

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

ANNEX 5

Resolution MEPC 19(22)

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

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THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

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

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

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

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

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

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

1. ADOPTS the IBC Code, the text of which is given in the Annex to the present resolution;
2. INVITES the Maritime Safety Committee to consider the adoption of corresponding amendments to the IBC Code (resolution MSC.4(48)) in accordance with the provisions of Article VIII of the 1974 SOLAS Convention as soon as the 1983 amendments to the 1974 SOLAS Convention enter into force;
3. REQUEST the Secretary-General to transmit a copy of the present resolution together with the text of the IBC Code to all Members of the Organization and to all Parties to the 1978 Protocol which are not Members of the Organization.

ANNEX

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

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

Preamble

Paragraph 1

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

Paragraph 2

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

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

Paragraphs 9 and 10

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

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

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

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

#### 1.1 Application

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

1.1.2A New paragraph 1.1.2A is added as follows:

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

1.1.2B New paragraph 1.1.2B is added as follows:

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

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

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

## 1.2 Hazards

### 1.2.6 New paragraph 1.2.6 is added as follows:

"1.2.6 Marine pollution hazard as defined by

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

## 1.3 Definitions

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

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

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

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

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

## 4 Equivalents

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

## 1.5 Surveys and certification

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

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

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

## 2.6 Location of cargo tanks

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

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

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

## 3.1 Cargo segregation

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

15.8 The existing section 15.8 is replaced by the following:

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

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

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

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

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

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

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

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

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

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

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

Spirally-wound stainless steel, with a filler of PTFE or similar fluorinated polymer, may be accepted by the Administration.

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

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

- .1 Neoprene or natural rubber, if it comes into contact with the products.
- .2 Asbestos, or binders used with asbestos.
- .3 Materials containing oxides of magnesium, such as mineral wools.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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\* See 15.8.22.1

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

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

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

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

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

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

$V$  = volume of the tank

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

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

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

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\* See 15.8.22.1



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

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

15.8.29 A water spray system of sufficient capacity should be provided to blanket effectively the area surrounding the loading manifold, the exposed deck piping associated with product handling, and the tank domes. The arrangement of piping and nozzles should be such as to give a uniform distribution rate of  $10 \text{ l/m}^2 \text{ min}$ . 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.

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

## 16.2 Cargo information

Following new paragraphs 16.2.6, 16.2.7, 16.2.8 and 16.2.9 and a footnote for paragraph 16.2.8 are added to the existing texts:

"16.2.6 Where column "m" in the table of chapter 17 refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

16.2.7 Where column "m" in the table of chapter 17 refers to this paragraph, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 60 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 60 mPa.s should be specified in the shipping document.

16.2.8 Where column "m" in the table of chapter 17 refers to this paragraph and the possibility exists that it will be unloaded within a Special Area\*, the cargo's viscosity at 20°C should be specified on a shipping document and if the cargo's viscosity exceeds 25 mPa.s at 20°C, the temperature at which the cargo has a viscosity of 25 mPa.s should be specified in the shipping document.

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

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

16A New Chapter 16A is added to the existing text as follows:

"CHAPTER 16A - ADDITIONAL MEASURES FOR THE PROTECTION  
OF THE MARINE ENVIRONMENT

16A.1 GENERAL

16A.1.1 The requirements of this chapter apply to ships carrying products noted as Category A, B or C noxious liquid substances in chapter 17.

16A.2 CONDITION OF CARRIAGE

16A.2.1 The condition of carriage for products listed in the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk should reflect the requirements of regulation 5A of Annex II of MARPOL 73/78.

16A.2.2 A Category B substance with a melting point equal to or greater than 15°C should not be carried in a cargo tank any boundary of which is formed by the ship's shell plating and should only be carried in a cargo tank fitted with a cargo heating system.

16A.3 PROCEDURES AND ARRANGEMENTS MANUAL

16A.3.1 Each ship should be provided with a Procedures and Arrangements Manual developed for the ship in accordance with the provisions of the Standards for the Procedures and Arrangements and approved by the Administration.

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

Existing text of chapter 17 is replaced by the following:

CHAPTER 17 - SUMMARY OF MINIMUM REQUIREMENTS

EXPLANATORY NOTES\*

Product name (column a)	The product names are not identical with the names given in previous issues of the Code, or the IBC Code for explanation see index of chemicals.
UN number (column b)	The number relating to each product shown in the recommendations proposed by the United Nations Committee of Experts on the Transport of Dangerous Goods. UN numbers, where available, are given for information only.
Pollution category (column c)	The letter A, B, C or D means the pollution category assigned to each product under Annex II of MARPOL 73/78. "III" means the product was evaluated and found to fall outside the categories A, B, C or D.
Hazards (column d)	S means that the product is included in the Code because of its safety hazards; P means that the product is included in the Code because of its pollution hazards; and S/P means that the product is included in the Code because of both its safety and pollution hazards.
Ship type (column e)	1 = ship type 1 (2.1.2) 2 = ship type 2 (2.1.2) 3 = ship type 3 (2.1.2)
Tank type (column f)	1 = independent tank (4.1.1) 2 = integral tank (4.1.2) G = gravity tank (4.1.3) P = pressure tank (4.1.4)

\* Note by the Secretariat:

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

Tank vents (column g)	Open: open venting Cont: controlled venting SR: safety relief valve
Tank environmental control* (column h)	Inert: inerting (9.1.2.1) Pad: liquid or gas (9.1.2.2) Dry: drying (9.1.2.3) Vent: natural or forced (9.1.2.4)
Electrical equipment (column i)	T1 to T6 temperature classes** IIA, IIB or IIC apparatus groups** NF: non-flammable product (10.1.6) Yes: flashpoint exceeding 60°C (closed cup test) (10.1.6) No: flashing point not exceeding 60°C (closed cup test) (10.1.6)
Gauging (column j)	O: open gauging (13.1.1.1) R: restricted gauging (13.1.1.2) C: closed gauging (13.1.1.3) I: indirect gauging (13.1.1.3)
Vapour detection* (column k)	F: flammable vapours T: toxic vapours
Fire protection (column l)	A: alcohol-resistant foam B: regular foam, encompasses all foams that are not of an alcohol-resistant type, including fluoroprotein and aqueous-film-forming foam (AFFF) C: water-spray D: dry chemical No: no special requirements under this Code
Materials of construction (column m)	N: see 6.2.2 Z: see 6.2.3 Y: see 6.2.4 A blank indicates no special guidance given for materials of construction
Respiratory and eye protection* (column n)	E: see 14.2.8

\* "No" indicates nil requirements.

\*\* Temperature classes and apparatus groups as defined in International Electrotechnical Commission Publication 79 (part 1, appendix D, parts 4, 8 and 12). A blank indicates that data are currently not available.

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Product Name	UN Number	Pollution Category	Hazards	Ship Type	Tank Type	Tank Vents	Tank Environmental Control	Electrical Equipment			Gauging	Vapour Detection	Fire Protection	Materials of Construction	Respiratory and Eye Protection	Special Requirements (see Chapter 15)
								Class	Group	Flashpoint > 60°C						
a	b	c	d	e	f	g	h	i	i'	i''	j	k	l	m	n	o
Acetic acid	2789	C	S/P	3	2G	Cont.	No	T1	IIA	No	R	F	A	Y1, Z	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8, 16.2.9
Acetic anhydride	1715	C	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A	Y1	E	15.11.2 to 15.11.4, 15.11.6 to 15.11.8
Acetone cyanhydrin	1541	A	S/P	2	2G	Cont.	No	T1	IIA	Yes	C	T	A	Y1	E	15.1, 15.12, 15.17 to 15.19, 16.6
Acetonitrile	1648	III	S	2	2G	Cont.	No	T2	IIA	No	R	F-T	A		No	15.12
Acrylamide solution, (50% or less)	2074	D	S	2	2G	Open	No	NF			C	No	No		No	15.12.3, 15.13, 15.16.1, 15.19.6, 16.6.1
Acrylic acid	2218	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	Y1	No	15.13, 16.6.1
Acrylonitrile	1093	B	S/P	2	2G	Cont.	No	T1	IIB	No	C	F-T	A	N3, Z	E	15.12, 15.13, 15.17, 15.19
Adiponitrile	2205	D	S	3	2G	Cont.	No		IIB	Yes	R	T	A		No	
Alkyl acrylate vinyl pyridine copolymer in toluene		(C)	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Alkyl benzene sulphonic acid	2584 2586	C	S/P	3	2G	Open	No			Yes	0	No	B		No	
Allyl alcohol	1098	B	S/P	2	2G	Cont.	No	T2	IIB	No	C	F-T	A		E	15.12, 15.17, 15.19
Allyl chloride	1100	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A		E	15.12, 15.17, 15.19
2-(2-Aminoethoxy)ethanol	3055	D	S	3	2G	Open	No			Yes	0	No	A,C, D	N2	No	15.19.6
Aminoethyl ethanolamine		(D)	S	3	2G	Open	No	T2	IIA	Yes	0	No	A	N1	No	
N-Aminoethyl piperazine	2815	D	S	3	2G	Cont.	No			Yes	R	T	A,C, D	N2	No	15.19.6
Ammonia aqueous, (28% or less)	2672 (m)	C	S/P	3	2G	Cont.	No		NF		R	T	C	N4	E(a)	
Ammonium nitrate solution, (93% or less)	2426	D	S	2	1G	Open	No		NF		0	No	No	Y4	No	15.2, 15.11.4, 15.11.6, 15.18, 15.19.6
Ammonium sulphide solution (45% or less)	2683	B	S/P	2	2G	Cont.	No	-	-	No	C	F-T	A,C	NI	E	15.12, 15.14, 15.16.1, 15.17, 15.19



ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
n-Amyl acetate	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
sec-Amyl acetate	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Amyl acetate, commercial	1104	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Aniline	1547	C	S/P	2	2G	Cont.	No	TI	IIA	Yes	C	T	A		No	15.12, 15.17, 15.19,
Benzene and mixtures having 10% benzene content or more	1114(t)	C	S/P	3	2G	Cont.	No	TI	IIA	No	R	F-T	B		No	15.12.1, 15.17, 16.2.9
Benzenesulphonyl chloride	2225	D	S	3	2G	Cont.	No			Yes	R	T	B,D	NI	No	15.19.6
Benzyl alcohol		C	P	3	2G	Open	No			Yes	O	No	A =		No	
Benzyl chloride	1738	B	S/P	2	2G	Cont.	No	TI	IIA	Yes	C	T	B		E	15.12, 15.13, 15.17, 15.19
n-Butyl acetate	1123	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6



ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
n-Butyl acrylate	2348	D	S	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		No	15.13, 16.6.1, 16.6.2
Butylamine (all isomers)	1125 1214	C	S/P	2	2G	Cont.	No			No	R	F-T	A	NI	E	15.12, 15.17, 15.19.6
Butyl benzyl phthalate		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
Butyl/Decyl/Cetyl/ Eicosyl methacrylate mixture		D	S	3	2G	Cont.	No				R	No	A,C, D		No	15.13, 16.6.1, 16.6.2
n-Butyl ether	1149	C	S/P	3	2G	Cont.	Inert	T4	IIB	No	R	F-T	A,D		No	15.4.6, 15.12
Butyl methacrylate		D	S	3	2G	Cont.	No		IIA	No	R	F-T	A,D		No	15.13, 16.6.1, 16.6.2
n-Butyraldehyde	1129	B	S/P	3	2G	Cont.	No	T3	IIA	No	O	F-T	A		No	15.16.1
Butyric acid	2820	B	S/P	3	2G	Cont.	No			Yes	R	No	A	YI	No	15.11.2, 15.11.3, 15.11.4, 15.11.6, 15.11.7, 15.11.8

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o		
Calcium hypochlorite solution		B	S/P	3	2G	Cont.	No	NF			R	No	No	N5	No	15.16.1
Calcium naphthenate in mineral oil		A	P	3	2G	Cont.	No			Yes	O	No	A		No	
Camphor oil	1130	B	S/P	2	2G	Cont.	No		IIA	No	O	F	B		No	15.19.6
Carbolic oil		A	S/P	2	2G	Cont.	No			Yes	C	F-T	A		No	15.12, 15.19
Carbon disulphide	1131	A	S/P	2	1G	Cont.	Pad+ inert	T5	IIC	No	C	F-T	C		E	15.3, 15.12, 15.15, 15.19
Carbon tetrachloride	1846	B	S/P	3	2G	Cont.	No	NF			C	T	No	Z	E	15.12, 15.17, 15.19.6
Cashew nut shell oil (untreated)		D	S	3	2G	Cont.	No			Yes	R	T	B		No	
Cetyl/Eicosyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A,C, D		No	15.13, 16.6.1, 16.6.2
Chloroacetic acid (80% or less)	1750	C	S/P	2	2G	Cont.	No	NF			C	No	No	Y5	No	15.11.2, 15.11.4, 15.11.6, 15.11.7, 15.11.8, 15.12.3, 15.19, 16.2.9
Chlorobenzene	1134	B	S/P	2	2G	Cont.	No	T1	IIA	No	R	F-T	B		No	15.19.6
Chloroform	1888	B	S/P	3	2G	Cont.	No	NF			R	T	No		E	15.12
Chlorohydrins, crude		(D)	S	2	2G	Cont.	No		IIA	No	C	F-T	A		No	15.12, 15.19

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
o-Chloronitrobenzene	1578	B	S/P	2	2G	Cont.	No			Yes	C	T	B,C,D		No	15.12, 15.17 to 15.19 16.2.6, 16.2.9, 16A.2.2
2- or 3-Chloro- propionic acid	2511 (n)	(C)	S/P	3	2G	Open	No			Yes	O	No	A	YI	No	15.11.2 to 15.11.4, 15.11.6 to 15.11.8
Chlorosulphonic acid	1754	C	S/P	1	2G	Cont.	No	NF			C	T	No		E	15.11.2 to 15.11.8, 15.12, 15.16.2, 15.19
m-Chlorotoluene	2238	B	S/P	3	2G	Cont.	No			No	R	F-T	B,C		No	
o-Chlorotoluene	2238	A	S/P	3	2G	Cont.	No			No	R	F-T	B,C		No	
p-Chlorotoluene	2238	B	S/P	2	2G	Cont.	No			No	R	F-T	B,C		No	15.19.6, 16.2.9
Chlorotoluenes (mixed isomers)	2238	A	S/P	2	2G	Cont.	No			No	R	F-T	B,C		No	15.19.6,
Coal tar naphtha solvent		B	S	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,D		No	
Creosote (coal tar)		(C)	S/P	3	2G	Open	No	T2	IIA	Yes	O	No	B,D		No	

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Creosote (wood)		A	S/P	2	2G	Open	No	T2	IIA	Yes	O	No	B,D		No	15.19.6
Cresols (mixed isomers)	2076	A	S/P	2	2G	Open	No	T1	IIA	Yes	O	No	B		No	15.19.6
Crotonaldehyde	1143	B	S/P	2	2G	Cont.	No	T3	IIB	No	R	F-T	A		E	15.12, 15.16.1, 15.17
Cyclohexane	1145	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6, 16.2.9
Cyclohexanol		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.7, 16.2.9
Cyclohexanone	1915	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	NS	No	
Cyclohexylamine	2357	C	S/P	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,D	NI	No	
p-Cymene	2046	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Decene		B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Decyl acrylate		A	S/P	2	2G	Open	No	T3	IIA	Yes	O	No	A,C,D	N2	No	15.13, 15.19.6, 16.6.1, 16.6.2
Decyl alcohol (all isomers)		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.9 <sup>(s)</sup>
Dibutylamine		C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	B,D	N4	No	
Dibutyl phthalate		A	P	2	2G	Open	No			Yes	O	No	A		No	15.19.6
o-Dichlorobenzene	1591	B	S/P	2	2G	Cont.	No	T1	IIA	Yes	R	T	B,D	N5	No	15.19.6
1,1-Dichloroethane	2362	B	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	B		E	
Dichloroethyl ether	1916	B	S/P	2	2G	Cont.	No	T2	IIA	No	R	F-T	A	N5	No	
2,2-Dichloroisopropyl ether	2490	C	S/P	2	2G	Cont.	No			Yes	R	T	B,C, D	N5	No	15.12, 15.17, 15.19
2,4-Dichlorophenol	2021	A	S/P	2	2G	Cont.	Dry	NF			R	T	B,C, D	N1	No	15.19.6
2,4-Dichlorophenoxy- acetic acid, dieth- anolamine salt solution		(A)	S/P	3	2G	Open	No	NF			O	No	No	N1	No	



ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
2,4-Dichlorophenoxyacetic acid, dimethylamine salt (70% or less) solution		(A)	S/P	3	2G	Open	No	NF			0	No	No	N1	No	
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution		(A)	S/P	3	2G	Open	No	NF			0	No	No	N1	No	
1,2-Dichloropropane	1279	B	S/P	2	2G	Cont.	No	T1	IIA	No	R	F-T	B	Z	No	15.12
1,3-Dichloropropane		B	S/P	2	2G	Cont.	No	T1	IIA	No	R	F-T	B		No	15.12
1,3-Dichloropropene	2047	B	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	B		E	15.12, 15.17 to 15.19
Dichloropropene/Di-chloropropane mixtures		B	S/P	2	2G	Cont.	No			No	C	F-T	B,C,D		E	15.12, 15.17 to 15.19
2,2-Dichloropropionic acid		D	S	3	2G	Cont.	Dry			Yes	R	No	A	Y5	No	15.11.2, 15.11.4, 15.11.6, 15.11.8
Diethanolamine		III	S	3	2G	Open	No	T1	IIA	Yes	0	No	A	N2	No	
Diethylamine	1154	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A	N1	E	15.12

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1983

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Diethylaminoethanol	2686	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	A,D	N1	No	
Diethylbenzene	2049	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Diethylene glycol methyl ether		C	P	3	2G	Open	No			Yes	O	No	A		No	
Diethylenetriamine	2079	(D)	S	3	2G	Open	No	T2	IIA	Yes	O	No	A	N2	No	
Diethyl ether	1155	III	S	2	1G	Cont.	Inert	T4	IIB	No	C	F-T	A	N7	E	15.4, 15.14, 15.15, 15.19
Di-(2-ethylhexyl) phosphoric acid	1902	C	S/P	3	2G	Open	No			Yes	O	No	B,C, D	N2	No	
Diethyl phthalate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Diethyl sulphate	1594	(B)	S/P	2	2G	Cont.	No			Yes	C	T	A,D	N3	No	15.19.6
Diglycidyl ether of Bisphenol A		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.9
Diisobutylamine	2361	(C)	S/P	2	2G	Cont.	No			No	R	F-T	B,D	N1	No	15.12.3, 15.19.6
Diisobutylene	2050	B	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i	i'	j	k	l	m	n	o	
Diisobutyl phthalate		B	P	3	2G	Open	No			Yes	0	No	A		No	16.2.6
Diisopropanolamine		C	S/P	3	2G	Open	No	T2	IIA	Yes	0	No	A = N2	No		16.2.7, 16.2.9
Diisopropylamine	1158	C	S/P	2	2G	Cont.	No	T2	IIA	No	C	F-T	A	N2	E	15.12, 15.19
Diisopropylbenzene (all isomers)		A	P	2	2G	Open	No			Yes	0	No	A		No	15.19.6
Dimethylamine solution (45% or less)	1160	C	S/P	3	2G	Cont.	No	T2	IIA	No	R	F-T	C,D	N1	E	15.12
Dimethylamine solution (greater than 45% but not greater than 55%)	1160	C	S/P	2	2G	Cont.	No			No	C	F-T	A,C, D	N1	E	15.12, 15.17, 15.19
Dimethylamine solution (greater than 55% but not greater than 65%)	1160	C	S/P	2	2G	Cont.	No			No	C	F-T	A,C, D	N1	E	15.12, 15.14, 15.17, 15.19
N,N-Dimethylcyclo- hexylamine	2264	C	S/P	2	2G	Cont.	No			No	R	F-T	A,C	N1	No	15.12, 15.17, 15.19.6
Dimethylethanolamine	2051	D	S	3	2G	Cont.	No	T3	IIA	No	R	F-T	A,D	N2	No	
Dimethylformamide	2265	D	S	3	2G	Cont.	No	T2	IIA	No	R	F-T	A,D		No	
Dimethyl hydrogen phosphite			S	3	2G	Cont.	No			Yes	R	T	A,D		No	15.12.1



ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS

IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i	i'	i''	j	k	l	m	n	o
Dimethyl phthalate		C	P	3	2G	Open	No			Yes	O	No	A		No	
Dinitrotoluene (molten)	1600	B	S/P	2	2G (o)	Cont.	No			Yes	C	T	A		No	15.12, 15.17, 15.19, 16.2.6, 16.2.9, 16A.2.2(p)
1,4-Dioxane	1165	D	S	2	2G	Cont.	No	T4	ITB	No	C	F-T	A		No	15.12, 15.19
Dipentene	2052	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Diphenyl ether		A	P	3	2G	Open	No			Yes	O	No	A		No	
Diphenylmethane diisocyanate	2489	(B)	S/P	2	2G	Cont.	Dry			No (b)	C	T(b)	C(c) D	N5	No	15.12, 15.16.2, 15.17, 15.19.6, 16.2.6, 16.2.9, 16A.2.2
Diphenyl oxide/Biphenyl phenyl ether mixture		A	P	3	2G	Open	No			Yes	O	No	A		No	
Di-n-propylamine	2383	C	S/P	3	2G	Cont.	No			No	R	F-T	A	N2	No	15.12.3, 15.19.6
Dodecene (all isomers)		B	P	3	2G	Open	No			Yes	O	No	A		No	
Dodecyl alcohol		B	P	3	2G	Open	No			Yes	O	No	A		No	16.2.6, 16.2.9, 16A.2.2
Dodecyl benzene		C	P	3	2G	Open	No			Yes	O	No	A		No	16.2.9

ANNEX 5  
Resolution MEPC 19(22)  
ADOPTION OF THE INTERNATIONAL CODE FOR THE CONSTRUCTION AND  
EQUIPMENT OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK (IBC CODE)  
adopted on 5 December 1985

a	b	c	d	e	f	g	h	i'	i''	i'''	j	k	l	m	n	o
Dodecyl diphenyl oxide disulphonate solution		B	S/P	3	2G	Open	No		NF		O	No	No		No	16.2.6, 16.2.9
Dodecyl methacrylate		III	S	3	2G	Open	No			Yes	O	No	A,C		No	15.13
Dodecyl/Pentadecyl methacrylate mixture		III	S	3	2G	Open	No			Yes	O	No	A,C,D		No	15.13, 16.6.1, 16.6.2
Dodecyl phenol		A	P	1	2G	Open	No			Yes	O	No	A		No	15.19
Epichlorohydrin	2023	C	S/P	2	2G	Cont.	No		IIB	No	C	F-T	A		E	15.12, 15.17, 15.19
Ethanolamine	2491	D	S	3	2G	Open	No	T2	IIA	Yes	O	F-T	A	N2	No	
2-Ethoxyethyl acetate	1172	C	P	3	2G	Cont.	No			No	R	F	A		No	15.19.6
Ethyl acrylate	1917	B	S/P	2	2G	Cont.	No	T2	IIB	No	R	F-T	A		E	15.13, 16.6.1, 16.6.2
Ethylamine	1036	C	S/P	2	1G	Cont.	No	T2	IIA	No	C	F-T	C,D	N2	E	15.12, 15.14