sodium hydrosulphide<br>Ammonium sulphide<br>solution             |      | B   | S/P | 2 | 2G | Cont | No                   | SP | C | F-T | A,C | 4.9, 4.11, 4.12.1,<br>4.13.1, 4.14, 4.15.1,<br>4.17, 4.18, |

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| a   | b    | c   | d   | e | f  | g    | h                 | i  | j | k   | l  | m  |
|---|------|-----|-----|---|----|------|-------------------|----|---|-----|----|--|
| Sodium hydroxide solution                       | 1824 | D   | S   | 3 | 2G | Open | No                | St | O | No  | No | 4.12.1, Copper, brass and bronze may be used |
| Sodium hypochlorite solution, (15% or less)     |      | B   | S/P | 3 | 2G | Cont | No                | St | R | No  | No | 4.12.5, 4.15.1                               |
| Styrene monomer                                 | 2055 | B   | S/P | 3 | 2G | Cont | No                | SP | O | F   | B  | 4.10, 4.12.4, 4.18.1, 4.18.2                 |
| Sulphur (molten)                                | 2448 | III | S   | 3 | 1G | Open | Vent or pad (gas) | SP | O | F-T | No | 4.3  |
| Sulphuric acid                                  | 1830 | C   | S/P | 3 | 2G | Open | No                | St | O | No  | No | 4.8, 4.15.2, 5.2.7, 5.2.8                    |
| Sulphuric acid, spent                           | 1832 | C   | S/P | 3 | 2G | Open | No                | St | O | No  | No | 4.8, 4.15.2, 5.2.7, 5.2.8                    |
| Tall oil, crude and distilled                   |      | A   | P   | 3 | 2G | Open | No                | St | O | No  | B  |  |
| Tall oil fatty acid (resin acids less than 20%) |      | (C) | P   | 3 | 2G | Open | No                | St | O | No  | B  |  |
| Tall oil soap (disproportionated solution)      |      | B   | P   | 3 | 2G | Open | No                | St | O | No  | A  |  |

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| a                      | b    | c | d   | e | f  | g    | h   | i  | j | k   | l                   | m  |
|------------------------|------|---|-----|---|----|------|-----|----|---|-----|---------------------|--|
| Tetrachloroethane      | 1702 | B | S/P | 3 | 2G | Cont | No  | St | R | T   | No                  | 4.9, 4.13.1  |
| Tetraethylenepentamine | 2320 | D | S   | 3 | 2G | Open | No  | St | O | No  | A                   | 4.12.1   |
| Tetrahydrofuran        | 2056 | D | S   | 3 | 2G | Cont | No  | SP | R | F-T | A,D                 |  |
| Tetrahydronaphthalene  |      | C | P   | 3 | 2G | Open | No  | St | O | No  | B                   |  |
| Toluene                | 1294 | C | P   | 3 | 2G | Cont | No  | SP | R | F   | B                   | 4.14.1   |
| Toluenediamine         | 1709 | C | S/P | 2 | 2G | Cont | No  | St | C | T   | B,C,D               | 4.9, 4.12.1, 4.13.1,<br>4.14, 4.17                   |
| Toluene diisocyanate   | 2078 | C | S/P | 2 | 2G | Cont | Dry | St | C | F-T | C <sup>C</sup><br>D | 4.9, 4.12.4, 4.13.1,<br>4.14, 4.15.2, 4.17,<br>5.2.8 |
| o-Toluidine            | 1708 | C | S/P | 2 | 2G | Cont | No  | St | C | T   | A,C                 | 4.9, 4.13.1, 4.14                                    |
| Tributyl phosphate     |      | B | P   | 3 | 2G | Open | No  | St | O | No  | B                   |  |

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| a                                     | b    | c | d   | e | f  | g    | h  | i  | j | k   | l     | m                     |
|---------------------------------------|------|---|-----|---|----|------|----|----|---|-----|-------|-----------------------|
| 1,2,4-Trichlorobenzene                | 2321 | B | S/P | 2 | 2G | Cont | No | St | R | T   | C     | 4.14.1, 5.2.8, 5A.2.2 |
| 1,1,1-Trichloroethane                 | 2831 | B | P   | 3 | 2G | Open | No | St | O | No  | B     |                       |
| 1,1,2-Trichloroethane                 |      | B | S/P | 3 | 2G | Cont | No | St | R | T   | No    | 4.9.1                 |
| Trichloroethylene                     | 1710 | B | S/P | 3 | 2G | Cont | No | St | R | T   | No    | 4.9, 4.13.1, 4.15.1   |
| 1,2,3-Trichloropropane                |      | B | S/P | 2 | 2G | Cont | No | St | C | T   | B,C,D | 4.9, 4.13.1, 4.14     |
| 1,1,2-Trichloro-1,2,2-trifluoroethane |      | C | P   | 3 | 2G | Open | No | St | O | No  | No    |                       |
| Triethanolamine                       |      | D | S   | 3 | 2G | Open | No | St | O | No  | A     | 4.12.1                |
| Triethylamine                         | 1296 | C | S/P | 2 | 2G | Cont | No | SP | R | F-T | B     | 4.9, 4.12.2, 4.17     |
| Triethylbenzene                       |      | A | P   | 2 | 2G | Open | No | St | O | No  | B     | 4.14.1                |
| Triethylene tetramine                 | 2259 | D | S   | 3 | 2G | Open | No | St | O | No  | A     | 4.12.1                |
| Triethyl phosphite                    | 2323 |   | S   | 3 | 2G | Cont | No | SP | R | F-T | A,D   | 4.9.1                 |

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| a  | b                 | c   | d   | e | f  | g    | h   | i  | j | k   | l                | m                           |
|--|-------------------|-----|-----|---|----|------|-----|----|---|-----|------------------|-----------------------------|
| Trimethylacetic acid   |                   | D   | S   | 3 | 2G | Cont | No  | St | R | No  | A,C              | 4.8.2 to 4.8.8, 4.12.6      |
| 1,2,4-Trimethylbenzene   |                   | B   | P   | 3 | 2G | Cont | No  | SP | R | F   | B                | 4.14.1                      |
| Trimethylhexamethylene diamine (2,2,4- and 2,4,4-isomers)      | 2327              | (D) | S   | 3 | 2G | Open | No  | St | O | No  | A,C              | 4.12.1, 4.14.1              |
| Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4-isomers) | 2328              | B   | S/P | 2 | 2G | Cont | Dry | St | C | T   | A,C <sup>c</sup> | 4.9, 4.13.1, 4.14.1, 4.15.2 |
| 2,2,4-Trimethyl-1,3-Pentanediol-1-isobutyrate                  |                   | C   | P   | 3 | 2G | Open | No  | St | O | No  | B                |                             |
| Trimethyl phosphite  | 2329              |     | S   | 3 | 2G | Cont | No  | SP | R | F-T | A,D              | 4.9.1, 4.14.1, 4.15.2       |
| Tritolyl phosphate (containing less than 1% ortho-isomer)      |                   | A   | P   | 2 | 2G | Open | No  | St | O | No  | B                | 4.14.1                      |
| Tritolyl phosphate, (containing 1% or more ortho-isomer)       | 2574 <sup>j</sup> | A   | S/P | 1 | 2G | Cont | No  | St | C | No  | B                | 4.9.3, 4.14                 |
| Trixylyl phosphate   |                   | A   | P   | 1 | 2G | Open | No  | St | O | No  | B                | 4.14                        |

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| a  | b    | c | d   | e | f  | g    | h     | i  | j | k   | l | m   |
|--|------|---|-----|---|----|------|-------|----|---|-----|---|---|
| Turpentine   | 1299 | B | P   | 3 | 2G | Cont | No    | SP | R | F   | B | 4.14.1  |
| 1-Undecene   |      | B | P   | 3 | 2G | Open | No    | St | O | No  | B |   |
| Undecyl alcohol  |      | B | P   | 3 | 2G | Open | No    | St | O | No  | B | 5.2.5, 5.2.8, 5A.2.2 <sup>r</sup>                   |
| Urea, ammonium nitrate solution, (containing aqua ammonia) |      | C | S/P | 3 | 2G | Cont | No    | SP | R | T   | A | 4.12.4, 4.12.9                                      |
| n-Valeraldehyde  | 2058 | D | S   | 3 | 2G | Cont | Inert | SP | R | F-T | A | 4.2.7, 4.15.1                                       |
| Vinyl acetate  | 1301 | C | S/P | 3 | 2G | Cont | No    | SP | O | F   | A | 4.10, 4.18.1, 4.18.2                                |
| Vinyl ethyl ether  | 1302 | C | S/P | 2 | 1G | Cont | Inert | SP | C | F-T | A | 4.2, 4.10, 4.11, 4.12.8, 4.14, 4.17, 4.18.1, 4.18.2 |
| Vinylidene chloride  | 1303 | B | S/P | 2 | 2G | Cont | Inert | SP | R | F-T | B | 4.10, 4.11, 4.12.5, 4.17, 4.18.1, 4.18.2            |
| Vinyl neodecanoate   |      | C | S/P | 3 | 2G | Open | No    | St | O | No  | B | 4.10, 4.15.1, 4.18.1, 4.18.2                        |
| Vinyl toluene  | 2618 | A | S/P | 3 | 2G | Cont | No    | SP | R | F   | D | 4.10, 4.12.1, 4.14.1, 4.18.1, 4.18.2                |

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| a                                      | b    | c   | d   | e | f  | g    | h  | i  | j | k  | l | m                    |
|--|------|-----|-----|---|----|------|----|----|---|----|---|----------------------|
| White spirit, low<br>(15-20%) aromatic | 1300 | (B) | P   | 2 | 2G | Cont | No | SP | R | F  | B | 4.14.1               |
| Xylene                                 | 1307 | C   | P   | 3 | 2G | Cont | No | SP | R | F  | B | 4.14.1, 5.2.8        |
| Xylenol                                | 2261 | B   | S/P | 3 | 2G | Open | No | St | O | No | B | 5.2.5, 5.2.8, 5A.2.2 |

- a Provision 4.17 applies to ammonia aqueous, 28% or less but not below 10%.
- b If the product carried contains flammable solvents such that the flashpoint is not exceeding 60°C, then special electrical systems and a flammable vapour detector are to be provided.
- c Although water is suitable for extinguishing open air fires involving chemicals to which this footnote applies, water should not be allowed to contaminate closed tanks containing these chemicals because of the risk of hazardous gas generation.
- d UN number 1198 only applies if flashpoint is below 60°C c.c.
- e Provision 4.17 applies to formaldehyde solutions 45% or less, but not below 5%.
- f Provision 4.17 applies to hydrochloric acid not below 10%.
- g Dry chemical cannot be used because of the possibility of an explosion.
- h UN number 2032 assigned to red fuming nitric acid.
- i UN number depends on boiling point of substance.
- j UN number assigned to this substance containing more than 3% of ortho-isomer.
- k UN number only applies to 2-chloropropionic acid
- l Dinitrotoluene should not be carried in deck tanks.

- m Temperature sensors should be used to monitor the cargo pump temperature to detect overheating due to pump failures.
- n Dry chemical should not be used as a fire-fighting medium
- o UN number 2672 refers to 20-35%.
- p Applies to n-Decyl alcohol only.
- q Requirements are based on those isomers having a flashpoint of 60°C or less, some isomers have a flashpoint greater than 60°C, and therefore the requirements based on flammability would not apply to such isomers.
- r Provision 5A.2.2 applies to 1-undecyl alcohol only.

CHAPTER VII - LIST OF CHEMICALS TO WHICH  
THE CODE DOES NOT APPLY\*

The existing text of chapter VII is replaced by the following:

1 The following are products which are not considered to come within the scope of the Code. This list may be used as a guide in considering bulk carriage of products whose hazards have not yet been evaluated.

2 Although the products listed in this chapter fall outside the scope of the Code, the attention of Administrations is drawn to the fact that some safety precautions may be needed for their safe transportation. Accordingly Administrations should prescribe appropriate safety requirements.

| Chapter VII   | UN number |
|---|-----------|
| Acetone   | 1090      |
| Alcohols (C <sub>13</sub> and above)                                  | -         |
| Alkyl (C <sub>9</sub> -C <sub>17</sub> ) benzenes                     | -         |
| Aluminium sulphate solution   |           |
| Aminoethyl diethanolamine/<br>Aminoethyl ethanolamine, water solution |           |
| n-Amyl alcohol  | 1105      |
| sec-Amyl alcohol  | 1105      |
| tert-Amyl alcohol   | 1105      |
| Amyl alcohol, primary   | 1105      |
| Butene Oligomer   |           |
| sec-Butyl acetate   | 1123      |
| n-Butyl alcohol   | 1120      |
| sec-Butyl alcohol   | 1120      |
| tert-Butyl alcohol  | 1120      |

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\* The product names are not always identical with the names given in the various editions of the Bulk Chemical Code (resolution A.212(VII)) or the International Bulk Chemical Code (resolution MSC.4(48)).

| Chapter VII  | UN number |
|--|-----------|
| Butylene glycol  | -         |
| $\gamma$ -Butyrolactone  | -         |
| Butyl stearate   | -         |
| Calcium alkyl salicylate   | -         |
| Calcium bromide solution   | -         |
| Calcium chloride solution  | -         |
| Caprolactam (molten or aqueous solutions)                        | -         |
| Choline chloride solutions                                       | -         |
| Coconut oil fatty acid methyl ester                              | -         |
| Dextrose solution  | -         |
| Diacetone alcohol  | 1148      |
| Dialkyl (C <sub>7</sub> -C <sub>13</sub> ) phthalates            | -         |
| Dicyclopentadiene  | 2048      |
| Diethylene glycol  | -         |
| Diethylene glycol butyl ether                                    | -         |
| Diethylene glycol butyl ether acetate                            | -         |
| Diethylene glycol dibutyl ether                                  | -         |
| Diethylene glycol diethyl ether                                  | -         |
| Diethylene glycol ethyl ether                                    | -         |
| Diethylene glycol ethyl ether acetate                            | -         |
| Diethylene glycol methyl ether acetate                           | -         |
| Diethylenetriamine pentaacetic acid<br>pentasodium salt solution | -         |
| Di-(2-ethyl hexyl) adipate                                       | -         |
| Di-(2-ethyl hexyl) phthalate                                     | -         |
| Dibetyl phthalate  | -         |
| Dihexyl phthalate  | -         |

| Chapter VII   | UN number |
|---|-----------|
| Diisobutyl ketone   | 1157      |
| Diisodecyl phthalate  | -         |
| Diisononyl adipate  | -         |
| Dinonyl phthalate (all isomers)                               | -         |
| Diisooctyl phthalate  | -         |
| Diisopropyl naphthalene                                       | -         |
| 2,2-Dimethyloctanoic acid                                     | -         |
| Dioctyl phthalate   | -         |
| Dipropylene glycol  | -         |
| Dipropylene glycol methyl ether                               | -         |
| Diundecyl phthalate   | -         |
| Dodecane (all isomers)  | -         |
| 2-Ethoxyethanol   | 1171      |
| Ethyl acetate   | 1173      |
| Ethyl acetoacetate  | -         |
| Ethyl alcohol   | 1170      |
| Ethylcyclohexane  | -         |
| Ethylene carbonate  | -         |
| Ethylenediamine tetraacetic acid<br>tetrasodium salt solution | -         |
| Ethylene glycol   | -         |
| Ethylene glycol butyl ether                                   | 2369      |
| Ethylene glycol butyl ether acetate                           | -         |
| Ethylene glycol methyl butyl ether                            | -         |
| Ethylene glycol methyl ether                                  | 1188      |
| Ethylene glycol methyl ether acetate                          | 1189      |
| Ethylene glycol phenyl ether                                  | -         |

| Chapter VII  | UN number |
|--|-----------|
| Ethylene glycol tert-butyl ether   | -         |
| Ethylene glycol phenyl ether/<br>Diethylene glycol phenyl ether mixture      | -         |
| 2-Ethylhexanoic acid   | -         |
| Formamide  | -         |
| Ethylene/Vinyl acetate copolymer (emulsion)                                  | -         |
| Glycerin   | -         |
| Glycine, sodium salt, solution   | -         |
| Ground nut oil   | -         |
| n-Heptane  | 1206      |
| Hexamethylene diamine adipate,<br>(50% in water)                             | -         |
| n-Hexane   | 1208      |
| 1-Hexanol  | 2282      |
| Hexylene glycol  | -         |
| N-(Hydroxyethyl) ethylenediamine triacetic<br>acid, trisodium salt, solution | -         |
| Isoamyl alcohol  | 1105      |
| Isobutyl alcohol   | 1212      |
| Isobutyl formate   | 2393      |
| Isododecane  | -         |
| Isopentane   | 1265      |
| Isopentene   | 2371      |
| Isophorone   | -         |
| Isopropyl acetate  | 1220      |
| Isopropyl alcohol  | 1219      |
| Lactic acid  | -         |

| Chapter VII                                       | UN number |
|---|-----------|
| Latex:  |           |
| Styrene butadiene rubber latex                    | -         |
| Carboxylated styrene-butadiene copolymer          | -         |
| Lignin sulphonic acid, salt (low COD)             | -         |
| Magnesium chloride solution                       | -         |
| Magnesium hydroxide slurry                        | -         |
| 3-Methoxy-1-butanol                               | -         |
| 3-Methoxyl butyl acetate                          | -         |
| Methyl acetate                                    | 1231      |
| Methyl alcohol                                    | 1230      |
| Methyl tert-butyl ether                           | 2398      |
| Methyl ethyl ketone                               | 1193      |
| Methyl isobutyl ketone                            | 1245      |
| 3-Methyl-3-methoxy butanol                        | -         |
| 3-Methyl-3-methoxy butyl acetate                  | -         |
| Molasses  | -         |
| Nonane  | 1920      |
| Oleic acid  | -         |
| Octane  | 1262      |
| Olefins (C <sub>13</sub> and above, all isomers)  | -         |
| alpha-Olefins (C <sub>16</sub> -C <sub>18</sub> ) | -         |
| n-Paraffins (C <sub>10</sub> -C <sub>20</sub> )   | -         |
| Paraffin wax                                      | -         |
| Petrolatum  | -         |
| Petroleum naphtha                                 | 1255      |
| Polyaluminium chloride solution                   | -         |
| Polybutene  | -         |
| Polyethylene glycol                               | -         |

| Chapter VII                                | UN number |
|--|-----------|
| Polyethylene glycol dimethyl ether         | -         |
| Polypropylene glycol                       | -         |
| Polypropylene glycol methyl ether          | -         |
| Polysiloxane                               | -         |
| n-Propyl acetate                           | 1276      |
| n-Propyl alcohol                           | 1274      |
| Propylene glycol                           | -         |
| Propylene glycol ethyl ether               | -         |
| Propylene glycol methyl ether              | -         |
| Propylene tetramer                         | 2580      |
| Sodium aluminosilicate slurry              | -         |
| Sulpholane                                 | -         |
| Tridecanol                                 | -         |
| Triethylene glycol                         | -         |
| Triethylene glycol butyl ether             | -         |
| Triisopropanolamine                        | -         |
| Trimethylol propane<br>polyethoxylate      | -         |
| Tripropylene glycol                        | -         |
| Tripropylene glycol monomethyl ether       | -         |
| Urea solution                              | -         |
| Urea, ammonium nitrate solution            | -         |
| Urea, ammonium phosphate solution          | -         |
| Urea resin solution                        | -         |
| Vegetable oil (those not otherwise listed) | -         |
| Vegetable protein hydrolyzed solution      | -         |
| Wine                                       | -         |

APPENDIX

MODEL FORM OF CERTIFICATE OF FITNESS FOR THE  
CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Existing form of the Certificate is replaced by the following:

CERTIFICATE OF FITNESS FOR THE CARRIAGE OF  
DANGEROUS CHEMICALS IN BULK

(Official seal)

Issued in pursuance of the  
IMO CODE FOR THE CONSTRUCTION AND EQUIPMENT  
OF SHIPS CARRYING DANGEROUS CHEMICALS IN BULK

(resolution MEPC 20(22))1/

under the authority of the Government of

.....  
(full official designation of country)

by

.....  
(full official designation of the competent  
person or organization recognized by the  
Administration)

| Name of ship | Distinctive number or letters | Port of registry | Gross tonnage | Ship type (Code paragraph 2.2.4) <sup>2/</sup> |
|--------------|-------------------------------|------------------|---------------|--|
|              |                               |                  |               |  |

Date on which keel was laid or on which the ship was at a similar stage of construction, or (in the case of a converted ship) date on which conversion to chemical tanker was commenced: .....

Date on which the building contract was placed: .....

.....  
The Certificate should be drawn up in the official language of the issuing country. If the language used is neither English nor French, the text should include a translation into one of these languages.

THIS IS TO CERTIFY:

- 1 (i) That the ship has been surveyed in accordance with the provisions of section 1.6 of the Code;
- (ii) that the survey showed that the construction and equipment of the ship:
  - \* (a) complied with the relevant provisions of the Code applicable to ships referred to in 1.7.2;
  - \* (b) complied with the provisions of the Code applicable to ships referred to in 1.7.3.
- 2 That the ship has been provided with a manual in accordance with the standards for procedures and arrangements as called for by Regulation 5, 5A and 8 of Annex II of MARPOL 73/78, and that the arrangements and equipment of the ship prescribed in the manual are in all respects satisfactory and comply with the applicable requirements of the said Standards;
- 3 That the ship is suitable for the carriage in bulk of the following products provided that all relevant operational provisions of the Code are observed

| Products <u>3/4/</u>  | Conditions of carriage <u>5/6/</u><br>(tank numbers etc.) |
|---|---|
|   |   |
| <p>* Continued on the annexed signed and dated sheet(s) numbered 1A</p> <p>* Tank numbers referred to in this list are identified on the annexed signed and dated tank plan numbered 2A</p> |   |

- 4 That, in accordance with 1.7.3/2.2.5\* the provisions of the Code are modified in respect of the ship in the following manner:
- 5 That the ship must be loaded:
- \*(a) in accordance with the loading conditions provided in the approved loading manual, stamped and dated .....  
and signed by a responsible officer of the Administration, or of an organization recognized by the Administration;
  - \*(b) in accordance with the loading limitations appended to this Certificate.

Where it is required to load the ship other than in accordance with the above instruction, then the necessary calculations to justify the proposed loading conditions should be communicated to the certifying Administration who may authorize in writing the adoption of the proposed loading condition.\*\*

- 6 This certificate is valid until .....  
subject to surveys in accordance with 1.6 of the Code

Issued at ..... 18  
(place of issue of Certificate)

The undersigned declares that he is duly authorized by the said Government to issue this Certificate.

.....  
(signature of official issuing  
the certificate and/or seal of  
issuing authority)

Notes on completion of Certificate:

- 1/ The Certificate can be issued only to ships entitled to fly the flags of States which are Parties to MARPOL 73/78.
- 2/ Ship type: Any entry under this column must relate to all relevant recommendations, e.g. an entry "Type II" should mean Type II in all respects prescribed by the Code. This column would not usually apply in the case of an existing ship and in such a case should be noted "See paragraph 1(ii)(b)."

\* Delete as appropriate.

\*\* Instead of being incorporated in the Certificate, this text may be appended to the Certificate if duly signed and stamped.

- 3/ Products: Products listed in Chapter VI of the Code, or which have been evaluated by the Administration in accordance with 1.8 of the Code, should be listed. In respect of the latter "new" products, any special requirements provisionally prescribed should be noted.
- 4/ Products: The list of products the ship is suitable to carry should include the noxious liquid substances of Category D which are not covered by the Code and should be identified as "Chapter VII Category D".
- 5/ Conditions of carriage: The limitations on the carriage of Category B or Category C substances under 5A.2 of the Code should also be indicated.
- 6/ Conditions of carriage: If a Certificate is issued to a ship which is modified in accordance with the provision of Regulation 1(12) of Annex II to MARPOL 73/78 the Certificate should indicate in the top of the table of products and conditions of carriage the following statement: "This ship is certificated to carry only pollution hazard chemicals"

ENDORSEMENT FOR ANNUAL AND INTERMEDIATE SURVEYS

THIS IS TO CERTIFY that at a survey required by 1.6 of the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, the ship was found to comply with the relevant provisions of the Code.

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

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

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

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

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

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

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

Place: .....

Date: .....

(seal or stamp of the Authority, as appropriate)

—  
\* Delete at appropriate

ATTACHMENT 1 TO THE INTERNATIONAL CERTIFICATE OF FITNESS  
FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Continued list of products to those specified in  
Section 3, and their conditions of carriage

| Products | Conditions of carriage<br>(tank numbers, etc.) |
|----------|--|
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |
|          |  |

Date .....  
(as for Certificate)

.....  
(Signature of official issuing the  
Certificate and/or seal of  
issuing authority)

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ANNEX 6  
Resolution MEPC.20(22)  
ADOPTION OF THE CODE FOR THE CONSTRUCTION  
AND OF SHIPS CARRYING DANGEROUS  
CHEMICALS IN BULK (BCH CODE)  
adopted on 5 December 1985